Dayananda Sagar University Bengaluru

Dayananda Sagar is backed by a Six-Decade Legacy in Education & Healthcare

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Samshodhana Sagara

2020 - 2021

Book of Research Abstracts

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Dedications

Founders who crafted our Institutions

Late Shri. R. Dayananda Sagar

Dayananda Sagar Institution is named in honour of its founder president Late Shri R Dayananda Sagar. He was a great, confident leader who saw no reason why, as an Indian, he could not provide education for all sections of society. Best known for his pivotal role in setting up the Mahatma Gandhi Vidya Peetha Education Trust (MGVP), Late Shri R Dayananda Sagar also played an important role in the education sector of the emerging India.

Late Smt. Chandramma Sagar

Wife of the founder, Late Smt Chandramma Sagar was a Doctor by profession - a Triple FRCS from London, Edinburgh and Glasgow. She was in the panel of Doctors for the President of India.

Editorial Committee

- Dr.M.K Banga, Professor & Dean-Research, DSU.
- Dr. Srinivas A, Professor & Dean, School of Engineering (SOE).
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- Dr. V Murugan, Professor & Principal, College of Pharmaceutical Sciences, School of Allied Health Sciences.
- Dr. Vijay Kumar, Professor & Principal, College of Physiotherapy, School of Allied Health Sciences.
- Dr. Anupama G, Asst.Registrar, Research Cell, DSU.

Message from the Hon. Chancellor

Dayananda Sagar University (DSU) continues to pursue the spirit of facilitating human excellence through higher education and its consistent efforts have been recognized many times earlier and which also continued in 2020-2021 with the Times Business Awards as the Best Emerging University.

This year, at the 5th Convocation of the University, the second batch of doctoral scholars who have successfully cleared the requirements for the award of doctorate degrees will be conferred their degrees. The research and consultancy endeavor of DSU continues with its focus on funded research projects with grants from Central & State Government organizations, consultancies in collaboration with various companies, patent applications and research publications done in National/International Journals & Conferences.

Samshodhana Sagara 2020-21, the Book of Research Abstracts compiles the research conducted by the faculty members, research scholars and students at DSU during the last Academic year. The research culture of DSU encourages all to continue their passionate and intellectual efforts to contribute to the enhancement of knowledge in their respective domains.

All the Best!

Dr. D. Hemachandra Sagar
Chancellor – Dayananda Sagar University

Message from the Hon. Pro Chancellor

At Dayananda Sagar University(DSU) we are committed to the focus on research and generating intellectual patents, by upholding the highest standards of research ethics. Research focus enables the creation of knowledge and influence the expansion of the body of knowledge for the sustainable welfare of humanity, environment and the planet. Importance of knowledge creation necessitates the creation & utilization of suitable resources that facilitates conduct of research in the most appropriate manner. DSU is proud to award doctorate degrees to its second batch of research scholars in the year 2021 and the awardees will be receiving their degrees at the forthcoming 5th Convocation of the University.

Alongwith the conduct of research, the dissemination of research outcomes, undertaken with utmost care and focus on upholding the highest standards of ethics, is necessary to ensure that knowledge creation initiated in a domain can motivate further developments by researchers whose intellectual curiosity encourages them to develop, extend and pursue novel ideas, discover and explore new research aspects while simultaneously working on collaborative & funding opportunities for the conduct of suitable interdisciplinary and multidisciplinary research that benefit all nationally and internationally. Our annual publication of of '**Samshodhana Sagara 2020-2021'** is an

effort in the direction towards highlighting and disseminating the research endeavors of our University Faculty members, researchers and students.

Accreditation & Global rankings for Universities and Higher Educational Institutions mandate monitoring various research output parameters along with teaching and learning outcomes. The present edition of '**Samshodhana Sagara 2020-2021',** DSU's annual publication of the Book of Abstracts, is a compilation of the research work done during the period August 01, 2020 to July 31, 2021. This edition also showcases the IPs generated by our faculty members and research scholars during the period.

Dr. D. Premachandra Sagar
Pro Chancellor –Dayananda Sagar University

Message from the Hon. Vice Chancellor

At the outset I would like to take this opportunity to thank the BOG, BOM, AC, RIC and FC of Dayananda Sagar University (DSU) for their support and guidance in our continuous endeavor to create excellence at the University. We would like to gratefully acknowledge the encouragement and support received from Dr. D. Hemachandra Sagar (Hon'ble Chancellor of DSU and Chairman of MGVPT) and Dr. D. Premachandra Sagar (Hon'ble Pro Chancellor of DSU and Vice Chairman of MGVPT), Ms. Tintisha Sagar (BOG member and Joint Secretary of MGVPT), Mr. Rohan Sagar (BOG member and Joint Secretary of MGVPT), Mr. Galiswamy (Secretary of MGVPT), Prof. H.P.Khincha (DSU Evangelist) and Mr. K. Jairaj (DSU Advisor and Former Additional Chief Secretary of GOK) in achieving this success.

Dayananda Sagar University (DSU), established by Mahatma Gandhi Vidya Peetha (MGVP) Trust under Karnataka Act No 20 of 2013, is a State Private University that started its programs of study from the academic year 2015-16. DSU is being mentored and nurtured by its visionary Hon'ble Chancellor Dr. Hemachandra Sagar and proactive Hon'ble Pro Chancellor Dr. Premachandra Sagar who both are highly qualified. DSU offers UG and PG in addition to PhD programs at present in the areas of Engineering, Commerce, Management, Applied Science, Health Science and Arts as well as Humanities. Offering high quality education to the students by providing world-class infrastructure, industry partnered innovation labs, qualified faculty, employability oriented curriculum and ample opportunities for learning to become competent professionals in their fields of specialization has been the tradition of DSU.

DSU encourages research among its faculty and students by providing the requisite support in creating high-end research facilities, providing research seed grant, supporting conference travel, organizing conferences, and the filing of patents

DSU has been bringing out a book of research activities (named as **"Samshodhana Sagara"**) to record the research achievements. This book contains the research accomplishments of Academic Year i.e., August 01, 2020 to July 31, 2021. The year has been a moderately good year for DSU as it could accomplish 138 International and 17 national Journal publications, 22 International and 42 national Conference papers, 16 book chapters, securing 16 patents, working on 12 sponsored projects and 2 consulting assignments. We have recorded all these accomplishments in '**Samshodhana Sagara 2020-2021'** and determined to achieve higher quality research accomplishments in the years to come to ensure a unique position for DSU in higher education sector of the country.

I am delighted, as Vice-Chancellor of DSU, to place before you all the edition of '**Samshodhana Sagara 2020-2021'**. We remain highly obliged, as ever, to receive your valuable feedback and inputs for scaling up the high quality research activities at DSU.

Dr. K.N. Balasubramanya Murthy,
Vice Chancellor - Dayananda Sagar University

Foreword by the Registrar

All our efforts are especially dedicated to our respected and beloved Founders, Late Shri R Dayananda Sagar and Late Smt. Dr. Chandramma Sagar. We are also thankful to the Management of DSU for their continuous support and guidance. As a University we remain strongly committed to the spirit of facilitating human excellence through higher education and conduct of research upholding the highest standards of research ethics for the benefit of all stakeholders. This year during DSU's 5th Convocation, the second batch of doctoral scholars who have successfully defended their Ph.D Thesis and Viva-Voce will receive their degrees.

Dayananda Sagar University(DSU) remains strongly committed to the focus on research and our annual publication, '**Samshodhana Sagara 2020-2021',** is a compilation of the abstracts of research publications, patents, on-going funded projects and consultancy assignments that have been done by the Faculty Members and Research Scholars at DSU during the period of 1st August'2020 to 31st July'2021.

The present edition of '**Samshodhana Sagara 2020-2021'** highlights 172 abstracts of publications and sixteen patents that resulted from the research work conducted by our Faculty Members and Research Scholars belonging to different Schools of DSU i.e. the School of Engineering , School of Basic & Applied Sciences, School of Allied Health Sciences, School of Medicine, School of Commerce and Management, School of Arts, Design & Humanities which were successfully published in various reputed International & National Journals, presented at various International & National Conferences, selected as Book Chapters & accepted for Patents. The book also lists eleven on-going funded projects & two consultancy & training assignments of DSU.

'**Samshodhana Sagara 2020-2021'** thus celebrates the annual research related accomplishments of the University's Faculty and Research Scholars.

Dr.Puttamadappa C,
Registrar-Dayananda Sagar University

From the Editorial Board

This Edition of '**Samshodhana Sagara 2020-21'** is dedicated to Late Barrister Shri R. Dayananda Sagar and his better half, Late Smt. Dr. Chandramma Sagar, triple FRCS from London, Edinburg and Glasgow, the founders of Mahatma Gandhi Vidya Peetha Trust, on the eve of Centenary Celebrations of Late Barrister Shri R. Dayananda Sagar. We take this opportunity to thank, Dr. D Hemachandra Sagar, the Chancellor and Dr. D Premachandra Sagar, Pro-Chancellor who have been very supportive in bringing out this Edition and approving the same. Our sincere thanks are due to Prof. K N Balasubramanya Murthy, our Hon. Vice Chancellor who insists on only quality publication without exception and his encouragement in every stage of bringing out this Edition. We also thank Prof. R. Janardhan and Prof. K. Muthuchelian, the Pro Vice Chancellors for their help in this initiative. We thank profusely Prof. Puttamadappa C, the Registrar, for his constant support in various initiatives taken up by the Research Cell.

It gives me immense gratification to release the 6th Edition of '**Samshodhana Sagara 2020-21'**, the collection of research publications, patents and the research abstracts at various conference proceedings in International and National conferences during the Academic Year 2020-2021. We have attempted to include only such publications which are published in peer reviewed journals. Books and Book chapters published by the faculty members in International Publications are also made part of 'Samshodhana Sagara'. This collection also provides the list of Research projects which are funded by DST, SERB/DST, DBT, GST and other funding agencies. There are 155 publications in International and National Journals, 64 International & National Conference presentations, 18 Book Chapters and 16 Patent Publications. There are twelve on-going Projects and two Consultancy & Training assignments for the year.

I thank all my colleagues in the Editorial Board from various Departments, Colleges and Schools who have helped us in editing this collection and bringing out this Edition. We sincerely hope that more quality publications are accomplished by our faculty members and research scholars in the years ahead.

We will be thankful for any feedbacks and suggestions for improving the quality and look and feel of 'Samshodhana Sagara' in the future.

Dr. M K Banga,
Dean Research - Dayananda Sagar University.

For Editorial Board.

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CSENB-01	**K.Krishna Sowjanya ,** V.K.Agrawal	UNSTRUCTURED DATA TO STRUCTURED DATA: A STUDY	Glimpses of Engineering and Technology in the Modern World ISBN: 978-81-942052-7-2, pages 126-132 (2020)	117
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CSENB-03	**Shaila SG**, Monish L, Rajlaxmi Patil	Book: Challenges and Opportunities for the Convergence of IoT, Big Data, and Cloud Computing	IGI Global ISBN13: 9781799831112, Pages 265-276, DOI: 10.4018/978-1-7998-3111-2.ch015	118
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SCHOOL OF ARTS, DESIGN & HUMANITIES
INTERNATIONAL JOURNAL PUBLICATION

I n d e x

School Of Engineering
PATENT PUBLICATION

ID	Author(s)	Title of the Patent	Publication Details	Page No.
DSUP -01	Dr. B.P Pradeep Kumar Dr. Pramod Kochanalli Biligiri Rangaiah, **Dr.Pushpa mala Siddaraju,** Mr. Dhanraj Saravana Bavan, Dr. Sunilkumar Siddaramappa Manvi, Mr. Nirmalkumar Siddappa Benni, Praveen Kochanalli Biligiri Rangaiah	System And Method For Enabling A Power Divider Based On Edge Coupled Microstrip Lines	Intellectual Property India, Application Number: 202041036103; Application Type: Ordinary; Date Of Publication: 04-09-2020	277
DSUP -02	**Dr. R.G. Babukarthik,** Mr. S. Vignesh	Cloud Based Web Service Selection: Huddle Particle Swarm Optimization System And Method Thereof.	Intellectual Property India, Application Number: 202041039561; Application Type: Ordinary; Date Of Publication: 25-09-2020	278
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DSUP -06	Dr. Manoj Hanaji Manjunathappa, Mr. Rajeev Kamal, Dr. Pradeep Kumar B.P, **Ms**. **Pushpa Mala Siddaraju**, Dr. Anil Kumar Chandrashekar, Dr. Surendiran J, Mr. Dhanraj Saravana Bavan, Mr. Abdul Saleem, Dr. Pramod	A System And Method For Preemies Monitoring	Intellectual Property India, Application Number: 201941040472; Application Type: Ordinary; Date Of Publication: 09-04-2021	280

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DSUP -07	**Dr Rajesh T M**, Dr.Narasimha Murthy M S, Dr.Kamalakshi Naganna, Dr. Deepa. S.R, **Dr Vaibhav A Meshram**, **Lavanya B Koppal**, Dr. Dayanand Lal N, Mrs.Neeta K S Mrs.Neeta K, Mrs.Vaishali B Kosamkar, Dr.Chethana Sridhar, Dr.Piyush Kumar Pareek	Method For Plant Disease Detection Using Machine Learning And Methods Thereof	Intellectual Property India, Application Number: 202141010619; Application Type: Ordinary; Date Of Publication: 19-03-2021	281
DSUP -08	Madiajagan M, Anand Shukla, T. Subramani, Jaishri Gothania, Swapnil M Parikh, Dr. Khalid Mohammad Kaleem, Nitin Purohit, Parvendra Kumar, **R.G. Babukarthik,** Rituraj Jain, Kiran Kumar Chandriah	A Multi-Faceted Optimization Algorithm For Deep Learning Alternative To Gradient Descent	Australian Government Ip Australia, Patent Number: 2021100738; Application Type: Ordinary; Date Of Publication: 06-02-2021	282
DSUP -09	Mr Praveen Kulkarni, **Dr. Rajesh T M**, **Dr Shaila S G**, Dr Pritee Parwekar, Dr Piyush Kumar Pareek	Grading Of Facial Emotions Using Multimodal Approach	Intellectual Property India, Application Number: 202141020173; Application Type: Ordinary; Date Of Publication:07-05-2021	283
DSUP -10	**Dr. Rajesh T M**, **Dr. Shaila S G, Dr. Girisha S G, Prof. Shivaprasad Ashok Chikop,** Rajlakshmi Ghatkamble, Dr.C.Umarani, Dr. Raghavi K Bhujang, Mr. Siddharth Ajmera, Veeranna Kotagi	Gardening Robot	Intellectual Property India, Application Number: 202041055966; Application Type: Ordinary; Date Of Publication:01-01-2021	284
DSUP -11	**Dr. Rajesh T M, Dr. Shaila S G, Dr Mallanagouda Patil, Prof. Shivaprasad Ashok Chikop, Prof. Nazmin Begum, Prof. Bindu Madavi K P, Prof. Lavanya B Koppal,** Veeranna Kotagi	Accident Surveillance System In Nh4 Using Video Analytics	Intellectual Property India, Application Number: 202141002013; Application Type: Ordinary; Date Of Publication:22-01-2021	284
DSUP -12	**Dr. Rajesh Tm**, **Shaila Sg, Sunanda Dixit, Mallanagouda Patil,** Vindhya P Malagi, Parashuram Baraki, Dinesha Ha, Narasimha Murthy Ms, Veena Rs, Latha Ph; Chitra Shashidhar,Aditya Pai H, Chandramma R, Piyush Kumar Pareek	Automated Location Identification System Using Text And Image Data	Australian Government Ip Australia, Patent Number: 2021100154; Application Type: Ordinary; Date Of Publication: 15-04-2021	285
DSUP -13	**Dr. Rajesh T M, Dr. Shaila S G, Dr. Girisha G S, Prof. Shivaprasad Ashok Chikop, Prof. Sharanabasavaraj,**	Robo Umpire	Intellectual Property India, Application Number: 202041056016; Application Type: Ordinary; Date Of	286

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DSUP -14	**Dr Rajesh T M, Dr Shaila S G, Dr Mallanagouda Patil, Prof. Shivaprasad Ashok Chikop, Prof. Bindu Madavi K P, Prof. Nazmin Begum, Prof. Lavanya B Koppal,** Veeranna K	Animal Surveillance System Using Video Analytics	Intellectual Property India, Application Number: 202141002027; Application Type: Ordinary; Date Of Publication:22-01-2021	287
DSUP -15	Prof.Santosh Kumar J, **Dr. Rajesh T M**, Govindaraju G N, Mr. V Sunil Kumar, Dr. Raghavendra S., Dr. B. K. Raghavendra, Saravana M K, Harish K, Srindhi Kulkarni V, Veeranna Kotagi	Big Data Performance Enhancement Using Machine Learning Spark-Ml Pipeline Auto Parameter Tuning	Intellectual Property India, Application Number: 202041057025; Application Type: Ordinary; Date Of Publication:01-01-2021	287
DSUP -16	**Dr. Rajesh T M, Shaila S G,** Rekha B. Venkatapur, Sangeetha V, Deepa S R, Vaneeta M, Aditya Pai H, Santosh Kumar J, Krishna S. Gudi, Piyush Kumar Pareek	Robo: Care Taker	Australian Government Ip Australia, Patent Number: 2021100004; Application Type: Ordinary; Date Of Publication: 18-03-2021	288

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DEPARTMENT OF CHEMISTRY
SCHOOL OF ENGINEERING
PUBLICATION SUMMARY

International Journals	**10**	**(CHIJ-01 – CHIJ-10)**

DEPARTMENT OF CHEMISTRY
SCHOOL OF ENGINEERING
INTERNATIONAL JOURNAL PUBLICATIONS

CHIJ-01

Studies on anion-induced structural transformations of iron(III) (Hydr)oxide micro-nanostructures and their oxygen evolution reaction performance

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Solid State Sciences
ISSN: 1293-2558, Volume 106, Page 106314 (2020)

Abstract

Herein, the fundamental studies on the influence of anions, NO_3^- and SO_4^{2-}, on the formation of nanostructured α-Fe_2O_3 and α-FeOOH has been reported. Interestingly, the nitrate (NO_3^-) endows the formation of α-Fe_2O_3 while sulphate (SO_4^{2-}) endows the formation of α-FeOOH. Thus, the prepared α-Fe_2O_3 and α-FeOOH were systematically characterized by using powder X-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray (EDX) and Fourier transform infrared spectroscopy (FT-IR). The SEM image reveals α-Fe_2O_3 and α-FeOOH were composed of microspheres and nanorods respectively. Further, the prepared α-Fe_2O_3 microspheres and α-FeOOH nanorods were used as potential electrocatalyst to catalyse oxygen evolution reaction (OER) where α-FeOOH nanorods were recognized as best OER catalyst with low overpotential of 333 mV at 10 mA cm^{-2} and stability over 20 h.

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CHIJ-02

Functionalized Co_3O_4 graphitic nanoparticles: A high performance electrocatalyst for the oxygen evolution reaction

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International Journal of Hydrogen Energy
ISSN: 0360-3199, Volume 45, Pages 31380-31388 (2020)

Abstract

We describe a novel synthesis technique for the production of graphitic carbon functionalized Co_3O_4 (G/Co_3O_4), which involves the rapid decomposition of cobalt nitrate in the presence of citric acid. Upon immobilization of the G/Co_3O_4 upon Screen-Printed macroElectrodes (G/Co_3O_4-SPEs) the G/Co_3O_4-SPEs were found to exhibit remarkable electrocatalytic properties towards the Oxygen Reduction Reaction (OER). A detailed investigation has been carried out on the influence that the graphitization of the citric acid has, during the course of preparation of Co_3O_4, upon the ability of the G/Co_3O_4 to catalyse the OER within alkaline conditions (1.0 M KOH). The graphitization of citric acid ensures the uniform distribution of Co_3O_4 and enhanced conductivity with maximal exposure of active sites, which are the key parameters to delivering enhanced electrochemical activity. The G/Co_3O_4-SPEs exhibits an overpotential of 304 mV (recorded at 10 mA cm^{-2}), a Tafel slope of 110 mV dec^{-1} and remain stable in its signal output (achievable current density) at varying temperatures (5–50 °C), and after 10 h of chronoamperometry in 1.0 M KOH. The G/Co_3O_4-SPE's OER activity was found to be superior to that of bulk and nano Co_3O_4. The results exhibited within this study will enable production of high-performance and environmentally benign electrocatalysts towards the OER for use within water splitting devices.

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CHIJ-03

Scalable chemical approach to prepare crystalline $Mn_2V_2O_7$ nanoparticles: introducing a new long-term cycling cathode material for lithium-ion battery

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Journal of Materials Science: Materials in Electronics
ISSN: 1573-482X, volume 31, pages 19638–19646 (2020)

Abstract

Herein, a new cathode material, $Mn_2V_2O_7$, for lithium-ion batteries is identified. A simple chemical method is proposed to synthesize newly identified $Mn_2V_2O_7$ material for large scale production. The synthesis of nanosized manganese vanadate in high yield with improved electrochemical performance toward lithium-ion battery applications is of fundamental and technological advancement. The newly identified $Mn_2V_2O_7$ holds a large reversible capacity of 242 mAh/g at 0.2 C rate with 82% of capacitance retention after 1442 cycles and thereby makes it suitable for lithium-ion battery fabrication. This long-term cycling is the highest reported for $Mn_2V_2O_7$ to the best of our knowledge.

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Sucrose-assisted rapid synthesis of multifunctional $CrVO_4$ nanoparticles: a new high-performance cathode material for lithium ion batteries

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Ionics
ISSN: 1862-0760, volume 27, pages39–48 (2021)

Abstract

The search of new multifunctional cathode materials, with new crystal structures and compositions, for lithium ion battery is extremely important to mitigate the drawbacks associated with the current electrode materials used in rechargeable lithium ion batteries. In this paper, orthovanadate family $CrVO_4$ has been identified and investigated as a new cathode material for high-rate and high-capacity lithium ion battery for the first time. A solution-based effective and versatile synthetic protocol has been proposed to synthesize $CrVO_4$ nanoparticles. Physical characterizations reveal that the prepared $CrVO_4$ consists of uniform and discreet nanoparticles of crystallite size ~ 19 nm with widespread pore diameter, enhanced conductivity and surface area. The prepared $CrVO_4$ nanoparticles have been evaluated as a potential cathode material for lithium ion batteries, wherein the experimental results demonstrate enhanced lithium storage with high rate-capability and cyclability. The experimental results reveal that the proposed $CrVO_4$ is working through a partial conversion reaction mechanism.

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CHIJ-05

Facile two-step electrochemical approach for the fabrication of nanostructured nickel oxyhydroxide/SS and its studies on oxygen evolution reaction

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Chemical Papers
ISSN: 2585-7290, volume 75, pages 2485–2494 (2021)

Abstract

The fabrication of an efficient electro-catalyst, made of non-precious metals, for oxygen evolution reaction (OER) is an exciting task. A simple cathodic deposition followed by electrochemical anodic activation has been proposed to prepare a potential electro-catalyst, amorphous nickel oxyhydroxide, on a stainless steel (SS) substrate wherein the whole fabrication procedure completes within a minute. The proposed protocol demonstrates good electrical contact between loosely packed amorphous nickel oxyhydroxide and SS substrate. The experimental results demonstrate cathodic deposition time significantly affect interfacial charge transfer resistance and in turn OER performance. Electrochemical results reveal OER proceeds through the formation of NiO_2 intermediate. The amorphous nickel oxyhydroxide@SS fabricated using cathodic deposition time of 40 s followed by anodic activation of 15 s display the low overpotential of 330 mV@25 mA cm^{-2} (1.56 V vs. RHE) with long-term stability over 70 h.

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Facile synthesis of Ni/NiO nanocomposites: the effect of Ni content in NiO upon the oxygen evolution reaction within alkaline media

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RSC Advances
ISSN: 2046-2069, Volume 11, pages 14654-14664 (2020)

Abstract

We present the facile synthesis of Ni/NiO nanocomposites, *via* a solution combustion methodology, where the composition of metallic Ni within NiO is controlled by varying the annealing time, from 4 minutes up to 8 hours. The various Ni/NiO nanocomposites are studied *via* electrically wiring them upon screen-printed graphite macroelectrodes by physical deposition. Subsequently their electrochemical activity, towards the oxygen evolution reaction (OER), is assessed within (ultra-pure) alkaline media (1.0 M KOH). An optimal annealing time of 2 hours is found, which gives rise to an electrochemical oxidation potential (recorded at 10 mA cm^{-2}) of 231 mV (*vs.* Ag/AgCl 1.46 *vs.* RHE). These values show the Ni/NiO nanocomposites to be significantly more electrocatalytic than a bare/unmodified SPE (460 mV *vs.* Ag/AgCl). A remarkable percentage increase (134%) in achievable current density is realised by the former over that of the latter. Tafel analysis and turn over frequency is reported with a likely underlying mechanism for the Ni/NiO nanocomposites towards the OER proposed. In the former case, Tafel analysis is overviewed for general multi-step overall electrochemical reaction processes, which can be used to assist other researchers in determining mechanistic information, such as electron transfer and rate determining steps, when exploring the OER. The optimal Ni/NiO nanocomposite exhibits promising stability at the potential of +231 mV, retaining near 100% of its achievable current density after 28 hours. Due to the facile and rapid fabrication methodology of the Ni/NiO nanocomposites, such an approach is ideally suited towards the mass production of highly active and stable electrocatalysts for application within the anodic catalyst layers of commercial alkaline electrolysers.

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CHIJ-07

One-Pot Synthesis of Novel Molybdenum Disulfide–Graphene Oxide Nanoarchitecture: An Impeccable Bifunctional Electrode for the Electrochemical Performance of Iron Redox Flow Batteries and Oxygen Evolution Reaction

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Energy Fuels

ISSN: 0887-0624, Volume 35, pages 8345–8357 (2021)

Abstract

The stable flower-like layered structure of molybdenum disulfide (MoS_2)–graphene oxide (GO) nanocomposites was synthesized by a one-pot hydrothermal process. The novel nanoarchitecture of MoS_2–GO nanocomposites acts as an electrocatalyst in multifunctional electrochemical performance. The distribution and morphological studies for MoS_2–GO nanocomposites were analyzed via X-ray diffraction, energy-dispersive X-ray analysis, scanning electron microscopy, Brunauer–Emmett–Teller, and X-ray photoelectron spectroscopy analysis. Modified graphite felt (MGF) electrodes were developed using a spray-coating process to uniformly distribute MoS_2–GO nanocomposites on graphite felt. The 1 mg cm^{-2} MGF electrode showed the best electrochemical activity and electrochemical reversibility toward the redox couples of the iron(II) electrolyte, as indicated in electrochemical impedance spectroscopy, cyclic voltammetry, and Tafel plots; this may be due to the presence of sulfur and oxygen heteroatom layers of the MoS_2–GO nanocomposites, which are more actively participated in the charge transfer redox reactions of the iron(II) electrolyte. Iron redox flow battery performance with an active area of 132 cm^2 was found to be 99.95% of coulombic efficiency (η_c), with a corresponding peak power density of 75.60 mW cm^{-2}. Furthermore, in 1.0 M KOH, MoS_2–GO nanocomposites demonstrate effective electrocatalysis for the oxygen evolution reaction (OER). The complete catalytic impact of MoS_2–GO nanocomposites toward the OER was investigated. The MoS_2–GO nanocomposites show an overpotential of 1.49 V (recorded at η of 10) and a Tafel slope of 381 mV dec^{-1} and remain stable after 20 h of chronoamperometry in 1.0 M KOH. The OER activity of MoS_2–GO nanocomposites was found to be significantly higher than that of the bare screen-printed electrode and MoS_2.

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CHIJ-08

Naftopidil Molecular Salts with Improved Dissolution and Permeation

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Crystal Growth & Design
ISSN: 1528-7483, Vol. 20, Issue 5, 3064–3076 (2020)

Abstract

Naftopidil (NFPD) is a α1 adrenoceptor antagonist drug. Low solubility and low permeability is the major drawback of this drug. The synthesis of multicomponent crystalline forms of this amine functional group drug with carboxylic acid coformers, both achiral and chiral acids, provides solution to improve its solubility as well as permeability. Eight molecular salts were crystallized by liquid-assisted grinding followed by isothermal crystallization. Single crystal X-ray diffraction (SCXRD) analysis of the molecular salts showed that the structures are stabilized by strong N−H···O, O−H···O, and weak C−H···O hydrogen bonds in the solid-state. The bulk phase purity of new solid forms was confirmed by powder X-ray diffraction (PXRD) and the crystalline products were further characterized by infrared (IR) spectroscopy and thermal analytical techniques (DSC). The molecular salts exhibit superior dissolution rates compared to pure NFPD. However, during dissolution, NFPD showed decrease in concentration after 60 min for all salts due to precipitation. The supersaturation occurred due to salt disproportionation which generates insoluble NFPD, as confirmed by PXRD of the residue. The salts reach high saturation concentration before 60 min which is indicative of immediate release formulation to achieve fast onset of therapeutic activity. Moreover, the salts exhibit high saturation in PBS (phosphate buffer saline) media and improved permeability compared to the pure drug. Finally, NFPD-MLA (DL-malic acid racemate) shows enhanced dissolution and permeability compared to all other salts and pure NFPD.

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CHIJ-09

Detailed molecular structure (XRD), conformational search, spectroscopic characterization (IR, Raman, UV, fluorescence), quantum mechanical properties and bioactivity prediction of a pyrrole analogue

Katta Eswar Srikanth[a], A. Veeraiah [a] , T. Pooventhiran[b], Renjith Thomas [b], K. Anand Solomon [c], Ch.J. Soma Raju [a], J. Naveena Lavanya Latha [d]

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Heliyon
ISSN: 24058440, Volume 6, Issue 6, e04106 (2020)

Abstract

Pyrroles are an exciting class of organic compounds with immense medicinal activities. This manuscript presents the structural and quantum mechanical studies of 1-(2-aminophenyl) pyrrole using X-Ray diffraction and various spectroscopic methods like Infra-Red, Raman, Ultra-violet and Fluorescence spectroscopy and its comparison with theoretical simulations. The single-crystal X-ray diffraction values and optimized geometry parameters also were within the agreeable range. A fully relaxed potential energy scan revealed the stability of the possible conformers of this molecule. We present the density functional theory results and assignment of the vibrational modes in the infrared spectrum. The experimental and scaled simulated vibrations matched when density functional theory simulations (B3LYP functional with 6–311++G**). The electronic spectrum was simulated using time-dependent density functional theory with CAM-B3LYP functional in dimethylsulphoxide solvent. The fluorescence spectrum of the compound was studied at different excitation wavelengths in the dimethylsulphoxide solvent. The stability of the molecule by intramolecular electron transfer by hyperconjugation was studied with the natural bond orbital analysis. Frontier molecular orbitals and molecular electrostatic potentials of the compound gave an idea about the reactive behaviour of the compounds. Prediction of activity spectral studies followed by docking analysis indicated that the molecule is active against arylacetonitrilase inhibitor.

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CHIJ-10

Enhanced solubility, permeability, and tabletability of Nicorandil by salt and cocrystal formation

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Cryst Eng Comm
ISSN 1466-8033,Vol. 23,2021, 227-237

Abstract

Cocrystallization is a rational selection crystal engineering approach for the development of novel solid forms with enhanced physicochemical and mechanical properties. Nicorandil (NCR) is a niacinamide vitamin derivative used to treat angina pectoris. A binary solid form screen of NCR with homologous dicarboxylic acids afforded NCR–oxalic acid (NCR–OA, 1 : 1), NCR–fumaric acid (NCR–FA, 1 : 1), NCR–succinic acid (NCR–SA, 1 : 1), and NCR–suberic acid (NCR–SBA, 1 : 0.5). The binary solids were characterized by powder X-ray diffraction, IR and NMR spectroscopy, and DSC. NCR–FA and NCR–SBA were crystallized by slow evaporation from chloroform and toluene solvents, respectively. Single crystal X-ray diffraction confirmed that NCR–FA is a molecular salt, while NCR–SBA is a neutral cocrystal. NCR and the FA anion are connected via the robust carboxylate⋯pyridinium synthon, whereas in the NCR–SBA cocrystal, the components associate via the carboxylic acid⋯pyridine synthon. The phase stability, solubility, dissolution rate, diffusion rate and tabletability studies have demonstrated that the binary solids exhibit improved physical and mechanical properties compared to the NCR drug. Specifically, the NCR–FA salt and NCR–SBA cocrystal have higher solubility, dissolution rate, and hardness at lower pressures, making the formulation suitable for tablet compression.

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DEPARTMENT OF MATHEMATICS
SCHOOL OF ENGINEERING

Publication Summary

International Journals	**06**	**(MATIJ-01 – MATIJ-06)**

DEPARTMENT OF MATHEMATICS
SCHOOL OF ENGINEERING
INTERNATIONAL JOURNAL PUBLICATIONS

MATIJ-01

Darcy-Benard double diffusive Marangoni convection with Soret effect in a composite layer system

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Malaya Journal of Matematik, Vol. 8, No. 4, 1473-79, Sep 2020

Abstract

The effect of Soret parameter on double diffusive Marangoni convection in a two-layer system, comprising an incompressible two component fluid saturated porous layer over which lies a layer of the same fluid under micro gravity condition is investigated analytically. The upper boundary of the fluid layer is free, the lower boundary of the porous layer is rigid and both the boundaries are insulating to heat and mass. At the interface, the velocity, shear stress, normal stress, heat, heat flux, mass and mass flux are assumed to be continuous. Thermal Marangoni number is obtained by solving ordinary differential equations using method of exact solution. The effect of different physical parameters on double diffusive Marangoni convection are also investigated in detail.

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MATIJ-02

Brinkman-Benard-Magneto-Surface Tension Driven Convection in an Infinite Horizontal Composite Layer in the Presence of Heat Source/Sink and Non-Uniform Temperature Gradients

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Advances and Applications in Fluid Mechanics Vol. 25, No. 1, 1-27, 2020

Abstract

The problem of Brinkman-Benard-Magneto-Surface tension driven convection is investigated in an infinite horizontal composite layer enclosed by isothermal-adiabatic boundaries in the presence of invariable heat source/sink, which is subjected to linear, parabolic and inverted parabolic temperature gradients. The eigenvalue, thermal Marangoni number in the closed form is obtained for lower surface rigid, upper surface free from surface tension and with the continuity of normal and tangential stresses and continuity of normal, tangential velocity boundary conditions at the interface. The deviation of various parameters on the Marangoni number against thermal ratio is discussed. It is observed that the heat absorption in the fluid layer, viscosity ratio and the applied magnetic field play an important role in controlling Brinkman-Benard-Magneto-Surface tension driven convection.

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MATIJ-03

Non-Darcian-Benard-magneto-surface tension driven convection in an infinite horizontal composite layer in the presence of heat source/sink and non-uniform temperature gradients

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Malaysian Journal of Fundamental and Applied Sciences, Vol. 16, No. 6, 615-624, 2020

Abstract

The physical pattern of the problem consists of an infinite horizontal composite layer, in the presence of uniform heat source/sink in both the layers enclosed by upper adiabatic, lower isothermal boundaries and continuity of heat and heat flux at the interface. The problem of non-Darcian-Benard-magneto-surface tension driven convection is investigated on this composite layer which is subjected to uniform and non uniform temperature gradients. The eigenvalue, thermal Marangoni number in the closed form is obtained for lower surface rigid, upper surface free with surface tension and with the continuity of normal and tangential stresses and continuity of normal, tangential velocity boundary conditions at the interface. The influence of various parameters on the Marangoni number against thermal ratio is discussed. It is observed that the heat absorption in the fluid layer and the applied magnetic field play an important role in controlling non-Darcian-Benard-magneto-surface tension driven convection.

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MATIJ-04

Computing Discrete Adriatic Indices of Probabilistic Neural Network

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European Journal of Pure and Applied Mathematics
ISSN 1307-5543, Volume 13, Pages 1149-1161 (2020)

Abstract

A Topological index is a numeric quantity which characterizes the whole structure of a graph. Adriatic indices are also part of topological indices, mainly it is classified into two namely extended variables and discrete adriatic indices, especially, discrete adriatic indices are analyzed on the testing sets provided by the International Academy of Mathematical Chemistry (IAMC) and it has been shown that they have good presaging substances in many compacts. This contrived attention to compute some discrete adriatic indices of probabilistic neural network.

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MATIJ-05

Scattering of Gravity Waves by a Rectangular Floating Flexible Porous Plate

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Journal of Advanced Research in Applied Mathematics and Statistics
Volume 6, Issue 1&2, Pg. No. 4-11 (2021)

Abstract

Scattering of oblique surface gravity waves by a finite, floating porouselastic plate is investigated, with assumptions of linear water wave theory and plate response. A boundary value problem is set up, wherein the thin plate equation together with a porosity parameter is used to formulate the condition on the floating plate. A matched eigenfunction approach is adopted for the solution of this problem, with roots of the dispersion relation being located with the aid of contour plots, and various hydrodynamic scattering quantities are computed. Energy dissipation due to plate porosity is seen to have a significant impact on both reflection and transmission of waves, while flexibility of plate only alters the extent of wave reflection by porous elastic plates. An oscillatory trend is shown by reflection coefficient for smaller values of relative plate width, and there is no variation in reflection or transmission coefficients when the plate width is increased beyond a certain cut-off value. Comparison of scattering properties of four different types of plates highlights the effects of porosity and flexibility and establishes the superiority of a flexible porous plate as a wave attenuating device, with moderate reflection, high energy dissipation and low transmission.

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MATIJ-06

Meromorphic Functions that Share One Finite Value with their Derivative in an Angular Domain

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Chinese Journal of Mathematical Sciences
Vol. 1 No. 1, 2021

Abstract
In this paper, we discuss an meromorphic function $f(z)$ and $f'(z)$ share the value 1 CM (counting multiplicities) with derivative in an angular domain.

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DEPARTMENT OF PHYSICS
SCHOOL OF ENGINEERING

Publication Summary

International Journals	**12**	**(PHYIJ-01 – PHYIJ-12)**

PHIJ-01

Photoionization of Xe 5s: Angular distribution and Wigner time delay in the vicinity of the second Cooper minimum

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Journal of Physics B: Atomic, Molecular and Optical Physics
ISSN: 09534075, Volume 53, pages (2020)

Abstract

The angular distribution and photoionization Wigner time delay of Xe 5s photoelectrons are studied in the region of the second Cooper minimum (SCM) using (i) the relativistic multiconfiguration Tamm-Dancoff approximation, (ii) the relativistic-random-phase approximation (RRPA) and (iii) the RRPA-with-relaxation to demonstrate how differing treatments of correlation, and the relativistic interactions, affect the results. The results of the three methods are compared with each other and with available experimental data. The comparison reveals the importance of electron correlations for which a multiconfiguration description of the initial state is essential. The spin-resolved and spin-averaged photoionization time delay results show important signatures in the region of the SCM in the Xe 5s photoionization cross-section.

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PHIJ-02

Time delay in atomic and molecular collisions and photoionisation/photodetachment

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International Reviews in Physical Chemistry
ISSN: 0144235X, Volume 40, 127-153 (2021)

Abstract

It is remarkable that time delay is an experimentally measurable quantity, but time itself is not. Time delay in quantum collisions and in photoionisation/photodetachment of atomic and molecular systems is reviewed in this paper. Wigner–Eisenbud formalism of time delay in quantum collision of a wavepacket with a target is discussed. Its equivalence with Smith's formalism of time delay, based on an independent basis for time delay in terms of excess particle density in the collision zone, is demonstrated. Similarity and difference between quantum collision of an electron with a positive atomic/molecular ion and photoionisation/photodetachment of a neutral atom/molecule are discussed, and the underlying quantum dynamics involving the time-reversal symmetry between solutions with outgoing and ingoing wave boundary conditions is pointed out to interpret photoionisation/photodetachment as half-scattering. This relationship is subsequently taken advantage to extend the formalism of Wigner–Eisenbud–Smith time delay in photoionisation/photodetachment. The measurability of time delay is accounted for in terms of a self-adjoint quantum operator that characterises it, even if there is no such operator for time itself. A few illustrative examples of theoretical and experimental studies of time delay are given to indicate outstanding advances made in this field in the last two decades.

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PHIJ-03

Nonstatistical behavior of the photoionization of spin–orbit doublets

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Journal of Physics B: Atomic, Molecular and Optical Physics
Volume 54, 085001, (2021)

Abstract

The photoionization branching ratios of spin–orbit doublets are studied both experimentally and theoretically at energies several keV above threshold. The results show significant relativistic effects for Ar 2p in the autoionizing region below the 1s threshold, and large many-body effects for Xe 3d and 4d in the vicinity of the L-shell thresholds. The branching ratios in Xe are also found to vary significantly over very broad multi-keV energy regions both above and below the inner-shell thresholds. In addition, the Ar 2p study confirms experimentally the decades-old theoretical prediction that the nonresonant branching ratio does not approach the statistical (nonrelativistic) value, and, in fact, progressively diverges from statistical with increasing photon energy.

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PHIJ-04

Electronic structure and dynamics of confined atoms

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The European Physical Journal D
ISSN: 1434-6079, Volume 75, 166 (2021)

Abstract

Confined atomic systems are of great importance owing a multitude of possible applications in various areas of science and technology. Of particular interest are atoms encaged in the C60 molecule, A@C60, since the near-spherical symmetry of C60 simplifies theoretical studies, and the stability of C60 renders it amenable to experimental examination. A review of investigations of the electronic structure and dynamics of A@C60 is presented in this manuscript focusing on developments in the last decade. Addressed mainly are how the confinement affects electronic structure properties such as ionization potentials, localization of atomic electrons, Shannon entropy, correlation effects, relativistic interactions, and others. In the area of dynamics, photoionization and e-A@C60 scattering are reviewed and summarized, and the major effects of confinement on the dynamical properties, e.g., confinement resonances, hybridization, Wigner time delay, are delineated.

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PHIJ-05

The electronic properties of graphene nanoribbons and the offset logarithm function

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Materials Today: Proceedings
ISSN: 2214-7853 (2021)

Abstract

Graphene Nanoribbons (GN), being an important class of next-generation carbon materials, are of immense interest and find innumerable applications in diverse fields. A variation of the generalized Lambert W function, called the Offset Logarithm function, has been found to have important applications in fields such as physics, engineering and nanotechnology. We study the electronic properties of zigzag GN and use the generalized Lambert W function to study the eigenvalue equations of the massless Dirac equation applied to zigzag GN. We have studied the effects of nanoribbon width and determined the parameters that significantly affect the obtained solutions.

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PHIJ-06

Controlling high harmonic generation using inhomogeneous two-color driving laser pulse

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Laser Physics
Volume 31, 075302 (2021)

Abstract

High harmonic generation (HHG) is strongly modified near plasmonic nanostructures due to confinement and inhomogeneity of the electromagnetic field. Previous studies have revealed low-intensity generation of HHG and extension of the plateau; however, the roles of potential shape and a combination of inhomogeneous infrared (IR) and blue fields on HHG have not been studied. In this work, we study HHG driven by inhomogeneous two-color (800–400 nm) IR and blue femtosecond pulses by numerically solving the time-dependent Schrödinger equation. HHG spectra are computed for two different models: for a short-range potential, which supports a single-bound state, and for a long-range potential, which supports a Rydberg series, to show potential dependence on inhomogeneous two-color HHG. A substantial enhancement in the value of the cut-off resulting from inhomogeneity up to the ~600th order, extending beyond the water window, is found for both the models. The HHG spectra are highly sensitive to the relative phase of the two-color fields and this sensitivity increases with increasing inhomogeneity. Possibilities of efficiently generating and controlling attosecond pulse train and isolated attosecond pulse are discussed.

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PHIJ-07

Effect of doping nano samarium(III) oxide in PVA+Na3C6H5O7 films for battery applications

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Asian Journal of Chemistry
09707077, Volume 32, 1947 - 1954 (2020)

Abstract

The effect of doping nano Sm2O3 particles in PVA + Na3C6H5O7 (90:10% w/w) polymer composite films on the structural, thermal, electrical properties and battery parameters are investigated. The PVA + Na3C6H5O7 + nano Sm2O3 (90:10:1-4% w/w) films were synthesized and characterized. A 2% w/w Sm2O3 film was relatively homogeneous with high amorphous in nature enabled the movement of nanoparticles in the matrix of polymer under potential gradient. The maximum conductivity was 2.09 × 10-3 S cm-1 for 2% w/w nano Sm2O3 film and it is 7 orders more than polyvinyl alcohol. The films were adopted in batteries with configuration: Anode (Mg+MgSO4) /[PVA:Na3C6H5O7 (90:10% w/w) + nano Sm2O3 (1-4% w/w)]/cathode (iodine + carbon + pieces of electrolyte) and battery parameters were assessed. The discharge time is 174 h with the cell having 2.0% w/w nano Sm2O3 film. These nano Sm2O3 doped films are successfully adopted in the fabrication of batteries and also the proposed cells are simple, effective, eco-friendly and economical.

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PHIJ-08

Thermal, Structural, Optical and Electrical Conductivity studies of pure and Mn2+ doped PVP films

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South African Journal of Chemical Engineering
ISSN: 1026-9185, Vol. 36, 8–16 (2021)

Abstract

Pure and Mn2+ ions doped (1 to 5 mol%) PVP polymer electrolytes were prepared by solution casting method by using double distilled water as a solvent. Thermogravimetric curves of the pure and Mn2+ doped polymer films show three distinct steps of weight loss. The Enhanced amorphous nature of PVP polymer film due to doping has been identified from X-ray diffraction analysis. SEM images appear the smoothest, uniform and homogenous surface, suggesting a good ordering structure. The optical band gaps of the films showed a decreasing trend with increasing dopant concentration. The FTIR spectra confirmed the complexation between the Mn2+ ions and the host polymer in terms of changes in intensity and certain bands position. The conductivity data, showed that 5 mol% Mn2+ doped PVP polymer electrolyte had shown maximum ionic conductivity of 3.21 × 10−8 S/cm at room temperature. From all the characterization results, 5mol% of Mn2+ ion-doped PVP polymer electrolyte exhibits better properties which are more suitable for fabricating solid-state batteries and other electrochemical devices.

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PHIJ-09

Nonclassical nature of thermal quantum states in the oscillating FRW Universe

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The European Physical Journal Plus
ISSN: 2190-5444, Volume 136, 363 (2021)

Abstract

We used coherent thermal and squeezed thermal vacuum states to represent the massive inflaton field in the semi-classical gravity; therefore, it would be useful to examine whether the field exhibits classical or nonclassical nature in the cosmological context. In the present article, we examine the non-classical nature of thermal quantum optical states in the cosmological context using Mandel's Q parameter.

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PHIJ-10

Scalable chemical approach to prepare crystalline Mn2V2O7 nanoparticles: introducing a new long-term cycling cathode material for lithium-ion battery

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Journal of Materials Science: Materials in Electronics
ISSN: 09574522, Volume 31, Issue 22, 19638 - 19646 (2020)

Abstract

Herein, a new cathode material, Mn2V2O7, for lithium-ion batteries is identified. A simple chemical method is proposed to synthesize newly identified Mn2V2O7 material for large scale production. The synthesis of nanosized manganese vanadate in high yield with improved electrochemical performance toward lithium-ion battery applications is of fundamental and technological advancement. The newly identified Mn2V2O7 holds a large reversible capacity of 242 mAh/g at 0.2 C rate with 82% of capacitance retention after 1442 cycles and thereby makes it suitable for lithium-ion battery fabrication. This long-term cycling is the highest reported for Mn2V2O7 to the best of our knowledge.

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PHIJ-11

Sucrose-assisted rapid synthesis of multifunctional CrVO4 nanoparticles: a new high-performance cathode material for lithium ion batteries

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Ionics

ISSN: 09477047 (2020)

Abstract

The search of new multifunctional cathode materials, with new crystal structures and compositions, for lithium ion battery is extremely important to mitigate the drawbacks associated with the current electrode materials used in rechargeable lithium ion batteries. In this paper, orthovanadate family CrVO4 has been identified and investigated as a new cathode material for high-rate and high-capacity lithium ion battery for the first time. A solution-based effective and versatile synthetic protocol has been proposed to synthesize CrVO4 nanoparticles. Physical characterizations reveal that the prepared CrVO4 consists of uniform and discreet nanoparticles of crystallite size ~ 19 nm with widespread pore diameter, enhanced conductivity and surface area. The prepared CrVO4 nanoparticles have been evaluated as a potential cathode material for lithium ion batteries, wherein the experimental results demonstrate enhanced lithium storage with high rate-capability and cyclability. The experimental results reveal that the proposed CrVO4 is working through a partial conversion reaction mechanism.

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PHIJ-12

Broad-band 'spectro-temporal' features of extragalactic black hole binaries LMC X-1 and LMC X-3: an AstroSat perspective

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Monthly Notices of the Royal Astronomical Society
ISSN: 0035-8711, Volume 501, 5457-5467 (2021)

Abstract

We present the first results of extragalactic black hole (BH) X-ray binaries LMC X-1 and LMC X-3 using all the archival and legacy observations by *AstroSat* during the period of 2016–2020. Broad-band energy spectra (0.5–20 keV) of both sources obtained from the *Soft X-ray Telescope* and *Large Area X-ray Proportional Counter* on-board *AstroSat* are characterized by strong thermal disc blackbody component (kTin ~ 1keV, $f$disc>79 per cent) along with a steep power-law (Γ ~ 2.4–3.2). Bolometric luminosity of LMC X-1 varies from 7to10 per cent of Eddington luminosity (LEdd) and for LMC X-3 is in the range 7−13 per cent of LEdd. We study the long-term variation of light curve using *MAXI* data and find the fractional variance to be ∼25 per cent for LMC X-1 and ∼53 per cent for LMC X-3. We examine the temporal properties of both sources and obtain fractional rms variability of power density spectrum in the frequency range 0.002–10 Hz to be ∼9−17 per cent for LMC X-1, and ∼7−11 per cent for LMC X-3. The 'spectro-temporal' properties indicate both sources are in thermally dominated soft state. By modelling the spectra with relativistic accretion disc model, we determine the mass of LMC X-1 and LMC X-3 in the range 7.64−10.00 and 5.35−6.22M⊙, respectively. We also constrain the spin of LMC X-1 to be in the range 0.82–0.92 and that of LMC X-3 in 0.22–0.41 with 90 per cent confidence. We discuss the implications of our results in the context of accretion dynamics around the BH binaries and compare it with the previous findings of both sources.

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DEPARTMENT OF AEROSPACE ENGINEERING SCHOOL OF ENGINEERING

Publication Summary

International Journal	**03**	**(ASEIJ-01- ASEIJ-03)**

ASEIJ-01

Effect of Aerospike on Unsteady Transonic Flow over a Blunt Body

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Journal of Spacecraft and Rocket

Abstract

Blunt-nosed launch vehicles featuring large nose-cone angles experience high levels of pressure fluctuations over the payload region at transonic Mach numbers due to shock-wave/boundary-layer interactions. The main cause for this phenomenon appears to be flow instability associated with separated flow and formation of a vortex pair. Interactions between the induced velocity of the vortex pair and oncoming mean flow cause oscillations of the λ-shock system and high levels of fluctuating pressures. An aerospike causes flow separation at the nose and reattachment of the shear layer downstream, energizing the boundary layer. Consequently, flow separation and vortex formation are prevented: shock oscillations are stabilized. Dramatic reductions in the pressure fluctuations, around 95–35% in the low-frequency range, are observed along the payload region at small angles of attack. The observations are based on wind-tunnel tests involving unsteady pressure measurements, surface-flow patterns, and high-speed shadowgraph recordings on a blunt nose cone with various cone angles.

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ASEIJ-02

Trigger Mechanism for Obtaining Dynamic Derivatives in Wind Tunnels

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Journal of Spacecraft and Rocket

Abstract

A pneumatic trigger and a mechanical trigger actuation system were designed and developed, and their performances were verified in bench tests as well as wind-on conditions for incorporation into a test rigar free-oscillation test technique to determine pitch-and yaw damping derivatives of models that have low aerodynamic damping. It was found that the mechanical trigger meets all the requirements for dynamically stable, unstable, and neutrally stable configurations. The pneumatic trigger actuation system was found to introduce undesirable release characteristics and additional damping, leading to unreliable results.

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ASEIJ-03

Investigation of mechanical & corrosion properties of graphene, R-glass fiber reinforced Aluminium 2024 hybrid composites

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Elsevier Materials Today: Proceedings
Volume 43, Pages 1684-1693, 2020

Abstract

Aluminium alloy 2024, due to its high strength & Fatigue resistance is used in aircraft structural application. The development of hybrid composites involves a combination of two or more reinforcement in a single matrix .The present proposed work focuses on evaluation of mechanical properties and corrosion behaviour of Aluminium 2024 alloy metal matrix composites by the addition of desirable reinforcements. The main objective of this research work is to develop hybrid aluminium composite which was fabricated using stir casting process considering two reinforcements such as graphene and R-glass fiber and Al2024 as a base alloy matrix. The casted aluminium alloy were machined as per ASTM standards and mechanical tests such as tension test and compression test were conducted on hybrid aluminium composite specimens based on the weight percentage of reinforcements and further the developed hybrid composites were subjected to study corrosion behaviour and corrosion test was conducted by dipping specimens in 0.25 N, 0.5 N, 0.75 N, 1 N hydrochloric acid solution as a corrodent for duration of 96 h with increment of 24 h by using weight loss method .Morphological study of the developed aluminium hybrid composites after corrosion test was carried out using scanning electron microscope.

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SCHOOL OF ENGINEERING

Publication Summary

International Journals	**21**	**(CSEIJ-01 – CSEIJ-21)**
International Conferences	**13**	**(CSEIC-01 – CSEIC-13)**
National Conferences	**02**	**(CSENC-01 – CSEIC-02)**
Book Chapters	**05**	**(CSENB-01 – CSEIB-05)**

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SCHOOL OF ENGINEERING
INTERNATIONAL JOURNAL PUBLICATIONS

CSEIJ-01

Insights of Strength and Weakness of Evolving Methodologies of Sentiment Analysis

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Global Transitions Proceedings

S2666-285X(21)00087-X, Pages 1-13 (2021)

Abstract

With every business process and organization being more concerned about adopting the latest technology towards understanding the success rate and risk associated with the product/service launch, they need to understand the intention and review of their prospective customer. Sentiment Analysis is one such advanced technology to analyze and perceive the behavior of a consumer. However, many challenges hinder analyzing precise sense of sentiments and locating the appropriate sentiment divisions. There has been a significant amount of work being carried out in this direction since the last decade. Furthermore, with the evolution of big data technologies, new methodologies have been introduced to improve sentiment analysis with various evolving applications. This paper provides a comprehensive study on sentiment analysis to provide valuable insight into sentiment analysis approaches and related fields. The paper discusses various essential information associated with the dataset, a new arena of application and methodologies, upcoming research methods, study findings, and further contributing to the ultimate study and research gap.

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CSEIJ-02

Autonomous Car Data Collection and Analysis

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International Journal of Scientific Research & Engineering Trends
ISSN (Online): 2395-566X, Volume 7, Pages 2056-2059 (2021)

Abstract

Autonomous car is driverless car, which can work without any human interaction. To design fully automated car the different sensors like Radar, Lidar, Camera, GPS and Ultrasonic sensor are used. These sensors perceives surrounding environment and collects different data. This data can be used to give instructions to car while driving, so analysis of data is very important. To analyze the sensors data this project provides different tools which are used for data Collection and analysis i.e, Drivers who go on drive use Dan View to record the vehicle Radar information, LIDAR Data, GPS and CAN frames. Drive Cal is used to calibrate the lidar sensor. Drive List is used to collect information about driver and drive details. Drive Store stores all drive data in the data base in cvw file format. Drive Trigger searches the data for specific events to be analyzed. Drive Scope tool is visualization tool, which allow user to analyze the drive data.

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CSEIJ-03

Proof of Authentication for Secure and Digitalization of Land registry using Blockchain technology

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4th International Conference on Intelligent Computing and Communication, ICICC 2020.
Year of publication 2021
H index is 1. Scopus
Computer Communication, Networking and IoT (2021)

Abstract

The aim is to secure land records and eliminate the fraudster to create duplicate land records and sell to another party. By using blockchain technology, we can solve this problem, the current land registries are still it is paper-based, and performance of document verification process is slow and unreliable in terms of accuracy, security, and occasionally corrupt. In this paper, we propose an architecture to improve the performance of record management. Architecture is separated by application domain and core system so that it improves the performance. The consensus algorithms play an important role in the blockchain for creating new blocks and appending them to the blockchain. The proposed New Block generate algorithm for creating a new block provides an efficient way of storing data in blocks. Before placing the block in the blockchain network, the block is digitally signed by using cryptographic techniques. The second algorithm is proof of authentication consensus protocol; it is used for the block validation process.

Keywords: Blockchain, Cryptographic technique, Proof of Authentication, New-Block generate algorithm, Architecture of Land record management.

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CSEIJ-04

Identifying Handwriting Difficulties in Children in Devanagari Script Using Machine Learning

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Data Engineering and Intelligent Computing, Advances in Intelligent Systems and Computing,
Online ISBN: 978-981-16-0171-2, vol 1, Pages 191-204 (2021)

Abstract

Dysgraphia is a medical disorder in children, due to which children face difficulties in writing. Children suffering from dysgraphia find it difficult in holding a pencil, alignment, differentiating the strokes, curves, and sizing of the alphabets, etc. It is more challenging in scripts where there are more alphabets, curves, and strokes. In India, about 75% of school-going kids write in Devanagari script (includes Hindi, Marathi, Gujarati) as a medium of study or second language. Diagnosis of writing difficulties in the Devanagari script can help the child to change the language or get assistance. Many researchers have come up with diagnosing dysgraphia in languages like English, Hebrew, etc. The current study aims at developing a model to identify children with dysgraphia and without dysgraphia in Devanagari script based on their performance characteristics as per the BHK algorithm. 52 students handwriting samples were collected, and feature analysis is done based on BHK and machine learning model using the KNN algorithm for the predictions.

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CSEIJ-05

Feature Extraction and Classification Techniques for Analysis Stress Using EEG Signals with Web Application

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International Journal of Scientific Research & Engineering Trends
ISSN (Online): 2395-566X , Volume 7, Issue 4, Pages 2879-2883, July-Aug-2021

Abstract

The biological response to stress originates in brain that involves different biochemical and physiological effects. Numerous basic clinical strategies to survey pressure depend on the nearness of explicit hormones and on highlights separated from various signs, including electrocardiogram circulatory strain, skin temperature, or galvanic skin reaction. To screen pressure various strategies can be utilised. In this task for an anxiety acknowledgment, Electroencephalogram (EEG) signal is utilised. Electroencephalogram (EEG) signal is a neuro-signal that is produced due to diverse electrical exercises in the mind. Various sorts of electrical exercises related to various conditions of the mind. These signs can be caught and handled to get the helpful data that can be utilised in early location of some physiological state. In this proposed system, EEG signal database is pre-processed and features are extracted. Classification of stress level is done by implementing machine learning algorithms. In which Random Forest will provide the better accuracy.

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CSEIJ-06

Novel video Steganography approach with the combination of knight tour and 7th bit model of embedding data

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Ilkogretim Online - Elementary Education Online, Year; Vol 20 (Issue 4): pp. 657-669 (Feb-2021) http://ilkogretim-online.org

Abstract

The art of video steganography is a promising tool in the science of secret communication by hiding the information in the cover video without any detectable changes in the cover file. The dynamic nature of the video format makes it immune to cyber-attacks which in turn helps in secret communication. As the attention to video file sharing is rapidly growing, it is vital to have enhanced and novel steganographic techniques. New approaches have been suggested to cover the hidden message in a video file with the proposed technique in this article. The confidential data is disguised by shielding them in the 7th bit of the identified pixel and the following pixel. Whereas the pixel in which the secret data should be shielded is picked using a knight tour algorithm that applies an added security to the secret message from cyber trespassers. The competence of this novel algorithm is proved by enumerating various parameters such as PSNR, MSE, SSIM, and embedded capacity.

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CSEIJ-07

Machine learning–based heart disease prediction system for Indian population: An exploratory study done in South India

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Medical Journal Armed Forces India (Elsevier),Volume 77, Issue 3, July 2021, Pages 302-311

Abstract

Background: In India, huge mortality occurs due to cardiovascular diseases (CVDs) as these diseases are not diagnosed in early stages. Machine learning (ML) algorithms can be used to build efficient and economical prediction system for early diagnosis of CVDs in India. Methods: A total of 1670 anonymized medical records were collected from a tertiary hospital in South India. Seventy percent of the collected data were used to train the prediction system. Five state-of-the-art ML algorithms (k-Nearest Neighbours, Naïve Bayes, Logistic Regression, AdaBoost and Random Forest [RF]) were applied using Python programming language to develop the prediction system. The performance was evaluated over remaining 30% of data. The prediction system was later deployed in the cloud for easy accessibility via Internet. Results: ML effectively predicted the risk of heart disease. The best performing (RF) prediction system correctly classified 470 out of 501 medical records thus attaining a diagnostic accuracy of 93.8%. Sensitivity and specificity were observed to be 92.8% and 94.6%, respectively. The prediction system attained positive predictive value of 94% and negative predictive value of 93.6%. The prediction model developed in this study can be accessed at http://das.southeastasia.cloudapp.azure.com/predict/ Conclusions: ML-based prediction system developed in this study performs well in early diagnosis of CVDs and can be accessed via Internet. This study offers promising results suggesting potential use of ML-based heart disease prediction system as a screening tool to diagnose heart diseases in primary healthcare centres in India, which would otherwise get undetected.

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CSEIJ-08

Artificial intelligence and improved healthcare

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Medical Journal Armed Forces India (Elsevier), Volume 77, Issue 1, January 2021, Pages 114-115

Abstract

CNN is an artificial intelligence (AI) algorithm which enables a machine to accurately classify smears as 'normal' or 'abnormal'. Diagnostic accuracy of 95.46% over a validation set of 441 images as reported in the study is appreciable. The performance of this AI tool needs to be evaluated over many smear samples collected from various hospitals spread across the country before using it as a screening tool. We wish to signify how the trending technology – cloud computing – shall prove beneficial in evaluation and further usage of this tool. Explained in simple words, cloud computing offers an easy way to store and share data via internet (such as e-mail). Cloud facilities such as Amazon Web Services and Microsoft Azure are being offered by big software companies such as Amazon and Microsoft, respectively, for improving the healthcare sector.2 Authors are suggested to make use of any of these services to enable easy access to the CNN model via internet.

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CSEIJ-09

Upgrading the Performance of Machine Learning Based Chronic Disease Prediction Systems using Stacked Generalization Technique

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International Journal of Computing and Digital Systems (Scopus)
ISSN: 2210-142X, Volume 10, Pages 1-9, 2020/7/1

Abstract

During the past few years, mortality due to chronic diseases has increased manifolds globally. Low- and middle-income group countries are worst affected as the healthcare facilities are neither affordable nor accessible easily. The challenges of unaffordable and inaccessible healthcare can be faced graciously by using machine learning based prediction models. These techniques are used to learn patterns from the medical datasets and build decision support systems for diagnosis of diseases in early stages and hence prevent high mortality. This research work is aimed at upgradation of the performance of chronic disease prediction models using Stacked Generalization approach. In this work, stacked generalization ensembling approach has been applied over five base classifiers namely Logistic Regression (LR), K-Nearest Neighbours (KNN), Support Vector Machines (SVM), Naïve Bayes (NB) and Decision Tree (DT) with 10-fold cross validation. Experimental results highlight the effectiveness of Stacked Generalization method in enhancing accuracy, sensitivity, specificity, positive predictive value, and negative predictive value of prediction system by reducing variance error to avoid overfitting. The prediction models developed in this study can efficiently be used in primary health care centres to diagnose five chronic diseases namely cardiovascular diseases, diabetes, breast cancer, hepatitis, and chronic kidney disease.

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CSEIJ-10

Tree Integrated High Utility Miner for Improving an Efficiency of Association Mining

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[2]Department of Computer Engineering Dayananda Sagar University Bengaluru, India

TEST Engineering & Management
Volume 83, Pages 15938 – 15946, 2020/6

Abstract

Finding associations among the items is the crucial step in the discovery of frequent itemsets. Traditional association mining algorithms include, apriori, frequent-pattern growth (FPgrowth) are performing well in a frequent item-sets generation. Both mining algorithms use the support-confidence framework for filtering out the item sets based on infrequent nature. In significant applications, like e-commerce, web recommendations, and healthcare, the support-confidence framework is not enough due to unable to considering the influenced utility factor. It is required to develop utility-based mining algorithms to overcome the limitation of traditional algorithms. Recent advances in association mining were focused on the development of utility-based mining algorithms. This paper presents the proposed work related to utility and frequent itemsets based mining algorithms using tree structure construction for performing active utility-based association mining.

The experimental section describes the efficiency of the proposed methodology with the demonstration of experimental results conducted on benchmarked datasets.

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CSEIJ-11

Descriptive Analysis of Sentiment Analysis in Big Data Social Streams

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International Journal of All Research Education and Scientific Methods (IJARESM),
ISSN: 2455-6211Volume 8, Issue 11, November-2020,

Abstract

Rapid improvement of internet, users express their feelings and views on internet. With the rapid development of social media, different users share valuable location on changing reviews, ideas on different services. Opinion mining is the growing area, which describes different user's feedback about any concept, relates to social media applications from big data sources. Sentiment analysis (SA) is an application of Natural Language Processing (NLP) has been witnessed of blooming interest over past years. Generally sentiment/opinion be the classifying the basic representation of text positive, negative and neutral expressions of different users. Traditionally different calculation methods/approaches/algorithms available for mining opinion of different users in social networks. Before applying any algorithm to explore opinion mining there are basic steps available i.e. pre-processing, polarity detection is carried out sentiment over document level, sentiment level like different granularities. This paper describes about different calculations and evaluation of social related sentiment analysis challenges discussed in real time fields.

Keywords: Sentiment Analysis, Natural Language Processing (NLP), Opinion Mining, Social Media, MachineLearning, Web Content.

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CSEIJ-12

Efficiency analysis of AODV, DSDV, DSR routing protocols

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International Journal of Engineering Applied Sciences and Technology, 2021

Vol. 5, Issue 11, ISSN No. 2455-2143, Pages 181-184(March-2021)

Abstract

MANET stands for Mobile Ad-Hoc Network; they consist of mobile nodes that offer a routable networking environment in the link layer. The nodes are connected wirelessly in a self-healing, self-configured network that have no fixed infrastructure or centralized management. Routing in MANET's is a very inconvenient process as wireless links in this network are highly prone to error and go down frequently because of the mobility of nodes. Therefore, it is a highly researched topic around the world, and to overcome such difficulty many routing protocols have been suggested around the world to improve its efficiency. Some protocols used in this paper are Ad-hoc On-demand Distance Vector (AODV), Destination Sequenced Distance Vector (DSDV), and Dynamic Source Routing. This paper hopes to summarize all the recent work done on MANET Routing protocols and the network simulator tool.

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CSEIJ-13

Characterization and Detection of Behavioral Patterns in Videos

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SEYBOLD Report Journal, Volume 15, 2020, 1533-9211 (ISSN)

Abstract

We applied Deep learning Convolutional Neural Network for detecting visual features like happy, sad, neutral and expressive by training 1,00,000 video frames of TED talk and various other talks. For audio feature extraction we have extracted the main audio features like STE (Short Term Energy, ZCR (Zero Crossing Rate), Magnitude and Standard Deviation of the audio file. Analyzing textual content in videos to characterize the behavior of speaker is very crucial point in our thesis as only audio and visual features are not sufficient to robustly detect and characterize the behavior of speaker. The IBM Watson Tone Analyzer service uses language analysis to identify emotional and language tones in written documents. This service detects tone at both document level and text (sentence) level. This service helps us to understand perceiving of our written communications and also to improve tone of the communications. We are also using Long Short Term Memory (LSTM) systems to categorize a text blob's sentiment into positive, neutral and negative. Finally we combine audio, visual and text features to develop a recommendation system of 27 categories, to analyze the behavior and ability of the speaker and recommend the future speakers to know the main factors which affect their public speaking skills and how to work for betterment of their speech.

Keywords: We would like to encourage you to list your keywords in this section.

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CSEIJ-14

Speech Quality Assessment Using Audio Features

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Journal of University of Shanghai for Science and Technology, ISSN: 1007-6735, Volume 22, Issue 10, October – 2020, pp:2126-2125

Abstracts

This paper discusses the design of features that aid in the classification of the quality of speech of a speaker. The data used in this study pertains to TED Talks. Since most TED speakers are high achievers and expert orators, we have a rich source of audio cues that define speech that is appealing to a large audience. The features used to categorize the speech quality can be the basis of analyzing the speech quality of novice speakers. Such a system can be used to draw a novice speaker‟s attention to specific areas of improvement, such an increase in amplitude or maintaining vocal consistency 22 and facilitate directed effort towards improving the quality of one‟s speech. We use a speaker classification technique designed and developed in house including Short Term Energy (STE), Zero Crossing Rate (ZCR), Mean power, Pitch, Magnitude and standard deviation. Finally we use an unsupervised classifying method called “Hierarchical clustering technique” to group speakers into 6 categories.
Keywords: Mean Power, Magnitude, Short Term Energy (STE), Standard Deviation, Zero Crossing Rate (ZCR).

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CSEIJ-15

Secure and load balanced routing model for wireless sensor networks

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Journal of King Saud University - Computer and Information Sciences
Available online 28 October 2020,In Press,
https://doi.org/10.1016/j.jksuci.2020.10.012

Abstract

Wireless sensor networks (WSNs) play a very important role in providing real-time data access for Big Data and Internet of Things applications. However, the open deployment, energy constraint, and lack of centralised administration make WSNs very vulnerable to various kinds of malicious attacks. In WSNs identifying malicious sensor devices and eliminating their sensed information plays a very important role for mission critical applications. Standard cryptography and authentication schemes cannot be directly used in WSNs because of the resource constraint nature of sensor devices. Thus, energy efficient and low latency methodology is required for minimising the impact of malicious sensor devices. This paper presents a secure and load balanced routing (SLBR) scheme for heterogeneous clustered based WSNs. SLBR presents a better trust-based security metric that overcomes the problem when sensors keep oscillating from good to bad state and vice versa, and also SLBR balances load among CH. Thus, aids in achieving better security, packet transmission, and energy efficiency performance. Experiments are con- ducted to evaluate the performance of proposed SLBR model over existing trust-based routing model namely Exponential Cat Swarm Optimisation (ECSO). The result attained shows SLBR model attains better performance than ECSO in terms of energy efficiency (i.e., network lifetime considering first sensor device death and total sensor device death), communication overhead, throughput, packet processing latency, malicious sensor device misclassification rate and identification.

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CSEIJ-16

Secure Cloud Backup for Data Sources Based on Blockchain

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Journal of Physics Conference Series 1964(4):042062, July 2021
DOI:10.1088/1742-6596/1964/4/042062

Abstract

Users can upload, save and download their data with cloud storage. The cloud does however handle the user's generation of data, as well as devices created by the fast Internet development of stuff, including such webcam, and IoT and edges cameras. This growth in outsourced data volume has posed two main problems in cloud infrastructure cloud management: optimum data storage and data protection. Cloud storage employs a deductibility strategy to prevent redundant data to solve the former problem and uses cryptography to solve the latter problem. Both of these questions however are orthogonal. The convergent encryption is concurrently tackles the two problems. The conventional systems rely on web server, however which put some confidence in a private entity that may malfunction in one stage. In this paper we propose a new, transparent, authenticated online storage framework, which removes data replication from the security of the file and enhances the credibility of blockchain software. Two different approaches to data deduplication secrecy are discussed, in particular: double hazing is used and symmetrical encryption is used. We have implemented the suggested architecture in order to show stability and accessibility in spite of the increase request throughput requirements for cloud data processing.
Keywords: Block chain, encryption model, deduplication, data secrecy, cloud.

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CSEIJ-17

Sampling - based visual assessment computing techniques for an efficient social data clustering

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The Journal of Supercomputing, January 2021, https://doi.org/10.1007/s11227-021-03618-6

Abstract

Visual methods were used for pre-cluster assessment and useful cluster partitions. Existing visual methods, such as visual assessment tendency (VAT), spectral VAT (SpecVAT), cosine-based VAT (cVAT), and multi-viewpoints cosine-based similarity VAT (MVS-VAT), effectively assess the knowledge about the number of clusters or cluster tendency. Tweets data partitioning is underlying the problem of social data clustering. Cosine-based visual methods succeeded widely in text data clustering. Thus, cVAT and MVS-VAT are the best suited methods for the derivation of social data clusters. However, MVS-VAT is facing the problem of scalability issues in terms of computational time and memory allocation. Therefore, this paper presents the sampling-based MVS-VAT computing technique to overcome the scalability problem in social data clustering to select sample inter-cluster viewpoints. Standard health keywords and benchmarked TREC2017 and TREC2018 health keywords are taken to extract health tweets in the experiment for illustrating the performance comparison between existing and proposed visual methods.

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CSEIJ-18

A Data Centre Configurable Data Mining Document Management Information System

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Journal of Physics Conference Series, July 2021, 1964(4):042095, DOI:10.1088/1742-6596/1964/4/042095

Abstract

Data extraction is often a dynamic process that can be easily modelled as a workflow for data processing. When massive collections of data have to be evaluated and/or sophisticated data mining algorithms have to be performed, it can take very long to execute data analysis workflows. Effective technologies are also needed to incorporate flexible data collection workflows through the use of cloud-based storage platforms, where data is stored even more regularly. The paper attempts to show how cloud infrastructure is implemented to introduce an optimised framework in which scalable data analyzation workflows can be planned and performed. We explain how the Data Mining Cloud Architecture is built and applied and a data analytics method that incorporates visual workflow vocabulary, parallel to the Virtualized environment. DMCF is developed with a view to simplifying the creation of applications for data mining associated with generic system monitoring schemes that are not created especially for this area, in view of the specifications of actual data mining applications. The effects are a high-level environment that minimises the programming effort with an optimised visual workflow language, allowing the implementation of typical patterns meant to generate and execute data mining application in parallel simple to professional developers. The wall mounted of the workflow, device design and mechanisms of the DMCF are shown. We also address many DMCF-developed data mining business processes and the scalability achieved by running business processes in a cloud environment.

Keywords: data mining, document management, management information system, Workflow, job predictions.

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CSEIJ-19

Phrase-Level Sentence Patterns for Estimating Positive and Negative emotions using Neuro-Fuzzy Model for Information Retrieval Applications

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Multimedia Tools and Applications
DOI: 10.1007/s11042-020-10422-6, Volume 80, pages20151–20190 (2021)

Abstract

The paper proposes phrase-level emotion patterns using Neuro-Fuzzy model. At the initial stage, the emotional patterns at phrase level are obtained using POS Tags and EMOT_Actifiers, which results into 16 patterns. These patterns works well with the sentences having single emotion and classifies them as Positive and Negative polarities. However, it is observed that these patterns unable to define the exact boundary between positive and negative polarities of these sentence patterns. Thus, this issue will affect the classification accuracy due to imprecise boundary between the sentences. Mixed emotions exist in long sentences with multi phrases and thus the sentences are broken at Phrase-level. The patterns are extracted at phrase-level and converted as fuzzy rules for the classification of mixed emotion patterns. Intensity grades are calculated for the patterns based on the features of phrases and their structure in the sentence. These intensity grades classify the patterns at phrase level into Positive and Negative emotions. Based on the intensity grades, a suitable weighing mechanism is proposed for the multi phrasal sentence structure which decides the degree of Positive and Negative polarities of emotion in a sentence. Higher weighted phrasal pattern decides the Positive and Negative polarities of emotion in a sentence. Proposed approach performs well and achieves good F-Scores compared with other comparative approaches on benchmark datasets.

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CSEIJ-20

Geometrical features of lips using the properties of parabola for recognizing facial expression

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Cognitive Neurodynamics
Volume 15, Pages 481–499 (2021), https://doi.org/10.1007/s11571-020-09638-x

Abstract

Various real-time applications such as Human–Computer Interactions, Psychometric analysis, etc. use facial expressions as one of the important parameters. The researchers have used Action Units (AU) of the face as feature points and its deformation is compared with the reference points on the face to estimate the facial expressions. Among many parts of the face, features from the mouth contribute largely to all the well-known emotions. In this paper, the parabola theory is used to identify and mark various points on the lips. These points are considered as feature points to construct feature vectors. The Latus Rectum, Focal Point, Directrix, Vertex, etc. are also considered to identify the feature points of the lower lips and upper lips. The proposed approach is evaluated on benchmark datasets such as JAFFEE and Cohn–Kanade dataset and it is found that the performance is encouraging in understanding the facial expressions. The results are compared with contemporary methods and found that the proposed approach has given good classification accuracy in recognizing facial expressions.

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CSEIJ-21

Interval graph of facial regions with common intersection salient points for identifying and classifying facial expression

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Multimedia Tools and Applications
Volume 80(11), Pages 1-24, DOI:10.1007/s11042-020-09806-5

Abstract

Measuring the facial expression is an important research and used in many real-time applications. Various methods are proposed in the academia and industry for a decade and still continue to have research potential. This paper proposes a novel scheme by using Interval graph of facial regions. It is assumed that common intersecting salient points of facial regions can be used for estimating the emotions. The facial region is decomposed in four sub regions and the Interval graph is extracted for each region. The common salient points and degree of deformation and direction of deformation are measured for vertical, horizontal and diagonal directions. These values are considered as feature vectors. The well-known datasets such as JAFEE and CK++ are used for evaluating the performance of various classification algorithms and estimating their average classification accuracy. The average classification of the proposed approach is 95.9% and 94.7% for CK++ dataset and JAFEE dataset respectively. The performance of the proposed approach is better when compared to other state of art approaches.

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INTERNATIONAL CONFERENCE PUBLICATIONS

CSEIC-01

Analyze the Legislative Framework relating to Surveillance and Right to Privacy : Issues and Challenges

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IOP Conference Series: Materials Science and Engineering
ISSN: 1757-899X, Volume 981, pages 022063 (2020)

Abstract

India is world's largest democracy of the world and accordingly protects free speech and expression through its laws and constitution, still freedom of speech and expression is not absolute and privacy in online sphere is being restricted for many reasons. There are several reasons for which speech and expression is being curtailed such as- defamation, maintenance of national security and communal harmony are major reasons for which they can be curtailed. Under the Indian Constitution, the scope of Article 21 is multi-dimensional. The laws of torts, criminal laws as well as property law also contain a right to privacy in this paper to examine the adequacy and balance between the privacy of the person and the protection and the safety of the country within the legislative structure relevant to surveillance. It is ironic that the majority of Indians were protected from cyber surveillance PRISM not because they were well shielded from any potential violation of their privacy, but actually because they were not yet able to be online. It also shows that even today, most Indians do not have computer access and do not have access to resources to ensure they are covered of any covert activity by surveillance agencies. But this is definitely not something that the government or the Indian people would stabilize.

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CSEIC-02

Cyber Security Challenges and Its Emerging Trends on Latest Technologies

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IOP Conference Series: Materials Science and Engineering
ISSN: 1757-899X, volume 981, pages 022062 (2020)

Abstract

Today, due to the modern life style people have joined technology life and using more technology for shopping as well as financial transactions in their cyber space. At the same time, safeguarding of knowledge has become increasingly difficult. In addition, the heavy use and growth of social media, online crime or cybercrime has increased. In the world of information technology, data security plays a significant role. The information security has become one of today's main challenges. Whenever we think of cyber security, we first of all think of 'cybercrimes,' which expand tremendously every day. Different government and businesses take various steps to avoid this form of cybercrime. In addition to numerous cyber protection initiatives, many people are also very worried about it. This paper focuses primarily on cyber security concerns related to the new technology. It also concentrates on the new technologies for cyber security, ethics and developments that impact cyber security.

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CSEIC-03

Data Science and Machine Learning Integrated Implementation Patterns for Cavernous Knowledge Discovery From COVID-19 Data

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IOP Conference Series: Materials Science and Engineering
ISSN: 1757-899X, volume 981, pages 022004 (2020)

Abstract

Pandemic is a well-known term for the year 2020. It's essentially a disease that spreads across a region or the entire planet. The entire planet appears powerless, and a jerk triggered by a virus outbreak has halted. On 11 March 2020, WHO announced Corona Virus disease 2019 (COVID-19) a pandemic. The outbreak or epidemic of the virus differs widely from one nation to another. Society is the secret to solving the pandemic. Fever is one of the common, easily detectable symptoms of COVID-19. The COVID 19 in India is one of the most widespread pandemics caused by extreme acute corona viral syndrome2 (SARS-CoV-2) in coronvirus disease 2019 (COVID-19). On 30 January 2020, the original case of COVID-19 in India, arising in China, was registered. India currently has the highest number of confirmed cases in Asia and the second largest number after the United States of America in the world, with a combined number of confirmed cases exceeding the thresholds of 100,000 on 19 May and 1.000,000 confirmed cases on 17 July 2020. The largest one-day increase in COVID-19 cases of 78,761 cases was observed in Indian countries on 29 August 2020, surpassing the previous record in US cases of 77,368 on 17 July 2020.Nowadays, data science tasks are not limited to traditional data analysis with limited attributes and records. In current scenarios, the real-time datasets are huge with enormous attributes and such datasets are very complex to evaluate using classical data analysis tools. For example, the datasets of the medical domain integrate several attributes in which the information of symptoms, diagnosis, travel history, health parameters, and many others are evaluated. To deal with such types of datasets assorted database query tools and programming languages are used.

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CSEIC-04

An Efficient Framework to Bifurcate Healthy and Diseased Vegetables and Fruits Using Multimodal Approach

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Data Engineering and Intelligent Computing. Advances in Intelligent Systems and Computing, vol 1407. May 2021, Springer, Singapore. https://doi.org/10.1007/978- 981-16-0171-2_44

Abstract

The importance of agriculture is known to mankind at the start of early human civilization, whereby farming and use of domestic animals created food supplies to people which helped cities to develop. Due to immense growth of population and industrialization, the demand for fruits and vegetables is more than its supply. Considering the wastage factor of modern agriculture, early detection of diseased fruits and vegetables by image processing and its techniques can hugely benefit in preventing rotting and its spread to neighbouring crops. Generally, these diseased fruits and vegetables are plucked by manual inspection. The same work is done by the autonomous robot with pattern and machine learning-based detection and recognition of diseased fruits and vegetables which covers much greater distance in a short period of time. The objective is divided into three stages. Firstly, after some basic preprocessing steps, the local and global features of diseases in fruits and vegetables are extracted using well-known algorithms of pattern recognition in feature extraction phase. Then the techniques like supervised and unsupervised learning are used to categorize them effectively and stored the same in training database. Then secondly, validating is done using k-NN classification and k-NN regression which is a type of instance-based learning. Lastly, after identification of the diseased fruit or vegetable, the robot plucks the target infected object and this cycle continues until it reaches the end of the agricultural land. This is beneficial for people like farmers, gardeners, home makers who have little or no information about the diseased crops which are growing and this invention saves their time and health by increasing the yield of healthy fruits and vegetables. Instead of having an expert agronomist to find out and study the disease every time, the robot can identify it by placing certain algorithms.

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CSEIC-05

A Novel Model for Disease Identification in Mango Plant Leaves Using Multimodal Conventional and Technological Approach

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Data Engineering and Intelligent Computing. Advances in Intelligent Systems and Computing, vol 1. Springer, Singapore. https://doi.org/10.1007/978-981-16-0171-2_44, (May 2021)

Abstract

Mango is considered as the king of fruits. India has the richest collection of mango cultivation and is an important fruit crop having socioeconomical significance. The fruit is admired because of the wide range of compliance, high nutritive value, medicinal values, excellent flavor and richness in variety. This has created high demand for mango in market. But, on the other hand, supply of mango to market is not sufficient, and the reasons could be many more, but plant disease problem stands first among all the problems. If there is no adequate yield of mango for export, there is increase of the price in market, which affects the common man to utilize the benefits of the same. Mango plants suffer from several infectious diseases and disorders including fungal, bacterial and other parasites of the tree as well as fruits. This drastically decreases yield and its quality. The identification of the diseases using conventional methods is time consuming, and there can be over usage of chemicals to overcome the diseases. The technological methods along with conventional methods can be used to identify the diseases efficiently and treat the disease time and cost effectively. This paper gives thorough knowledge to the readers/researchers on different types of mango plant diseases and the procedure followed in conventional and technological domains to identify the plant diseases.

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CSEIC-06

Study of different feature extraction method for visual speech recognition

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Published in: 2021 International Conference on Computer Communication and Informatics (ICCCI) INSPEC Accession Number: 20552367, DOI: 10.1109/ICCCI50826.2021.9402357, Publisher: IEEE

Abstract:

The prime rule of visual speech recognition is lip-reading under noisy conditions because visual features are less sensitive to noise. It is a very challenging task to extract significant visual features. Visual articulations are different for different speakers and contain very less discriminative features to recognize visual speech. Thus, to recognize visual speech, geometric and texture based features are widely used. This paper presents different visual features for lip reading and the comparative analysis of these features. Local Binary Pattern (LBP), discrete cosine transforms (DCT) and LBP-three orthogonal planes (LBP-TOP) are widely visual features. Here, we use these features for visual speech recognition and also introduce a comparative analysis of different visual features. Artificial Neural Network (ANN) and Support Vector Machine (SVM) classifiers are applied for classification of visual speech.

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CSEIC-07

A Review of Arrhythmia Classification with Artificial Intelligence Techniques: Deep vs Machine Learning

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Published in: 2021 2nd International Conference for Emerging Technology (INCET), INSPEC Accession Number: 20765382, DOI: 10.1109/INCET51464.2021.9456394, Publisher: IEEE

Abstract:

Cardiovascular diseases like arrhythmia are a significant health concern worldwide, affecting both elderly and young population due to lifestyle changes. Early diagnosis of cardiac arrhythmia using Electrocardiogram (ECG) by trained cardiologists is vital to prevent heart ailments and save lives. With the growth of wearable and standard ECG monitoring devices and a dearth of qualified cardiologists required to analyse the vast amounts of data collected, automated arrhythmia detection by Machine Learning (ML) and Deep Learning (DL) techniques have become very popular in recent years. In this study, we have reviewed the literature and described standard ML and DL studies in ECG arrhythmia classification. While ML techniques do demonstrate very good metrics, ML classifiers like SVM, nearest-neighbours, Decision Trees, etc. need pre-processing and hand-crafted feature extraction. DL methods which use networks like Convolutional Neural Networks (CNN), Long-Short-Term-Memory (LSTM) do not need any feature extraction as they automatically learn the features by themselves. Recent studies in DL have demonstrated very high performance metrics without the need for feature extraction. While some DL techniques do need noise filtering and determination of other features like the QRS complex, many of them can work with raw ECG signals and hence are ideally suited over their ML counterparts for real time ECG classification. DL networks can also be used as feature extractors and combined with ML classifiers. We thus conclude that state-of-the-art DL methods offer inherent advantages and flexibility over ML methods for automated arrhythmia classification. This review aggregates the niche features of leading ML and DL studies in this field which interested researchers can benefit from.

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CSEIC-08

A NOVEL COMPUTER AIDED DIAGNOSIS SYSTEM FOR LUNG TUMOR BASED ON SUPPORT VECTOR MACHINE

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Second International Conference on Image Processing and Capsule Networks. ICIPCN 2021. Lecture Notes in Networks and Systems, vol 300. Springer, Cham. Pages: 752-766 (2021), https://doi.org/10.1007/978-3-030-84760-9_64.

Abstract

A cursory web search brings into view that cancer of the lungs takes more lives every year compared to colon, breast and prostate cancer combined. These sobering revelations were enough to make us consider investigating the current prognostic techniques in detail and possibly propose one of our own which might hopefully be good enough to supersede the existing ones. This paper proposes a robust Computer Aided Diagnosis (CAD) system that allows identification of lung cancer through analysis of Chest Computed Tomography (CT) images of the lung region and classifies the tumor as Benign or Malignant.

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CSEIC-09

A Systematic Approach For Data Cleansing Process ofGeospatial Data to Perform Application Specific Data Analytics

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Springer International Conference on Computing, Communication and Control, System, I3CAC 2021, 7-8 June 2021, https://eudl.eu/proceedings/I3CAC/2021

Abstract

Data Analytics is the key word of today's era. Huge data is getting generated day by day from various resources starting from social networking sites to sensors then machines. How this can be handled in effective manner to get some value out of it, this is the biggest question in front of all engineers today. Geo Spatial Data, this data is another type of data which is getting produced because of the objects on the surface either they are static or dynamic. As per the statistics every year there is a 20% increase in Geospatial data production. And this Geospatial Data can be used for multiple purposes in various applications like autonomous vehicles, location based services, identifying the object in surface etc..., but the biggest challenge faced here is how this data can be analyzed and stored for future purpose. This data may be live data or stored data, it might be structured, un-structured or quasi structured data, it might be with duplicates or without duplicates and with null values or without null values. The challenge here is how this data can be used to perform data analytics and produce the results which can be used for future use. In the proposed research the main concentration is on how Geospatial data can be cleaned and made ready to use for data analytics for future use in applications like driverless vehicles, Location Based Services etc.., the first step in performing data analytics is collecting the Geospatial data then cleaning the same for further use. Once it is cleaned and ready to use the data analytics will be performed for further decision making.

Keywords: Data Analytics, Geospatial Data, Structured, Quasi Structured, Un-Structured.

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CSEIC-10

Improving the performance of heart disease prediction system using ensembling techniques

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AIP Conference Proceedings
Volume 2316, Issue 1, 2021/2/16, Pages 050002

Abstract

Machine learning is bringing a revolution in the healthcare domain. These algorithms have an immense capability to generate hidden insights from the data generated by the healthcare sector. These insights can be used to predict the risk of occurrence of fatal diseases in an early stage. Heart diseases pose a serious threat to the lives of people specifically in low- and middle-income group countries. Early detection of heart diseases using machine learning can be an effective way to prevent these diseases. In this research, a system was built to predict heart diseases. Freely available online dataset to predict heart diseases was used in the study. In this paper, a comprehensive effort has been made to enhance the performance of the prediction system. Ensembling techniques namely bagging and boosting have been applied. Experimental results prove that these techniques effectively improve the prediction.

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CSEIC-11

Health 4.0-Can India Make it?

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9th International conference System Modeling and Advancement in Research Trends (SMART), IEEE Xplore (Scopus), DOI 10.1109/SMART50582.2020.9336796, 2020/12/4, Pages 459-462

Abstract

In healthcare sector, industry 4.0 is known as health 4.0. Health 4.0 refers to transformation of healthcare sector using digital technologies. This paper discusses the obstacles in adopting health 4.0 in India. After extensive literature review and discussions with experts from healthcare and information technology sector, twelve obstacles were identified. Risk of losing jobs, apprehensions regarding digital technologies, lack of clarity of data privacy regulations, and shortage of interdisciplinary research activities were the major points of concern. Timely steps taken by the government authorities will help realize the aim of health 4.0 - to reduce the cost of treatment and improve quality of healthcare.

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CSEIC-12

EEG Signals in Epilepsy Seizure Detection: An Empirical Study

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IEEE 4th International Conference on Electronics, Communication and Aerospace Technology (ICECA) IEEE Xplore (Scopus), DOI 10.1109/ICECA49313.2020.9297632, 2020/12/28, Pages 295-300

Abstract

A seizure is an uncontrolled electrical disturbance in the brain that causes changes in behavior, movements or feelings, and in the levels of consciousness. The occurrence of recurrent seizure in patient indicates the presence of epilepsy, which directly affects central nervous system. The detection of Epilepsy is performed based on the Electroencephalogram (EEG) signals, which helps in recognizing the mental state of the patient suffering from the brain disorders. Since the manual detection and monitoring of electrographic seizures in continuous EEG is very time-consuming and requires a trained expert, so attempting to develop an automatic seizure detection is challenging task Various researches have been studied on Epilepsy disease using machine learning and big data concepts. Several features, classifiers, and data transformation have been used to classify seizures based on EEG signals that recognize the mental state of the patient. The features used from feature extraction, data transformation and decomposition techniques are summarized with a comparative study with respect to the performance metrics. The present research gives an overview of the seizure detection from the EEG signals and also provide challenges during seizure determination. A comparison is made among the state-of-art techniques and the algorithms that are involved in the Epilepsy seizure determination. The comparative analysis for the Epilepsy seizure determination was evaluated by means of accuracy, precision, sensitivity, and specificity. At last, an efficient emprical mode decomposition (EMD) algorithm is used for seizure detection to overcome the limitations faced in existing research and clearly explained in this research.

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CSEIC-13

Soil Moisture Sensor Using for Smart Irrigation System

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Innovative Applications of Emerging Technologies and Management,2021
https://www.piemr.edu.in/wp-content/uploads/2021/02/Innovative-Applications-of-Emerging-Technologies-and-Management-11-06-2021.pdf

Abstract

In this world green food plays a major role for every living being. To feed an empty stomach a farmer plays a vital role to grow green and healthy food. In this developing world IoT plays a vital role in technology and computer development. India is a country of agriculture and farmers. About 70% of the total population depends on agriculture for their sustenance and is a major source of earning. Because of IoT development there are so many applications of it like smart cities, smart rooms and one of the major applications that is under development is SI. A SI is a concept helpful to farmers as well as economic growth of a country. A SI is the application of controlling the level of water to the soil according to plants needs and is more feasible economically. Generally, farmers depend on monsoon for water to irrigate their crops but by using this technology farmers will control this level smartly from anywhere across the globe. After use of SI, a farmer doesn't have to wake up early to see the water level of his/her irrigation field. The objective of this paper is to explain the needs of SI in our day to day farmer life. We are implementing this Smart irrigation system by using the concept of IOT which is sometimes referred to as 'INTERNET OF EVERYTHING'. The IOT enables us to connect multiple devices including sensors, computers, mobile phones and many more within a connection. Here sensors are the vital components that collect the data/information from the surrounding and process that data. IoT works with sensors/devices, connectivity, data processing and user interface.

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NATIONAL CONFERENCE PUBLICATIONS

CSENC-1

HANDWRITTEN DIGIT RECOGNITION USING DEEP LEARNING

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3, pages- 187-193(2021)

Abstract

Handwriting recognition using traditional systems depends on hand-designed features and a large amount of prior knowledge. Research in the handwriting recognition field is focused on deep learning techniques and has accomplished improvement in its performance in the last few years. This paper focuses on incorporating Convolutional Neural Networks for handwritten digit recognition in the field of deep learning. Convolutional neural networks are very effective in observing the design of handwritten characters in ways that help in the automatic extraction of features and this makes CNN the most suitable approach for solving handwriting recognition problems. CNN and Ensemble Machine learning algorithms are compared and evaluated in terms of accuracy and performance. Our point in the proposed work is to investigate the various options like a number of layers, kernel size, and padding for CNN-based handwritten digit recognition and design a Multi Classifier model which is an ensemble model of three algorithms-Support Vector Machine, K-Nearest Neighbor, Random Forest. Also, design a GUI for the CNN model which can recognize digits. The results show that CNN is the most accurate algorithm; it has a 99.26% accuracy rate. whereas the multi-classifier model has a 98.06% accuracy rate. Thus, a CNN architecture achieved accuracy even better than that of ensemble architectures, along with reduced complexity and cost.

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CSENC-2

A CLOUD COMPUTING FAULT DETECTION ANALYSIS

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

Cloud computing provides a collaborative and challenging environment to the users. It has made software, platform, and infrastructural resources available as a service which is available on demand and is easily scalable. Accessibility of cloud computing is hampered due to it being vulnerable to failures. To utilize cloud services to their maximum extent it is important to effectively handle issues related to reliability and availability in cloud computing. Several types of faults may occur in cloud computing environments leading to failure and performance degradation. Therefore, fault detection is an important requirement to achieve highavailability in cloud computing. Data of cloud systems is collected, monitored and used to identify the state ofa cloud system and helps in Fault detection. In this paper we have done the literature survey of various fault detection methods in cloud computing.

Keywords—Cloud Computing, fault detection, fault tolerance, reactive fault tolerance, proactive fault tolerance.

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NATIONAL BOOK CHAPTERS

CSENB-01

UNSTRUCTURED DATA TO STRUCTURED DATA: A STUDY

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Glimpses of Engineering and Technology in the Modern World
ISBN: 978-81-942052-7-2, pages 126-132 (2020)

Abstract

The rapid growth of the internet has an immense impact on the information generated and shared by many organizations. It is around 90 percent of data that is of unstructured format, which the organizations process daily. Social media posts, IoT sensor data, satellite imagery, e-mails, etc., are the primary sources of the unstructured data. Accessing the information from unstructured data is a bit complicated because it doesn't have a pre-defined data model and also cannot be maintained in any form of a database. Structured data allows easy manipulation, querying and extracting crucial information from the data. As data is the life of the business, there is a necessity to manage and analyse the unstructured data for better insights and to reduce the storage complexity required for these large volumes of data. This can be accomplished by converting unstructured data to structured format. This paper presents various techniques to convert unstructured data into structured data.

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CSENB-02

Criticism of Cryptographic Encryption Algorithm for Securing and Protecting the Data in Cloud Computing

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Glimpses of Engineering and Technology in the Modern WorldISBN: 978-81-942052-7-2, pages 126-132 (2020)

Abstract

Cloud Computing is a developing technology today. Everybody in businesses and academics use cloud computing. It is inevitable that many security problems arise. When the same cloud is shared by multiple users which will lead to many security issues. Individuals and companies want their data to be secured. In cryptography system encryption techniques are used to secure and ensure the information which is stored in the cloud. This article presents various security algorithms to protect and secure the data. The main objective is to provide data security from unauthorized users during the time of data transmission. The paper presents recent security algorithms and techniques which are proposed by various authors to secure the data which are stored in the cloud.

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CSENB-03

Book: Challenges and Opportunities for the Convergence of IoT, Big Data, and Cloud Computing

Real-Time Problems to Be Solved by the Combination of IoT, Big Data, and Cloud Technologies

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IGI Global
ISBN13: 9781799831112, Pages 265-276, DOI: 10.4018/978-1-7998-3111-2.ch015

Abstract.

This chapter brings out the perspective outcomes of combining three terminologies: artificial intelligence, cloud, and internet of things. The relation between artificial intelligence, machine learning, and deep learning is also emphasized. Intelligence, which is the capability to attain and apply knowledge in addition to skills, is analyzed in the following sections of the chapter along with its categories that include natural intelligence, artificial intelligence, and hybrid intelligence. Analysis of artificial intelligence-based internet of things system is deliberated on two approaches, namely criterion-based analysis and elemental analysis. Criterion-based analysis covers the parameter-based investigation to highlight the relation between machine learning and deep learning. Elemental analysis involves four main components of artificial intelligence-based internet of things system, such as device, data, algorithm, and computation. Research works done using deep learning and internet of things are also discussed.

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CSENB-04

PRODUCTIVE TRAINING USING E-MAIL INTERFACE

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Glimpses of Engineering and Technology in the Modern World

Abstract

An application developer who builds user applications on an operating system like Linux spends most of his time compiling the code for traditional applications and training the model for Machine learning (ML) applications. For example, the training image classification ML algorithm takes several hours. So, any notification to the developer which provides the details of the task once it is completed and given them the facility to execute operating system commands remotely, will immensely help the developer and boost his/her productivity on a large scale idea can develop companies' productivity. Therefore, proposed is a method, an email operating system interface in which application developer can use to get a notification when his task is completed and also use the same interface to execute any operating system commands remotely using any mobile device. The proposed solution follows the multithreaded architecture, which helps to cater to the request from multiple users at the same time. The current solution uses a python daemon process to receive the operating system commands from a simple mail transfer protocol email interface and execute the same in a separate thread and share the output back to the user. Alternatively, users can employ this tool to get mail notification once the task like training algorithm is completed and based on the output user can modify the hyper-parameters and re-issue the model training command. Thus, with this approach productivity will help software developers and especially machine learning developers to speed up their software development efforts.

Keywords – Hyper-parameter tuning, Machine learning, Deep learning, OS commands.

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CSENB-05

Book: Challenges and Opportunities for the Convergence of IoT, Big Data and Cloud Computing

Chapter 15: Real-Time Problems to Be Solved by the Combination of IoT, Big Data, and Cloud Technologies

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IGI Global

ISBN13: 9781799831112, Pages 265-276, DOI: 10.4018/978-1-7998-3111-2.ch015

Abstract

This chapter brings out the perspective outcomes of combining three terminologies: artificial intelligence, cloud, and internet of things. The relation between artificial intelligence, machine learning, and deep learning is also emphasized. Intelligence, which is the capability to attain and apply knowledge in addition to skills, is analyzed in the following sections of the chapter along with its categories that include natural intelligence, artificial intelligence, and hybrid intelligence. Analysis of artificial intelligence-based internet of things system is deliberated on two approaches, namely criterion-based analysis and elemental analysis. Criterion-based analysis covers the parameter-based investigation to highlight the relation between machine learning and deep learning. Elemental analysis involves four main components of artificial intelligence-based internet of things system, such as device, data, algorithm, and computation. Research works done using deep learning and internet of things are also discussed.

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DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY
SCHOOL OF ENGINEERING

Publication Summary

International Journals	**02**	**(CSTIJ-01 – CSTIJ-02)**

DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY
SCHOOL OF ENGINEERING
INTERNATIONAL JOURNAL PUBLICATIONS

CSTIJ-01

Dynamic Pricing Techniques in Demand - Side Management Smart Electricity Grids: A Review

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International Journal of Advance Science and Technology, Vol. 29, No. 10S, (2020), 7025 - 7032

Abstract
Smart grid is the modern era of electricity for improving the country's economy. DSM equalizes energy consumption per day using different techniques, as it affects each consumer's unit cost. Pricing is one of the key components in electricity billing. The supplier prepares integrated electricity offers combining the three elements of the bill, i.e. energy, network costs and taxes and levies. Reducing the electricity cost at residential area is one of the major challenges in DSM. This paper highlights the insight of traditional electricity tariffs and disadvantages of traditional tariffs. The previously mentioned disadvantages can be overcome by Dynamic pricing. It sets flexible rate based on electricity demands. The application of dynamic pricing in electricity is already well known to the following parts of the world China, Korea, Japan and Asia. This paper gives clear picture of dynamic pricing programs RTP, TOU, and CPP, which will be useful for researchers and academicians.

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CSTIJ-02

Cognitive computing models for estimation of reference evapotranspiration: A review

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Abstract

Irrigation practices can be advanced by the aid of cognitive computing models. Repeated droughts, population expansion and the impact of global warming collectively impose rigorous restrictions over irrigation practices. Reference evapotranspiration (ET0) is a vital factor to predict the crop water requirements based on climate data. There are many techniques available for the prediction of ET0. An efficient ET0 prediction model plays an important role in irrigation system to increase water productivity. In the present study, a review has been carried out over cognitive computing models used for the estimation of ET0. Review exhibits that artificial neural network (ANN) approach outperforms support vector machine (SVM) and genetic programming (GP). Second order neural network (SONN) is the most promising approach among ANN models.

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING SCHOOL OF ENGINEERING

Publication Summary

International Journals	**06**	**(ECEIJ-01 – ECEIJ-06)**
National Journals	**05**	**(ECEJA-01 – ECEJA-05)**
International Conferences	**09**	**(ECEIC-01 – ECEIC-09)**
National Conferences	**40**	**(ECENC-01- ECENC-40)**
Book	**01**	**(ECEB-01)**

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
SCHOOL OF ENGINEERING
INTERNATIONAL JOURNAL PUBLICATIONS

ECEIJ-01

Detection of oral cancerous cells using highly sensitive one-dimensional distributed Bragg's Reflector Fabry Perot Microcavit

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Journal For Light And Electron Optics
ISSN:0030-4026, volume 244, 167599 (2021)

Abstract

In the proposed work, a multi-layered Distributed Bragg's Reflector (DBR) Fabry Perot Microcavity resonator is proposed theoretically to sense bio-analyte. One dimensional Photonic-Crystal (PhC) sensor is designed and analysed to sense the presence of oral cancerous cells in the analyte. The Characteristic Matrix Method (CMM) is used to design, model and analyse the proposed sensor. A multi-layer structure with a central defect having 3 pairs of high and low refractive index layers on either side of the defect is analysed for its sensing performance. The incident light having wavelength in the range of mid-infrared frequency is used at input source, which enhances the sensor sensitivity. Five normal (INOK) cells and oral cancerous (YD-10B) cells are considered for the analysis of sensor performance. The effect of variation in the geometrical length of central defect layer and the number DBR layers on resonant wavelength, sensitivity, and Q factor is performed. A highest sensitivity of 3630 nm/RIU with a Q-factor of 11,323 and a very minimum resolution of 9.5 × 10− 5 RIU is obtained. The sensor proposed in this work is suitable for labelfree, easy fabrication, cost-effective, and highly sensitive sensor designs for biomedical applications.

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ECEIJ-02

Centroid and Path determination of Planets for Deep Space Autonomous Optical Navigation

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International Journal of All Research Education and Scientific Methods (IJARESM), ISSN: 2455-6211 Volume 8, Issue 11, November-2020

Abstract

Autonomous space navigation might be the future of deep space navigation as ground-radio based navigation from earth is largely limited in terms of accuracy. The automation of interplanetary space-crafts would become more demanding for future deep space missions. Optical Navigation offers a method for autonomous navigation with the use of optical navigation sensor and a navigation camera on board. The objective of this project is to provide an algorithm for detection of celestial bodies (planets, satellites, etc.) and also predict its path. This is performed by use of a set of filters including the sharpening filter and the ring filter followed by least square method to find the center and radius of the planet/satellite. The algorithm is tested and verified on raw images. The path prediction of the celestial body is performed by taking a certain number of samples and using least square method to predict its path

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ECEIJ-03

Designing the parameters of an FSS antenna for communication systems Using an enhanced UTC-PSO approach

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Journal of Computational Electronics, 19, 1579–1587, 2020

Abstract

In recent years, communications-based applications have become increasingly important, depending principally on the design, architecture, and performance of the antenna. The design for an antenna for use in a proposed system must consider its range of applications in several fields. The use of a Frequency-Selective Surface (FSS) is proposed herein to vary the performance based on the design parameters. The FSS is optimized herein using the Particle Swarm Optimization (PSO) enhanced Ultra Wideband Tightly Coupled Array with Resistive FSS (denoted as the PSO-UTC-FSS approach). The PSO technique improves the accuracy of the designed antenna parameters. The FSS maintains the gain while reducing the bandwidth interference. Using these concepts, the losses are minimized, hence improving the radiation efficiency, gain, bandwidth ratio, etc.

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ECEIJ-04

An Efficient Content Prefetching Method for Cloud Based Mobile Adhoc Network

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Journal of Computational and Theoretical Nanoscience, Volume 17, Numbers 9-10, pp. 4162-4166(5). 2020,

Abstract

Recently, Mobile Ad-hoc Networks (MANETs) has emerged as a very important research area for provisioning service for remote client through internet, cloud computing, and cellular network. This work focusses on improving image access in MANET. Various method has been present recently for reducing data access and reduce query latency. Number challenges need to addressed such as caching, content prefetching, shared access environment, dynamic high speed node mobility environment etc. As mobile adhoc network is growing rapidly for the possessions of its capability in forming provisional network without the requirement of any predefined infrastructure, improving throughput (i.e., access rate), reducing bit error rate (BER) (i.e., query latency) has been a major concern and requirement in mobile adhoc network. This work aimed at building an efficient content prefetching technique of geographically distributed data for enhancing the access rate and reduce query latency. Along with, our model can minimize processing time and cost for carrying content prefetching operation. Experiment result shows the proposed content prefetching method improves bit error rate (BER) and throughput performance.

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ECEIJ-05

INTEGRATION OF IMAGE AND VIDEO SIGNATURE IN GRAPHICAL PASSWORD AUTHENTICATION SYSTEM

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International Journal of Engineering Research & Technology, Volume 9 Issue 5, ISBN 2275-0181, 2020

Abstract

In this study we are providing the security and authentication for the user. This paper includes two parts, Image processing using cued click point and video processing using clicked intervals, where the combination of both will generate a password for the user to login. To login its necessary that both the combination need to match. The user is allowed to select their choice of images and video for the process and it is stored in a private database so that they are not available to other users. The password generated by both image and video is hidden from both users and developers. This method is obtained for prevent unauthorized access to important and confidential data and to protect them.

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ECEIJ-06

Super resolution and recognition of unconstrained ear image

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International Journal of Biometrics, ISBN 1755 8301, Volume 12, issue 4: 396-410, 2020

Abstract

In this paper, a framework is proposed to super-resolve low resolution ear images and to recognise these images, without external dataset. This frame uses linear kernel co-variance function-based Gaussian process regression to super-resolve the ear images. The performance of the proposed framework is evaluated on UERC database by comparing and analysing the peak signal to noise ratio, structural similarity index matrix and visual information fidelity in pixel domain. The results are compared with the state-of-The-Art-Algorithms. The results demonstrate that the proposed approach outperforms the state-of-The-Art super resolution approaches.

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INTERNATIONAL CONFERENCE PUBLICATIONS

ECEIC-01

Monitoring of Rail Wheel Impact for Various Train Speeds

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8th International Conference on Computing for Sustainable Global Development (INDIACom), IEEE,2021

Abstract

In today's era, monitoring train speed is an important factor in structural health monitoring of trains in railways. In this work, finite element analysis has been done for rail wheel model using ANSYS15.0 software. Simulation of Fiber Bragg Grating sensor is done by GratingMOD. Here train speed varies from 20 to 80kmph to observe the stress and strain response on the rail, with maximum stress, 190.96 MPa, strain of 111.89e-5mm and total deformation of 697.4mm, at constant wagon weight 57.3tons. Shift in Bragg's wavelength is 1551.4845nm at maximum speed, 80 kmph

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ECEIC-02

A Systematic Survey on Radar Target Detection Techniques in Sea Clutter Background

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Bengaluru, India

International Conference on Smart Computing and Informatics (SCI), volume 224, Springer, pp 327-336(2021)

Abstract

Sea clutter is an unwanted return or echo signal which exhibits non-linearity and disarray and is random in nature. The reliable way of detecting the moving targets in the presence of clutter background has always been a setback in radar signal processing. The unwanted sea clutter greatly influences the target detection, which biases its characteristics and increases the difficulty of radar detection. With the development of advanced radar processing methods, the sea clutter can be suppressed considerably and targets can be detected reliably. In this paper, we report a review on current development in clutter suppression, clutter modeling based on the statistical modeling of sea clutter, which covers amplitude features of sea clutter, i.e., Rayleigh distribution, Log-Normal distribution, Weibull distribution, and K-distribution. The current developments in radar target identification methods are also conferred, within the framework of these clutter models. This review article provides a systematic comparison of various methods to suppress the clutter and to detect the target in a sea clutter environment.

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ECEIC-03

Compact High Gain Microstrip Patch Multi-Band Antenna for Future Generation Portable Devices Communication

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International Conference on Emerging Smart Computing and Informatics (ESCI)
ISBN-978-1-7281-8520-0 (2021)

Abstract

Telecommunication services have been developing at a continuously accelerating pace, and it is forecasted that it will accelerate even more, that is particularly so for the wireless communication system with the introduction of 4G and 5G and the integration of the Internet of Things (IoT). Microstrip patch antennas present undeniable advantages when compared to other antennas such as low cost, compact, planar surface, flexibility in performance parameters and easy fabrication. Such advantages have made these antennas so popular. The main objective of this research is to design an antenna operating at multiple frequencies with high performance. This paper discusses design of compact multiband antenna with microstrip-line-feed designed for future wireless devices applications. The introduced antenna is simulated using Rogers RT-5880 substrate of having dimensions 21 × 16 × 0.507 mm 3 with dielectric value 2.2 and 0.0009 tangent loss. Planned patch antenna operates initially at 10GHz with return loss -11.19dB and VSWR 1.76. I shaped slots on patch and defective ground structure technique is employed for multiband operation and improvement in performance parameters. Multiband antenna resonates frequencies 10, 21, 30and 34 GHz with return loss -19 dB, - 12dB, -12dB, -11 dB and VSWR 1.2, 1.5, 1.6, 1.82. International Telecommunication Union (ITU) specified these frequencies for radio astronomy, wireless LAN, satellite communications, DBS applications. Designed antenna provides gain 7.785dB, 3.508 dB, 7.510 dB,7.7746 dB at 10,21,30,34GHz respectively.

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ECEIC-04

Designing of adaptive depth control for autonomous underwater vehicle using type-2 fuzzy logic controller

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International Conference on Electrical and Electronics Engineering, ICEEE,

Springer Volume 661,pp 455-465(2021)

Abstract

Adaptive depth control for an autonomous underwater vehicle is presented in this research. The response of an underwater system is moderate compared to air monitoring systems. The slow response is due to the speed constraints and high density of water. Establishing an accurate control technique for AUV is a difficult task due to the nonlinearity of hydrodynamic elements. The depth control analysis was done using PID control and type-2 fuzzy logic controller (Type-2 FLC). Type-2 FLC is used to tune the PID controller. The dynamic functionalities of an AUV are determined by using six degrees of freedom differential equations of motion keeping fixed earth as reference. Modeling and analysis of AUV are presented in the research and simulation of the model is done using MATLAB. Precise results for depth analysis are obtained using type-2 FLC.

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ECEIC-05

An iot framework for healthcare monitoring and machine learning for life expectancy prediction C.

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Evolutionary Computing and Mobile Sustainable Networks , Springer,vol 53, pp-637-644,2021

Abstract

The beginning of the IoT era, shrinking of devices and the concept of intelligent independently learning machines have led to improvements in the quality of human life. The application of machine learning to IoT data has led to the automation of the creation of analytical models. One key area of research has seen such a revolution in the health care sector. This work aims to design a wireless healthcare system that detects patients vitals using sensors, transfers data to cloud, and predicts the approximate life expectancy using machine learning techniques. The notion of the Internet of Things (IoT) interconnects devices and offers effective health care service to the patients. Here the IoT architecture gathers the sensor data and transfers it to the cloud where processing and analyses take place. Based on the analyzed data, feedback inputs are sent back to the doctor and using the present pulse rate of the patient, nominal or approximate value of life expectancy is predicted using machine learning algorithms.

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ECEIC-06

Image Overlays on a video frame Using HOG algorithm

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IEEE International Conference on Advances and Developments in Electrical and Electronics Engineering (ICADEE), ISBN 978-1-7281-9252-9, pp. 1-5, 2021

Abstract

Snap chat is popularly known application where some cool and awesome face filters can be added on our pictures. This paper put forwards a technique for applying face filters on the detected facial region in the in a video frame and apply filters by taking input from user to select the desired filter that could applied on face region. Applying face filters on a captured video frame will be done by tracking and detecting faces using face detection algorithm in dlib based Histograms of Oriented Gradients (HOG) feature-based classifier and Linear Support vector Machine (LSVM) model is a commonly used model for detecting face. Results are obtained using Python code with Open CV and dlib library.

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ECEIC-07

Performance Analysis and Enhancement of QoS Parameters for Real-Time Applications in MANETs-Comparative Study

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International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), ISBN 978-1-7281-9773-9, pp. 256-260, 2021

Abstract

Mobile Ad Hoc Networks (MANETs) are self-directed wireless networks, which form dynamic topology and communicate through multi-hop networks. MANETs are playing an important role in technology from the last two decades, trends and usage of MANETs has drastically increased because of its wide range of applications. These include, Defense, Healthcare, vehicular Ad Hoc networks, commercial sector, Academic and Industrial Environment Applications, etc. As a result, MANETs have become one of the most rapidly emerging fields in the market. MANETs work with better QOS performance standards such as throughput, end to end delay, jitter, PDR, reliability, bandwidth. In this

paper priority aware mechanism in AOMDV protocol, Adaptive modulation & coding (AMC), delay and energy- aware protocol, Packet prioritization methods are being summarized. This paper provides a systematic comparison of the mechanisms used by various authors in developing algorithms and ways to improve their performance is being reviewed.

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ECEIC-08

Power Aware GALS Based Pipelined des System

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IEEE International Conference on Electronics and Communication Technologies (CONECCT), ISBN 978172816828, pp. 1-5, 2020

Abstract

The method of cryptography establishes the confidentiality for digital data transmission and storage. Cryptography is used in different applications like ecommerce, health-monitoring and military for protecting information. The Data encryption standard (DES) is widely used cryptographic algorithm due to its symmetric nature and economical implementation to provide short term data security. The same key and architecture set is used for encrypting and decrypting in DES algorithm accordingly. The substitution operation is performed by S-Box by using the key to obtain information uniquely. This paper implements DES algorithm using Globally Asynchronous Locally Synchronous (GALS) methodology which uses independent clock. This improves speed due to its pipelined architecture enabling concurrent data processing. The encryption and decryption engine are implemented by VLSI architecture. This architecture is simulated in Verilog HDL and synthesized on the Xilinx 14.2 device. The logical units of architecture on Field Programmable Gate Array (FPGA) increases by 6.25% to provide improved security. Hence, the speed is improved by trading off with area. This proposed method is proved to be robust for Differential Power Analysis (DPA) which is analyzed from the statistics of the processing time through 50000 encryptions.

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ECEIC-09

Efficient Communication Routing Through WiMax Network during Disaster

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International Conference on Recent Developments in Robotics, Embedded and Internet of Things (ICRDREIOT2020), Tamil Nadu, India, Materials Science and Engineering,
ISBN 1757-899X, Volume 994, 12-35, 2020

Abstract

During emergency situation like flood, Volcano, tsunami etc., the communication has to reach all the people in that area within a short span of time ensuring the necessary quality of service (QoS). The time at which the information is conveyed save a lot of life. In this paper we propose a communication through a Wi-max technology which broadcast information to all the nodes within the location. The node cooperates among them so that the information is conveyed to all the nodes within the coverage range of the Wi-max. Many cities are affected by some natural disaster where many lives are lots. The implementation of this technology cannot prevent the natural disturbance and certainly give warnings to people and save the valuable human lives. The WiMax network is implemented in Qualnet and various network parameters are measured when the node is mobile and non-mobile.

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NATIONAL CONFERENCE PUBLICATIONS

ECENC-01

Optimization of Ultra-Wide Band Communication TCA and AVA by using PSO and IGWO-FU Algorithm

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[2]Department of Electronics and Communication Engineering, School of Engineering, Dayananda Sagar University, Bangalore
[3]Department of Electronics and Instrumentation Technology, Bangalore Institute of Technology

National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Recently, with the faster pace of development on the sophisticated detection and stealth technology, an extensive attention is being paid to the reduction of Radar Cross Section (RCS) as it emerge in security and commercial application. Communication based applications have greater influence depends upon design architecture and performance of an antenna. This paper proposed FSS to triumph over varying values as considering design parameters. Here, Frequency Selective Surface (FSS) is optimized with a technique said to be PSO, used for coupled array (PSO-UTC-FSS). This paper intends to design an Optimized Vivaldi antenna to enhance the gain performance. More particularly, optimization algorithms play a vital role in fine-tuning of parameter, and hence this paper intends to propose a new Improved Grey Wolf Optimization Algorithm with Fitness based Update evaluation (IGWO-FU), which is the enhanced version of traditional GWO. Using above concepts, losses are minimized and hence it improves gain measurement, radiation efficiency and bandwidth ratio etc. Finally, the performance of proposed IGWO-FU model is compared over other traditional algorithms with respect to gain, VSWR, directivity, charge and current distribution, return loss as well.

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ECENC-02

Modelling, Simulation and Analysis of Electrostatically Actuated Mems Cantilever Beam Displacement

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Electrostatically actuated micro devices experience a basic limit on their stable travel range due to a phenomenon called as the pull-in Instability. An elementary structure of elastic cantilever beam in MEMS design is considered. This example shows how electrostatic forces leads to bending of a beam. The model uses the electromechanics multi-physics interface for solving the coupled equations for the structural deformation and the electric field. Such structures are frequently tested by means of a low frequency capacitance voltage sweep. A systematic method of analysis of electrostatic beam is discussed in this paper. Behavior of interaction of nonlinear electrostatic force with linear restoring force of the micro cantilever beam is studied. Static analysis using COMSOL multi-physics finite element package is done to validate the results.

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ECENC-03

Effect of Physical Dimensions of the Electrodes in Microfluidic Device for the Segregation of RBC's and Platelets: A Comparative Study

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

This work proposes segregation of two main blood components, RBCs and Platelets, by using DEP in microfluidic channel. The segregation of these blood particles is based on its size. Dielectrophoresis (DEP) is a technique where the dielectric particle experiences a force under the influence of non-uniform electric field. DEP exerts higher force for the larger particles and lesser force for the smaller particles. RBCs are having higher particle diameters as compared to Platelets. Therefore, RBCs experience higher DEP force and

deflect more inside the microfluidic channel as compared to platelets. An electric field inside the channel can be generated by applying voltage to the electrodes of microfluidic channel. A comparative study of effect of physical dimensions of these electrodes for blood particle segregation is also studied. In this work, an FEM technique is used to model, design and analyze the segregation of RBC's and Platelets using microfluidic device. By analyzing the results, best design is selected for the segregation of blood components with minimum applied voltage. Minimum voltage requirement for the particle segregation is one of the criteria considered while designing microfluidic channel due to cell viability. Hence an optimized microfluidic device structure is selected, which is best suitable as an LOC for the biomedical applications.

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ECENC-04

Monitoring of Load wheel Impact using Optical Sensors

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd- 4th May (2021)

Abstract

Indian Railways has huge network of trains which carries passenger and goods from one place to another. With increase in population, demand of railway transport is increasing day by day. Real challenge comes in continuous monitoring of train parameters such as axle count, weight of wagon, speed etc. In this work, finite element analysis has been done for rail wheel model using ANSYS15.0 software. Simulation of Fiber Bragg Grating sensor is done by Grating MOD. Here train speed varies from 60 to 80kmph to observe the stress and strain response on the rail, with maximum stress, 190.96 MPa, strain of 5.67e-5mm at constant wagon weight 60 tons. Shift in Bragg's wavelength is 1551.4845 nm at maximum speed, 80kmph.

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ECENC-05

DC-DC Boost Converter with Constant Output Voltage

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

The ideal design of most batteries comes in the range of 3.3V to 12V, now a days we have loads with 60V or more. For example, a group of LEDs in car headlamp or in a street light where the load is not the same 12V. There should be a step up in the voltage and power so that the load is satisfied with its requirements. This is the reason for designing a boost converter with constant output voltage. Recent researches and advancements tell us that majority of the car headlamps are LEDs which requires constant current and constant power all the time. So, the voltage needs to be stepped up as well to maintain the voltage for any amount of input given. In order to maintain a constant voltage in the output the MOSFET has to be controlled with the feedback from the output such that for any input voltage the output is maintained constant. The feedback from the output is reduced to a point (less than 5V) where it can be fed to any microcontroller like Arduino. The duty cycle of the PWM which has to be fed to the MOSFET will be controlled.

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ECENC-06

Comparison of Clustering Techniques for Reduction in Energy Consumption in Wireless Sensor Networks

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Applications of Wireless Sensor Networks (WSNs) have invaded every walk of life. Wireless Sensor Networks find application in monitoring health care, traffic, smart buildings, telematics, logistics, environmental safety and biodiversity mapping, disaster management systems etc. Most of these Wireless Sensor Networks are placed in positions where replacing or recharging of the batteries used in sensor nodes is difficult if not impossible. Hence, networks must include many nodes to cover the target area successfully. Thus, the primary requirement in the design of WSN is to increase the network lifetime. Clustering technique is one of the most important techniques to effectively utilize the energy. Some of the trending techniques to enhance network lifetime are data reduction by using adaptive filters and data predictive algorithms. This paper aims at carrying out a comparison of different techniques available and examining the merits and demerits of the same to study how power consumption in sensor nodes can be reduced. Efficient energy consumption can be carried out by forming clusters and using efficient clustering techniques. Here, an attempt is made to provide a clear view of the different techniques used in clustering with their salient features, findings, applications, and future scope.

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ECENC-07

Activity-Based Learning Product for Children in Anganwadi

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

We would like to present an Activity-Based Learning (ABL) product that is suitable for the age group between 2.5 to 4.5 years. For instance, let's take the example of Apple. The apple is sliced horizontally containing one part of the electronic component which when joined by the child with the other slice of the apple which contains the 2nd electronic component hence making the circuit complete which triggers the voice interface producing a sound "Hey I am an apple" listening to this, the Channapatna toy gets triggered thereby giving the extra information about the apple such as apple is red, vitamin present in apple, and asking the child to pronounce the apple word twice and so on. It can be implemented in multiple languages also. The cycle repeats for the rest of the alphabets. It helps the child to patiently focus on the instructions. Improves child's physical and intellectual abilities (creating & sorting mental images). Helps to learn the pronunciation thereby improving the speech. Also helps in color identification so that any difficulty in the differentiation of colors. (color blindness) can be further diagnosed by the doctor in the early stages. We are focusing on the Karnataka state, and have chosen the Channapatna toy as our interface model. Other regional toys which are on the verge of extinction can also be used, such as bamboo toys from the northern part of India, that enhance our rich heritage and cultural importance to the new age kids who lack this information.

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ECENC-08

IOT Bases Fire and Gas Safety System

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Fire accidents are major disaster which leads to loss of people's life, not only people who are stuck under fire accidents but also rescue team member's life is under danger. Finding solutions for such cases is not that difficult in this modernized era. Though many big flats and malls are included with fire extinguishing system, normal houses do not include such systems. IOT has been utilized in different areas and the success is also pretty good. So, our project mainly focuses on building prototype for domestic purpose on IOT based autonomously fire extinguishing process to reduce the risk of injury to victims and detects leakage of LPG gas and control it by its own, it acts as first aid during catch of fire. This is basically a low-cost prototype which is suitable for domestic purpose. The robot chassis has 4 dc motors with castor wheel which constitutes base to carry water container with dc pump in it. Arduino Mega is main controller for this prototype along with Node MCU. To monitor fire, robot is designed to follow a prefixed black path in rectangle area with help of IR sensors, when fire is detected by flame sensors of the robot first aid steps will be executed i.e., Water spray to extinguish fire and message system which includes location, camera access local IP address, alert message will be sent to owner of the building. To some extent human interference will be avoided if the situation is under control of the designed prototype.

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ECENC-09

Smart Traffic Light

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

The aim of the traffic administration is to develop the traffic system and regulations for ambulance and accident vehicles for rescue operations on a continuous basis. Intelligent traffic management will become a challenge in the future as the number of vehicle users continues to increase and current infrastructure services become limited. Avoiding

traffic congestion is beneficial to both the environment and the economy. Our main focus is on the processing of traffic in a city using IR sensors. To minimize vehicle delays and stops, traffic parameters are estimated by Intelligent Traffic System (ITS). Fixed traffic control is not based on density, but rather on a programming method that has already been developed in the system This paper proposes an intelligent device that will be implemented in the city using Arduino nano technology. Most cities around the world face traffic congestion problems and has become a major concern for the locals. Signal delays and improper traffic signal timing are to blame. The traffic light delay is hard-coded and independent of traffic. As a result, there is an increasing need for a systematic, quick automated traffic control system. The aim of this paper is to develop a dynamic traffic signal control system based on density. The signal timing adjusts automatically when the amount of traffic at the intersection is detected. When a traffic junction is completely packed, it will send a signal to a nearby traffic junction, indicating that the traffic light is blocked and that a diversion to another route should be taken. This is accomplished using Nano technology, Arduino, and sensors.

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ECENC-10

Smart Library Assistant Robot

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Library is an essential part of education for students, encouraging curiosity and inducing high quality knowledge in growing minds. In the pandemic scenario, restrictions are impelled in every place. Even in libraries, the new normal condition has serious impacts. In this article, a robot is proposed to pick a requested book from a shelf. A display interface such as TFT LCD is used that allows the customer to choose the book. This ensures a contact-less borrowing of books in the new normal state. A LCD screen is used as input interface that communicates with the robot using a wireless connection. The library robot is implemented on a line follower robot equipped with a robotic arm for picking and placing of books. A low cost QR based technology is used for identification of books from the shelves.

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ECENC-11

Predictomatic – Disease Forecaster

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

With the emergence of technology, there is a need for advancement in the manual methods of disease diagnosis. Nowadays, deep learning and machine learning are making a huge impact on the lives of the common man. Manual diagnosis of diseases is expensive and needs high computing equipment. In this work, we have utilized ML techniques to predict few commonly existing disorders such as Depression, PCOS, and Asthma. We perform different ML algorithms like Naive Bayes, Logistic Regression, ANN, Random Forest, and Decision Trees and SVM to get the highest accuracy rate. The first diseases we aim to predict are depression, PCOS, asthma. Based on the highest accuracy rate which we have obtained using the ML algorithms for the diseases, we develop an app called Predictomatic to predict the same by using the features of the dataset as an input. It is evident from Predictomatic that it outperforms manual diagnosis for disease prediction.

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ECENC-12

Ground Control Station for Unmanned Aerial Vehicles using ROS

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Ground Control Station System application software for Offboard mode and Manual control of unmanned aerial vehicles is a prime requirement for the UAV flight in the current technological era for multiple onboard operations like Tracking, Surveillance, and Patrolling. This paper introduces a software for controlling and getting important information from unmanned aerial vehicles. The software is developed using Python3

language and the graphical user interface is developed using Qt5 framework. The communication and networking is achieved using robot operating system (ROS) melodic. The forward, backward, up, down, left and right movements for the drone can be controlled using the software. The live stream from RGB camera (day camera) and Night vision camera can be viewed and also be captured as snapshots. The live stream video can also be saved to the disk. Also, object detection and object tracking features are included for surveillance purposes. If a gimbal is mounted on the drone, it can also be controlled using the software. The beta testing of the whole software is done on the Gazebo real world simulation and the experimental results were obtained by the real-world flight of a hexacopter.

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ECENC-13

HEXAPOD - BLUETOOTH CONTROLLED SIX-LEGGED ROBOT

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru, 3rd -4th May (2021)

Abstract

We have different types of robots that acts as a substitute for the human mind used in the batch processing in industries for recurrent tasks and one among them is the compound legged robot which can traverse on irregular terrains. The major objective of this project is to design the navigation for the hexapod robot so that it can move in the forward direction, turn by 90 degrees in forward direction, and by 180 degrees, the movement is controlled using Bluetooth module and android application to obtain a maximum navigation. The hexapod is developed using Arduino Uno to control the motion of servomotors through the inter integrated circuits interface servo motor driver - PCA9685. These robots are very beneficial when there is an occurrence of natural calamities, for combatant applications and the areas where human pursuits are restricted. This robot comes handy in such situations and can be monitored by human or through machines. Our robot is one of the legged robots that is appropriate in the situations where there is a requirement for greater efficiency and flexibility.

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ECENC-14

Gesture Controlled Robot

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

With the introduction of new technologies in today's life the interaction between human and machine is widely spreading and in turn reducing the gap between the humans and machines and making the standard of living much easier. Gestures play a prominent role in reducing this gap. This project is about developing a hand gesture controlled robot that is wirelessly controlled which is designed and implemented using a low cost 3-axis accelerometer which is a 3-axis estimation gadget with the range of + - 3g. This gadget when tilted, measures the static acceleration of gravity. The position of the hand is sensed and the direction of the robot chassis changes accordingly. In various situations usage of robotic devices with the help of switches and buttons becomes complicated so here we use a concept of gesture identification. This approach replaces the conventional controlling mechanism of robots by a gesture-based control using Arduino Lilypad. Some of the applications require semiautonomous or human controlled robots and most commonly used motion-controlled robot is hand gesture-controlled robot. This type of robots are widely used in fields where the risk factors of handling the machines through switches or remote are high like, military application, industrial robotic, construction field etc.

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ECENC-15

An Innovative Technique for Estimating the Depth of the Earth's Subsurface Layers is Based on Continuous Wavelet Local Maxima Lines

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Geophysical research employs a variety of measurement techniques to investigate the earth's subsurface deposits at various locations. In this paper, we demonstrate how the continuous wavelet transform, local maxima lines are useful to differentiate between various layers. The most effective wavelet transformation is Daubechies continuous wavelet transform. We will look at how the size of reflection events in sub surface

seismic data can be linked to litho geophysical borehole data. To do so, we must first log the data at the required location with at least two different offsets using the common midpoint method. The frequency atoms of local maxima lines can be used to identify layers. Also, take note of the two-way travel time of all the layers from offset one to offset two. This time delay aids in determining the layers' velocity. Time frequency 2-D representation provides layers information. By selecting the length of the raw signal, we can determine the depths of all subsurface layers within the depth of our interest using these two frequency and velocity data. The depth of the different layers is correlated with the litho geophysical date of the bore hole rigged at the specific location where the data was logged in this study.

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ECENC-16

Object Detecting Robot

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Computer Vision (CV) is the branch of the science that deals with computers and software systems which will be able to recognize and understand images and scenes. CV consists of different features such as image recognition, object detection, image generation and many more. Object detection is a computer vision technique which is used to identify and locate objects in an image or video. It can be used to count the number of objects in a scene as well as determine and track their precise locations and label them if required. Object detection has been used in many applications such as human-computer interaction (HCI), robotics, industrial quality check, consumer electronics, security, surveillance etc. In this robot building project, on the software side, we would be using highly accurate and efficient object detection-algorithms/models such as "MobileNetV2" and "TensorFlow Lite". The hardware consists of components such as Raspberry Pi 4 Model B, Servo motor and Pi camera. Raspberry Pi 4 Model B is a 1.5 GHz 64-bit quad core ARM Cortex-A72 processor which is the latest version of the low cost Raspberry Pi computer. With the help of a suitable python code, the movement of the servo motor can be controlled. The Pi camera is linked with the Raspberry Pi which will help in detecting the target object. By using the above mentioned algorithms and various other parts we are going to build an object detecting robot which will be able to detect the object and also lets the user know about the presence of the target object.

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ECENC-17

Automobile Burglary Ranging System

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

The automobile burglary is one of the main and important crimes which need urgent assistance as the number of burglaries in the current living and the modern ways of burglaries need a modern solution which needs a complete assistance. This automobile burglary ranging system helps in maintain the all-in-one assistance to the vehicle maintaining the risk of accident, theft and rash driving which makes it unique to and value-added feature to be implicated in the current scenario. If the owner is sending 'YES' as a reply to the GSM the buzzer does not turn on. Whereas, if the GSM receives 'NO' as a reply from the owner the buzzer is activated and the GPS coordinates starts sending text messages every 2 minutes with GPS coordinate. This project also gives a choice to lock the vehicle using text message. This project also allows and assists in the accident detection and rash driving using MEMS sensor and IR sensor by generating a monitoring the threshold speed and angle.

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ECENC-18

"D-BOT"- The Institutional Chatbot

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National Conference on Recent Trends in Engineering (NCRTE), Dayananda Sagar University, Bengaluru,3rd-4th May (2021)

Abstract

Chatbot is the software bridge to communicate between the human and smart devices to share knowledge. This project acts as a bridge because both have their own languages like human use different languages to interact in their daily life, whereas computer and smart devices understand only binary language (i.e. 0's and 1's). This paper helps the Chatbot to interact with the users using Natural language processing to understand and respond. This was possible using various tools, IDE's, libraries and programming

languages. The chat bot is trained and tested across various datasets of the institution such as the links, locations, fee payments and many other detailed applications.

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ECENC-19

Automatic Water Dispenser Using Raspberry Pi through Voice Commands

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

The proposed Automatic Water Dispenser Using Raspberry Pi through Voice Commands is being implemented using Raspberry Pi. It is designed to reduce the wastage of water that takes place due to manual operation. This simple but effective water dispensing system can be used in homes/ offices/educational institutions/public spaces/restaurants etc. The automatic water dispensing system can also be used by the disabled and the elderly to simplify and make the process of obtaining hot water safer than conventional heating methods. In light of the recent developments regarding COVID-19 and the increased awareness regarding hygiene and protective health measures, this system will prove an asset due to its automatic control requiring no physical contact of the user with the dispenser.

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ECENC-20

Image Processing And Voice Recognition Robotic Car.

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

Nowadays, the development of nanostructures of oxide-based materials gained significant research interest owing to their new merits and avenues to design better electrodes for lithium-ion battery. It is well known that vanadium and vanadium-based oxide materials have high theoretical capacity but the practical applications are limited mainly due to the fast capacity fading, resulting from the structural collapse, upon cycling and poor electronic conductivity. In this paper, we demonstrate the fabrication of mesoporous vanadium-based oxide with nanostructures, which significantly improved the capacity fading upon cycling. A simple and generic synthetic protocol has been proposed to synthesize highly porous AlV_3O_9 using aluminum nitrate and ammonium vanadate with the assistance of sucrose. It is found that the decomposition of surface-adsorbed sucrose during the course of AlV_3O_9 preparation creates homogeneously distributed mesopores. The prepared porous AlV_3O_9 has been used to fabricate positive electrode for lithium rechargeable battery where high discharge capacity of 240 $mAhg^{-1}$ was achieved at 0.2 C rate, which is comparable to the best reported results of vanadium-based positive electrodes. The characteristic features are 240 $mAhg^{-1}$ capacity and ~ 100% columbic efficiency, demonstrating porous AlV_3O_9 as a promising cathode material for high-power batteries.

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Gps and Gsm Based Vehicle Tracking SystemWith Accident Detection

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ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

As per the World Health Organization (WHO), more than a million individuals on the planet die every year on account of vehicle accidents. Despite care cause, this issue is at this point growing because of rider's helpless practices, for instance, drunken driving, speed driving, riding without satisfactory rest, riding with no cap, and so forth. The high demand of automobiles can be one such reason that has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country and the lack of technology in detecting the accidents as soon as possible. An automatic accident detection device for vehicle accidents is introduced in this paper. This plan is a framework which can identify accidents in significantly less time and sends the fundamental data to emergency treatment within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team (hospitals or emergency contacts) in a short time, which will help in saving the valuable lives. The system consists of accelerometer, vibration sensor, ultrasonic sensor, GPS and GSM Module that supports in sending messages. Accelerometer detects the unexpected change within the axes of the vehicle. Vibration sensor helps in detecting the heavy vibration within the vehicle. Ultrasonic sensor decreases speed of the vehicle when it comes closer to the opposite vehicle and GSM module sends the alert message to mobile with the situation of the accident. Area of accident is consigned within the Google Map link, derived from the latitude and longitude from GPS module. Then after confirming the situation, necessary actions are going to be taken and this can assist to achieve the rescue service in time and save the valuable human life.

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ECENC-22

Covid-19 Traceability and Fencing System

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Abstract

Social distancing refers to the non-pharmaceutical measures taken to reduce the frequency of physical contacts and the range of distances between people during an infectious outbreak. This paper aims to provide a comprehensive survey on how wireless modes of technology can enable, encourage, and enforce the practice of social distancing. One of the most effective technology in the social distancing scenario would be 'Contact-Tracing'. The different concepts of technology within the application along with its importance in managing the ongoing pandemic is further explained in the study. The application usesGlobal Positioning System (GPS) technologies to create a Geo-Fence to create a barrier between a healthy and an infected zone, which once upon finishing, alerts a user when they are nearby a COVID-19 infected zone. The objective of this paper surveys the emerging technologies regarding the pandemic, producing a 'Contact traceability' device which alerts healthy people entering contaminated areas and notifies an infected person trying to enter a healthy area.

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ECENC-23

A Review on the Relation Between RTOS And IOT In Automobiles

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ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

The rapid pace of technological advancement has led to the growth and research of advancement in the field of Real-Time Operating Systems, the field of the Internet of Things, and also a huge advancement in the fieldof Automobiles. Real-time operating systems are operating systems that are used in embedded systems to perform tasks and control the task flow whereas the Internet of things deals with the sensors and actuators being connected over the web and communicating with each other, sharing data, which

is used for carrying out tasks. This review elaborates how these are interrelated, as in, how Real-Time Operating Systems are usedfor the Internet of Things which are in turn used in automobiles, and also how they have advanced along withthe technological advancement over the years.

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ECENC-24

Survey on Most Protocol in Automotive Communications.

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Abstract

Several factors seem to favor the introduction of MOST technology in automotive communications. Due to the increase in the use of the automobiles, the requirements on the infotainment applications for automobilesare also increasing drastically. So the new automobile network called MOST (Media Oriented Transport Protocol) has been introduced. Generally compared to other protocols the MOST protocol gives the highest data rate (up-to 150Mbps). Due to its high bandwidth and QoS support, the infotainment systems is desirableto be connected to MOST protocol. Since many automotive networks are used for different applications suchas CAN and LIN we need a network gateway to control the ECU's. The purpose of this publication is to provide the facts and trends towards introduction of MOST protocol in automotive industry and also describeshow the bridging is done between two protocols. It also shows some future scope applications that can be added in automotive in near future.

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ECENC-25

Forged Currency Detection Using Image Processing

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

Paper currency counterfeiting is a major problem for the world economy due to price inflation. Theadvancement of technology in scanning and printing over the recent past has led to an increase in the circulation of counterfeit notes. To combat this issue, it is essential that there exists an efficient affordable mechanism to detect counterfeit currency. This paper proposes a system that can classify and subsequently verify paper currency using fundamental image processing techniques like the Hough transformation algorithm. Features such as watermark, security thread, a latent image of denomination numeral, bleed lines etc. are extracted by detecting the edges and estimating the gradient of the image at every point to generate a gradient image and thresholding the gradient image to accomplish image segmentation from the banknote images and the comparison is performed. This work is in progress and is expected to show promising results over previous counterpart approaches.

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ECENC-26

Autonomous Robot Using Reinforcement Learning

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Abstract

Research and developments of autonomous self-navigating robots by using robotics for research and development results and application started in Japan in the early 1990s. Autonomous self-navigating robots are not only a development it is a revolution itself. Self-driving robots are set to revolutionize the way humans live. The transformational technology is the cutting edge of robotics, machine learning, software engineering, and mechanical engineering. Autonomous self-driving robots are able to navigate, perceive and learn the environment without human involvement. The potential benefits of autonomous

vehicles include reduction in infrastructure cost, increased safety with significant reduction in traffic collisions. The robot which is designed uses Machine learning and Reinforcement learning to learn and predict decisions just like human brains.. Machine Learning is a subset of artificial intelligence which focuses mainly on machine learning from their experience and making necessary predictions based on its experience. Autonomous robot has ability to sense surrounding environment and navigate without any human intervention applied. The model will be built using Nvidia Jetson Nano Board. The fundamental components for this are the Nvidia Jetson Nano microcomputer board, L298N driver moduleand Raspberry Pi Camera module. The model works on a Computer vision and will be trained by feeding in images of tracks which will be labelled and these data sets will be used to train the model. After the model istrained and it will be capable of taking its own decisions. All the obstacles will be avoided in the way on detection and moves in the given premises without crashing with the objects on its own with the help of machine learning.

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ECENC-27

A Brief Review On Nanoantenna And Its Materials For Wireless Communication

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Abstract

The day-by-day increasing demand of energy for this world to meet the mobile applications for 5G technology.At present lots of R&D is going on to There are well-known methods to increase the bandwidth of antennas, including increase of the substrate thickness, the use of a low dielectric substrate, use of various impedance matching and feeding techniques, and use of slot antenna geometry. Therefore, a new device called Nanoantenna has been designed for an efficient nano structure precise antenna is a major challenge. Nano structure antennas have found extensive application in wireless communication system and has a major advantage. To meet the required bandwidth and resonant frequency for a wireless communication system. Finally, the designed antenna structures are fabricated and tested using HFSS Software and the simulated and measured results are validated. In near future its contribution will be in various fields like space communication, broadband wireless links, wireless optical communication, mobile communication (5G), radar detection and higher order frequency applications. Nanoantenna can be fabricated by different techniques like electron beam lithography, focused ion beam and nanoimprinting lithography. The material selection for nanoantenna is also a big problem, so we will also discuss how to eliminate it. Based on the literature review my present work to be proposed on nano antenna design for wireless applications.

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ECENC-28

Radio-Frequency Identification-Based PaymentSystem for Vehicles

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Abstract

Radio Frequency Identification (RFID) is a wireless technology using radio frequency electromagnetic fields to transfer data for identification. Comparing it to the barcode, an RFID tag does not require line- of-sight and it can be read by several readers simultaneously. The RFID tag cannot be easily replicatedwhich makes it safe to use . In addition, an RFID tag can store huge volumes of data. Currently we use this system to pay tolls which accounts to a transaction of more than rupees 100 crore per day (March2021). We aim to extend the use of RFID for more than just paying tolls, but payments associated with vehicles like parking, fine collection, at petrol stations, etc. The tag can also be used to detect cars in no parking zones. Further the tags can contain vehicles documents (RC card, Driver's license, insurance, pollution certificate etc.) so that the user does not need to carry the documents. This system reduces the hassle of handling cash for payments related to vehicles and carrying the related documents. In this project we have created a simulation for a payment environment of vehicles using the hardware specified below. An application was created to display the transactions, add money to your tag, show the current balance. This app helps the user to use this system without any hassle.

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ECENC-29

Survey on Air Purifier with Carbon Dioxide Filter

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Abstract

Global warming and Air pollution are two major issues being faced by mankind. Major cause of global warming is the increase of greenhouse gases like carbon dioxide, nitrous oxide etc. Due to increase in temperature, we face many issues like extreme weather events, glacier events, changes in time of seasonal events (early flowering of plants), sea level rise etc.Exposure of CO2 more than 1000 ppm can cause various health issues. These may include headaches, dizziness, restlessness, a tingling or needle feeling, difficulty breathing, sweating, tiredness, increased heart rate, elevated blood pressure, coma, asphyxia, and convulsion. Air pollution is a threat to both the environment and

ecosystem. Air pollution causes heart diseases, respiratory diseases, and damages organs such as the brain, lungs etc. According to WHO survey, seven million people die every year because of air pollution, particularly household air pollution causing 4 million deaths. In our survey paper we have proposed an air purifier with a carbon dioxide filter to keep the surrounding environment clean and healthy. Graphene based semi-coke porous carbon with a nitrogen-rich layered sandwich structure is used for suction for CO2. We can set the limit of carbon dioxide suction, by adjusting the filters according to our needs.

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ECENC-30

Real Time Remote Monitoring Healthcare App Based On IOT for Healthcare Applications

Smita Giri, Samiya Tajammul, Pranati T, Rajashree Narendra, Shwetha M.P, Saara K
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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

In the current era, there is a requirement of a system with connected devices, persons, time, places and networks, which is completely incorporated in what is called as Internet of Things (IoT). Internet of Things has become the ultimate building block in the development of healthcare applications. The aim of an efficient IoT healthcare system is to provide real time remote monitoring of patient health condition, to prevent the patient's critical conditions and to improve the quality of life through smart IoT surroundings. This paper discusses healthcare application based on IoT by building an application and storing the data on the cloud using Firebase. The application called MEDI Q is built on android studio using the language Java. This application helps in the interaction between numerous patients and doctors and helps in solving health related queries.

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ECENC-31

Strategic Survey on MIMO Based Cryptography for IOT Applications

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

With the internet having reached a level that merges with our lives, growing explosively during the last several decades, data security has become a main concern for anyone connected to the web. While cryptography is the science of protecting data, crypt analysis is the science of analyzing and breaking secure conversation. A cryptographic method, or cipher, is a mathematical function used in the encryption and decryption

process. A cryptographic algorithm works in composite with a key a word, number, or phrase to encrypt the plaintext. In this paper the strategic survey on MIMO based cryptography is given in a detailed manner. Data security ensures that our data is only accessible by the intended receiver and prevents any modification or alteration ofdata. In order to achieve this level of security, various algorithms and methods have been developed.

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ECENC-32

Assisting Health Workers to Avoid Covid-19 InfectionUsing Robotic Arm

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

In today's world, there is a growing imperative to build devices like Robotic Arm for various inhuman conditions where human contact is complicated or dangerous. The main goal is to develop and recruit a miniature version of robotic arm which will make the main robotic arm mimic as it does while the miniature arm is controlled by a human operator. This can be done by availing gyroscope and flex sensors at the joints of the miniature limb. The data is shared by the miniature robotic arm and the main robotic arm with the aid of HC05 Bluetooth wireless module. The prime utilization of such robotic arm is to eliminate person-to-person interaction and to ensure cleaning, sterilization and assistance in hospitals and related facilities such as quarantine. This will help in minimizing the life hazard to medical workers and doctors take an active part in the control of the COVID-19 pandemic or any other communicable diseases.

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ECENC-33

Air Substrate Tilted Beam Star Pattern Triangular Microstrip Patch Antenna.

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

A low cost Triangular Microstrip Patch Antenna (TMSA) is proposed to generate tilted beam radiation pattern. The antenna is a star shape beam steering antenna with four TMSA printed in four quadrants. The antenna is designed for operating frequency of 2.4GHz using air as substrate. The shorting vias are inserted to hold the antenna and the patch is fed at four sides using co-axial feeds. The antenna produces four tilted beam in fourrespective quadrants by exciting one feed at a time. The proposed antenna generates four radiation patterns by appropriately selecting the feeding position which results in improved gain and directivity.

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ECENC-34

Linear Regression and LSTM Based Rainfall Prediction Model

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

Rainfall plays an important role in the nation's economy because it has its importance in many sectors. In this project we will predict rainfall using machine learning. A comparative study has been made between two approaches, i.e., Linear regression and recurrent neural networks. As per the literature survey, it is observed that LSTM (Long-Short term memory) is more accurate than other algorithms like linear regression, support vectormachines etc. Rainfall dataset is extracted from the Kaggle website for our project. Only certain parameters are considered from the dataset to predict rainfall. The required software and libraries are downloaded and installed. Initially a linear regression model is being implemented to predict the rainfall and its accuracy and error is being noted. Then recurrent neural network (LSTM) is implemented and the results are compared withprevious algorithms.

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ECENC-35

A MEM Electric Field Sensor of Characterization Of Charges In Resonant Electrostatic-Capacitive MEMS Device: A Systematic Survey

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

Microelectromechanical systems (MEMS) are playing a vital role in technology particularly in the industrial Applications. For the past two decades, trends and usage of MEMS has been drastically increased due to its wide and variety of applications. These include not only the automotive domain for automation but also in medical instrumentation, industrial process control, telecommunication industries, consumer domain, environmental weather monitoring, military etc. As a result, MEMS technology has become one of the most rapidly developing fields in market. Electrostatic driving, migration or movement of charges in dielectric material and capacitive read-out, play an important role in micro electro mechanical system (MEMS). In this paper we propose a report, which gives the review on an Electric surface potential, accelerometer, extensive experimental characterization, focused on the influence of the surface separations, pull-in instability, drift phenomenon and investigation of the behavior of charges in MEMS devices to derive rules for the designand the fabrication process of MEMS devices. This review article provides a systematic comparison of the methods and processes used by various authors in designing MEMS electric field sensor and ways to improve their performance is discussed.

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ECENC-36

IOT Based Solar Powered Weather Station

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

The project proposed is an advanced solution for weather monitoring, the technology behind this is Internet of things (IoT) because it makes data easily accessible. IoT device can be used to measure physical parameters pertaining to a physical object. As the name suggests projects deals with monitoring weather and climatic changes like temperature, humidity, wind-speed, moisture, light intensity, and carbon monoxide (CO) levels in the air using multiple sensors. These sensors send the data to the platform and the sensor data is plotted as numerical value and is displayed as output. The data uploaded in the platform can be easily accessible. The data gathered in this IoT platform can also be used for future references.The system engages a Microcontroller, sensors, solar panels, buck converter, battery, and the dashboard where the output is displayed. Due to the compact design and fewer moving parts the system requires less maintenance and charges, using this system more power is saved as components used does not consume more power and it will be powered by solar panels. It is also light and portable. Compared to the other devices that are available in the market the system proposed is cheaper and cost effective. This project is a resourceful monitoring system through which the required parameters are monitored remotely using the internet and the data gathered from the devices are stored in the platform. The IoT platform used in this project is Thingspeak. This project can be of great use to weather stations, aviation, agricultural industry, meteorological departments and even marine industry.

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ECENC-37

Glaucoma Detection Using Artificial Intelligence & Machine Learning Algorithms – A Perspective View to Apply for Recognition Process

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

Glaucoma actually is a passive attacker of vision, marked by increased intra-ocular eye pressure &progressive vision loss that gradually leads to chronic blind-ness. While the infection is treatable, the effects may be decreased, rendering early prognosis being made an important aspect of detection. This 2nd most disease in the universe is an out-patient treatment to diagnose the infection using advanced methods, but we are

creating a technique for diagnosis that is accessible to all parts of the population, and can also be identified at an early level, allowing for better prevention so that the progress of the ailment can be stopped gradually from an early stage. As a consequence, by designing software algorithms in Lab VIew or in C++ or in Matlab, we suggest several innovative methods & techniques for glaucoma disease prediction & various other parameters, etc…from the C D R or from the R N F L parameters. The glaucoma could be pigmentary, neo-vascular, neo-natal, congenital type. Hybrid algos could be used for detection purposes, in the sense for segmentation-2 methods could be merged, for feature extraction-2 methods could be merged, for image enhancement-2 methods can be merged, for classification-2 methods can be merged, like that & so on. We use the concepts of AI ML DL such as the re-inforcement based learning, un-supervised based type of learning, supervised type of learning, imitation learning, multi-agent learning for the training purposesand finally detect the disease in human beings with utmost accuracy. Matlab is the tool which is going tobe used for the simulation purposes. The work that is going to be considered in this report will be just a simulation case proposed in the environment of the software tool used by us. The same can be thought of developing a model in the area of the Simulink tool after the proposed model that is being developed is run & the simulated results are observed making justifications showing the effective-ness of the concepts thatare being proposed by us in this paper.

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ECENC-38

Detection of Glaucoma Diseases Using Image Processing Techniques with the Concept of Support Vector Machines as Classifiers

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

In this paper, the detection of glaucoma diseases using image processing techniques with the concept of support vector machines as classifiers is presented. The human eye forms one of the vital organs of the body. The eye always plays a vital role in our daily life; as without eyes, the whole world would be dark & performance of the daily routine works would be very difficult. In the sense, without sight, it would be very difficult for any person to do any activity. There are various reasons for the loss of vision/sight in the human eyes. Hence, blindness has to be avoided in the human eyes as the most precious human organ is solely responsible for the vision. One ofthe cause for blindness & loss of vision in the eyes is due to different types of diseases that occurs in the eyesbecause of various factors. One such disease which is caused due to vision loss is the 'Glaucoma'. In this method, a Convolutional Neural Network (CNN) is proposed for glaucoma detection from fundus images of the eyes. Inthe proposed algorithm we use, k-means algorithm for segmentation, GLCM for feature extraction and classifyusing Multi-SVM (Support Vector Machine). In this paper, a brief review of the M.Tech. (PG) project work that was undertaken during the course of III & IV semester of the PG program is being presented in a nutshell. Here, we present how to detect the glaucomatic disease & how do we classify using the SVM concepts.

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ECENC-39

A Brief Survey / Review of the Recent Advances In Wireless Sensor Networks Used In Communication Sectors.

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3 : 2021

Abstract

Wireless sensor networks consist of spatially dispersed and sensors for monitoring physical parameters in various applications and organizing the collected data at centralized location. WSNs find large number of applications. In this survey paper, an overview of different applications in WSN's is being presented in a nutshell. It gives background information about the different applications of WSN & serves as a ready reckoner to all the researchers who want to pursue research in this field.

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ECENC-40

Facial Emotion Detection Using Deep Learning Technique

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Shodhsamhita : Journal of Fundamental & Comparative Research
ISSN 2277-7067, Vol. VII, No. 3: 2021

Abstract

Human beings normally depend a lot on non-verbal communication and Facial Emotion has a major role in it. In this paper we explore the recognition of human facial expressions through a Deep learning approach which uses a Mobile net architecture. The system uses a labelled data set containing around 16,496 images with various facial expressions for training and testing the data taken from FER-13 dataset. The model used for prediction can identify four emotions such as Happy, Neutral, Fear, and Angry. Results of our work provide an accuracy of 77.69% for the recognition of all four emotions. Similarly, performance is evaluated for all the test images of the dataset and a confusion matrix is built

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JOURNAL ARTICLE

ECEJA-01

Cascade object detection and remote sensing object detection method based on trainable activation function

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Journal Remote Sensing, Volume 13,
ISBN:2072-4292(2021)

Abstract

Object detection is an important process in surveillance system to locate objects and it is considered as major application in computer vision. The Convolution Neural Network (CNN) based models have been developed by many researchers for object detection to achieve higher performance. However, existing models have some limitations such as overfitting problem and lower efficiency in small object detection. Object detection in remote sensing hasthe limitations of low efficiency in detecting small object and the existing methods have poor localization. Cascade Object Detection methods have been applied to increase the learning process of the detection model. In this research, the Additive Activation Function (AAF) is applied in a Faster Region based CNN (RCNN) for object detection. The proposed AAF-Faster RCNN method has the advantage of better convergence and clear bounding variance. The Fourier Series and Linear Combination of activation function are used to update the loss function. The Microsoft (MS) COCO datasets and Pascal VOC 2007/2012 are used to evaluate the performance of the AAF-Faster RCNN model. The proposed AAF-Faster RCNN is also analyzed for small object detection in the benchmark dataset. The analysis shows that the proposed AAF-Faster RCNN model has higher efficiency than state-of-art Pay Attention to Them (PAT) model in object detection. To evaluate the performance of AAF-Faster RCNN method of object detection in remote sensing, the NWPU VHR-10 remote sensing data set is used to test the proposed method. The AAF-Faster RCNN model has mean Average Precision (mAP) of 83.1% and existing PAT-SSD512 method has the 81.7%mAP in Pascal VOC 2007 dataset.

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ECEJA-02

Fire Fighting Robot

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Journal of Emerging Technologies and Innovative Research,Volume 8,pp 77-79
ISBN-2349-5162 (2021)

Abstract

Detecting fire and extinguishing it is a dangerous job that puts life of a fire fighter at risk. There are many fire accidents which fire fighters had to sacrifice their lives in the line of duty each year throughout the world. The research and development in the field of Artificial Intelligence has given rise to Robotics. Fire Fighter is a robot designed to use in such extreme conditions. It can be operated and controlled by remote user and has the ability to extinguish fire after locating the source of fire. It is equipped with a monitoring system and operates through a wireless communication system. The fire detection system is designed using the sensors mounted on the Fire Fighter Robot. The robot is controlled autonomously using Android application. Android mobile phone platform developed by Google has gained popularity among software developers due to its powerful capabilities and open platform. Therefore, Android is a great platform to control a Robotic system. Android provides many resources and lready integrates lot of sensors. Through testing, it is possible to run in a realistic scene simulated in the lab and to detect and extinguishment the flame. Robot can transfer video to remote location. This concept helps to generate interest as well as innovation in field of robotics while working towards a practical and obtainable solution to save lives and mitigate the risk of property damage.this out, we use MATLAB for running the algorithm for all the three methods and use GUIDE, to create a Graphical User Interface in MATLAB to display the result of the brain tumour detected.

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ECEJA-03

Hybrid optimization algorithm for security aware cluster head selection process to aid hierarchical routing in wireless sensor network

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Journal of IET Communications, pp 1-15
ISBN-1751-8628 (2021)

Abstract

In wireless sensor networks, clustering is said to be the most noteworthy technique for increasing the lifetime of network that directly leads a better routing mechanism. This approach involves grouping of sensor nodes to clusters and choosing the appropriate cluster heads for each cluster. In fact, cluster heads gathers data from corresponding nodes in cluster and transmits those aggregated data to base station. However, the major issue in this is the selection of the appropriate cluster head. Till now, many research works have been carried out for solving this issue by considering different constraints. This paper introduces a new cluster-based routing model by selecting the optimal cluster head. Moreover, a novel algorithm known as grey wolf updated whale optimization algorithm is introduced. Here, a new multi-objective function is defined with respect to different constraints like distance, delay, security and energy.

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ECEJA-04

Merged glowworm swarm with ant colony optimization for energy efficient clustering and routing in Wireless Sensor Network

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Pervasive and Mobile Computing, Volume 71,Issue 6, ISBN-1574-1192(2021)

Abstract

Nowadays, in Wireless Sensor Network (WSN), the ability to transfer data over the network via a better route seems to be the tactic aspect due to certain criteria like network lifetime, energy consumption, and so on. A lot of efforts has been taken so far on better routing in the network via the clustering technique. Since clustering is an effective and apt way of providing a better route that transmits data without any conflicts. However, in the concept of clustering, the selection of Cluster Head (CH) is considered as a complex process as it has to satisfy certain parameters for effectual performance. If proper clustering is not made, the network will be suffered from network failures and energy depletion as well. To cope with these issues, this paper intends to find the optimal cluster head for energy-efficient routing protocol in WSN. As the main contribution deals with the Cluster Head Selection (CHS), this paper intends to propose a new hybrid algorithm namely Ant Colony Optimization (ACO) integrated Glowworm Swarm Optimization (GSO) approach (ACI-GSO), which is the hybridization of (GSO) and (ACO) algorithms. The objective of the CHS is to reduce the distance among the selected CH node. It makes the fitness function using multiple objectives like distance, delay, and energy. Finally, the performance of the proposed work is evaluated and the efficiency of the proposed work is proved over other conventional works.

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ECEJA-05

An optimized ANN Model for predicting the efficiency of perovskite solar cell using MATLAB

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Journal of Emerging Technologies and Innovative Research, Volume 8,pp2349, ISBN-2349-5162(2021)

Abstract

The amalgamation of material science genome and algorithmic development has elevated the evolution of material science. Traditional methods of material discovery, development and deployment takes a long time frame. Therefore, machine learning models which primarily learns from past data helps in catering to the inherit limitations of conventional methods used in material science. Hence we demonstrate the potential of deep learning via Artificial Neural Network (ANN) which utilizes radical features to predict the efficiency of perovskite solar cell. Dataset was collected varies technical papers. The trained model then predicts the efficiency on unseen perovskite data. This paper also finds insights of challenges faced with ANN and how it could beimprovised in the near future.

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BOOK

ECEB-01

Advanced Welding Techniques

Mukti, C[1]., A. S. Vendan[1]

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Springer, ISBN- 978-981-33-6621-3(2021)

Abstract

Presents a holistic view of the welding processes like material selection, mechanical and electrical requirements.

Contains a multidisciplinary approach for the design calculations and parametric considerations for the process of welding. Provides the basic information on the design for welding to the interested groups for their day-to-day teaching, learning, practicing, and subsequent studies.

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DEPARTMENT OF MECHANICAL ENGINEERING
SCHOOL OF ENGINEERING

Publications Summary

International Journals	**20**	**(MCEIJ-01 – MCEIJ-20)**
Book Chapter	**01**	**(MEBC-01)**

DEPARTMENT OF MECHANICAL ENGINEERING
SCHOOL OF ENGINEERING
INTERNATIONAL JOURNAL PUBLICATIONS

MEIJ-01

Low-Velocity Impact Studies on GFRP and Hybrid Composite Structures

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International Journal of Advances in Engineering Sciences and Applied Mathematics
12, pages125–141, 2020

Abstract:

In this study, low-velocity impact analysis on glass fibre-reinforced polymer (GFRP) and hybrid laminates is performed through an explicit numerical analysis and relevant experiments. Hybridised composite laminates are fabricated by sandwiching the flexible Polycarbonate sheet between the glass fibre-reinforced polymer laminas. In order to analyse the improvement in the impact resistance of hybrid laminates, low-velocity impact tests are performed on both GFRP and hybrid laminates by dropping an impactor from various predefined heights and the absorbed energy in each case is estimated. Results from the numerical analysis are validated with experimental results.Based on the numerical and experimental analysis, variation of the absorbed energy as a function time is estimated. Furthermore, shapes of the damaged areas are also estimated using the experimental specimens. Analysis of results indicates that the hybrid laminates display better energy absorption characteristics before rupture, as compared to the GFRP laminates. For a given energy absorption weight, savings up to 30.77% are observed using polycarbonate-based hybrid composites as compared to the GFRP laminates.

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MEIJ-02

Evaluation of Mixed-Mode Fracture (KI & KII) in Epoxy using AECS Configuration

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Solid State Technology, 63 (6), 2020

Abstract

Mixed-mode fracture tests are conducted on Asymmetric Edge Cracked Semi-circular (AECS) bend specimens made of Epoxy Resin material. AECS specimens are exposed to 3-point bend asymmetric loading. The crack parameter stress intensity factor (SIF) for different support locations and crack lengths is obtained using ANSYS. By selecting suitable locations for the load points, complete mode mixes (mode I to II) can be attained. A sequence of fracture experiments are carried out and results were obtained on proposed specimens made of epoxy and a very decent agreement was achieved among the experimental results and the predicted results.

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MEIJ-03

Development on Graphene Based Polymer Composite Materials and Their Applications—A Recent Review

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AIP Conference Proceedings 2316, 030016, 2021

Abstract:

Graphene is a super material in the material science world because of high surface area, excellent thermal conductivity, high electron mobility, high young's modulus, high light transmittance. In this work, a recent review is carried on Graphene based polymer composites and their applications. Different properties such as mechanical, thermal, electrical and medical properties of Graphene based polymer composites are discussed. Potential applications and development in the field of polymer composites, synthesis and processing are discussed and their vital roles are elaborated.

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MEIJ-04

A Meso-Mechanical Study of the Effect of Straight Shank Hole in FML Plates Subjected to Tensile Loading

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AIP Conference Proceedings 2316, 030009, 2021

Abstract:

Fibre Metal Laminates combine the strength of polymers and the adaptability of aluminium to form novel exotic composite materials that can potentially replace both aluminium and Fibre reinforced polymers. Usage of FMLs in aircraft structures has challenges of its own. One such challenge is joining FML plates to the airframe. The most common method of joining various structural components is riveting. This method of joining introduces stress concentration due to rivet holes, varied load paths, added secondary loads etc. These complications along with bi-material interface on a mesoscopic level are seldom studied. This study addresses the above mentioned shortcomings through a detailed 3-dimensional stress analysis. Accurate prediction of these local stresses will lead to better prediction of fatigue life as well as the joint strength of the structures. Glass fibre reinforced aluminium composite (GLARE) is chosen as the ideal specimen for these studies since it is actively explored as a viable replacement for the existing structural components. A square plate with a centrally located hole is loaded in tension. The GLARE plate is modelled using ABAQUS Standard platform. 8-noded hexahedral elements are functionally graded to appropriately simulate the stress concentration developed in each layer for a particular load. The detailed layer wise behavioural study is presented by plotting the stress and force values obtained across time and displacements. Furthermore, a parametric study of different types of GLARE is carried out to formulate a holistic understanding of the effect of tensile load in an infinite plate with a standard rivet hole.

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MEIJ-05

Review of Cryogenic Treatment on Metal Matric Composites

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AIP Conference Proceedings 2316, 030018, 2021

Abstract:

The tool down time is one of the important factors in machine tool industry while machining with the help of different cutting tools. The cryogenic treatment is a one-time permanent, sub-zero heat treatment that entirely changes cross-section of cutting tool. The physical and mechanical properties such as hardness, toughness beside tribological properties such as wear resistance, coefficient of friction, surface finish, and dimensional stability are vastly improved by the cryogenic treatment involving deep freezing of cutting tool materials. Thus, cryogenic treatments on metals and alloys have drawn the attention of researchers. The present review discovers the previous studies those are conducted on LM25-SiC matrix composites specially focusing on deep cryogenic treatment. The review also briefly introduces the concept of deep cryogenic treatment through review their gaps which has been found in previous studies will be analyzed and authenticated in future.

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MEIJ-06

Stability, Performance and Emission Analysis of Single Cylinder Diesel Engine Fueled With Water Diesel Emulsion as an Alternate Fuel

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AIP Conference Proceedings 2316, 030030, 2021

Abstract:

In the present work, the surfactant concentration is varied and optimised to achieve long term stability of water in diesel emulsion. The non- ionic, non-irritant, safe surfactants derived from sorbitan esters and polyoxyethylene groups are used to prepare emulsion by varying the concentration. It is observed that the mixture of span 20 and tween 80 forms a highly stabled emulsion by the aid of mechanical homogenizer. The blends are prepared by adding surfactants and water droplets to the diesel. The viscosity, flash and fire point, calorific value and density of prepared blends were

determined as per standards. The experiments were performed in a single cylinder, 4-stroke water cooled diesel engine at constant speed (1500 RPM) over different load conditions. Engine performance parameters and emission characteristics are evaluated. From the results it is observed that brake thermal efficiency increases by 1.2% and NOX reduction is 20 to 30%. Increasing trend is observed for HC and CO emissions with increase in water concentration in water diesel emulsion.

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MEIJ-07

Emission Characteristics of Single Cylinder Diesel Engine with Algae Oil as Bio-Diesel

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AIP Conference Proceedings 2316, 030034, 2021

Abstract:

This paper involves entire studies based on the production, fuel characterization, emission characterization of Algae oil biodiesel and its blends Blend20, Blend 40, Blend 60, and Blend 80 were successfully conducted after free fatty acid test and Transesterification Process. Single cylinder of four stroke diesel engine is opted for the emission characteristics of the algae biodiesel, emission characteristics of CO, CO2, NOx and HC on Brake power are evaluated for different diesel blends. Results are evaluated, compared and tabulated.

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MEIJ-08

CFD Simulation of Transonic Turbulent Flow past NACA 0012 Aerofoil

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AIP Conference Proceedings 2316, 020013, 2021

Abstract:

An aircraft needs to operate under different free stream conditions during different phases of its flight like, take-off, climb, cruise, descend and finally landing. In the transonic speed regime at which most of the commercial aircrafts operate, the aerodynamic performance of the aircraft is affected to a great extent by the presence of various nonlinearities. The present work focuses on the analysis of transonic flow past a NACA 0012 Aerofoil, which is widely used for modern commercial passenger aircrafts operating at transonic flight speed. The compressible flow field around a NACA0012 aerofoil which forms the cross section of an aircraft wing has been computed using the ANSYS Fluent 14.5. The simulation 2D compressible flow of air around NACA 0012 aerofoil for a range of flow Mach numbers and Angles of Attack, forms the major contents of this work. Navier Stokes equations for conservation of mean momentum components, coupled to the continuity equation and additional equations for relevant turbulence scalar conservation have been simultaneously solved for a given grid network around the aerofoil. Two different turbulence models viz., Spalart-Allmaras and k-co turbulence models have been used for the computations. The effect of Mach number and Angle of Attack on the aerodynamic performance of the NACA0012 aerofoil has been studied for a given flow Reynolds number. The detailed chord wise distribution of static pressure, skin friction coefficient and turbulence intensity has been compared to reliable wind tunnel measurement data available in open literature. The computed surface pressure and wall shear stress on the aerofoil have been properly integrated to derive the overall aerodynamic performances like variation of Lift and Drag Coefficient and the Pitching Moment of the aerofoil for given angles of attack and flow Mach numbers.

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MEIJ-09

Design and Development of Progressive Tool for Mold Tag

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AIP Conference Proceedings 2316, 030015, 2021

Abstract

A progressive tool carries out a sequence of basic sheet metal operations like blanking, piercing, notching, coining, bending etc. at multiple stations during each stroke of press in order to produce a final component. The challenging part of the project was to design a progressive tool for mold tag because of the complexity involved in it. The objective of the project is to design a progressive tool for mold tag to meet the customer specification, analyse the punches to determine the stress induced using ANSYS workbench and validate the results with theoretical calculations, fabricate and trial run the designed progressive tool for the component. The methodology of the project includes detailed study of component drawing and generation of blank development & strip layout using AutoCAD software. Based on the strip layout design various forces are calculated. Total force is used for the design of elements of progressive tool. The design of progressive tool includes 2D drawing and 3D modelling. The 2D drawing is carried out by AutoCAD software and 3D modelling by Autodesk Fusion 360 software. After the modelling of different punches and dies, the FEM analysis is performed on punches and dies using ANSYS workbench to determine whether the stress and strain are within the allowable limits. It is followed by the manufacturing and assembly of elements of progressive tool. Finally, the tool is fabricated to produce mold tag component.

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MEIJ-10

Design Model of Air Powered Pneumatic Car

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AIP Conference Proceedings 2316, 030010, 2021

Abstract

Cost and contamination with petroleum and diesel are driving vehicle produces to create vehicles energized by elective energies. Designers are working to make utilization of air as a source to run automotive. This work deals with Light utility vehicles which are ending up with exceptionally well-known methods for autonomous transportation. In this air-powered vehicle a pneumatic cylinder for continuous motion, and spur gears for transmission of motion and also a metallic chassis, pneumatic air compressor is used which is based on pneumatic power. This pneumatic cylinder gives a continuous linear

motion which is converted into rotary motion. The vehicle consists of spur gears which transmits mechanical power from one place to another. There is a point of interest in utilizing compacted air as a wellspring of vitality to run vehicles. This approach simulates almost the same performance with existing cars driven by fuel in terms of parameters such as power, torque, efficiency.

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MEIJ-11

Numerical and Experimental Analysis of Thermal Conductivity of PC-ABS Nanocomposite Reinforced With Graphene Developed by Fused Deposition Modeling

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**Materials Today Proceedings, Elsevier Publications, Volume 46, Part 18, 2021,
Pages 8964-8967**

Abstract

Present investigation focuses on numerical and experimental studies on thermal conductivity of polymer nanocomposites reinforced with graphene particles. Fused Deposition Modelling (FDM) a process of Additive Manufacturing (AM) is used to develop nanocomposite specimens for analysis of thermal conductivity. Polycarbonate (PC) – Acrylonitrile Butadiene Styrene (ABS) was taken as matrix material in definite proportion and Graphene was added in different weight proportions. The mixture was developed into filament of 1.75 mm through the process of compounding and extrusion. The test samples were developed through FDM. Experimental results were compared with well-known mathematical models for thermal conductivity test from the literature. The variation of thermal conductivity behaviour with varied percent of graphene is elaborately discussed in this study.

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MEIJ-12

Effect of Nano Fillers on Glass/Silk Fibers Based Reinforced Polymer Composites

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Materials Today Proceedings, Elsevier Publications, Volume 46, Part 18, 2021,
Pages 9032-9035

Abstract

The need for more eco-friendly and biodegradable materials has resulted in greater advancements in the field of nano-materials and their utilization in polymeric matrix materials as filler materials has been rising day by day in developing sustainable natural fiber reinforced polymeric composite laminates. The striking properties like high aspect ratio and larger surface area of nanocomposites have made them to be used in several engineering and commercial sectors such as biotechnology, packaging, aerospace and automotive, building and construction industries. The hybrid composites that exploit the harmony between natural fibers and synthetic fibers in nano filler based reinforced polymeric composites helps in bettering various mechanical properties as well as assists in sustaining environmental biodegradability to acceptable level. In the research investigation, glass/silk/Ca2SiO4 reinforced hybrid epoxy composites are manufactured via hand lay-up method using standard ASTM methods. The mechanical properties such as tensile, bending and impact strength are being evaluated. The hybrid composites of glass fiber (50 wt%), silk fiber (10, 9, 8 & 7 wt%), Ca_2SiO_4 nano filler (with 0, 1, 2 & 3 wt%) reinforced with epoxy (40 wt%) are scrutinized and results reveal that the composite laminates with 3 wt% Ca_2SiO_4 show better tensile, flexural and impact strength properties.

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MEIJ-13

Characterization of Banana and E Glass Fiber Reinforced Hybrid Epoxy Composites

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**Materials Today Proceedings, Elsevier Publications, Volume 46, Part 18, 2021,
Pages 9119-9125**

Abstract

In this paper Fibers of banana and Eglass used as a reinforcement because if its low cost and its abundancy. Normally density of fibre is calculated by using water displacement methods. Fiber were intially treated with 5% concentration of NaOH and NaCl solution to improve adhesion property between fibres. These fibers are again treated with Hardner -HY951. 20% and 30% of volume fraction of fibres are teken and fabricated using Hand lay up method for the dimension 300*300 mm2. Change in the volume fraction of FRC's changes the value of young's modulus by making material stiffer. The testing was carried out by the computer integrated universal testing machine (UTM) which has the capacity of 100KN Kalpak software is used for the data acquisition the testing. Specimen is cut into as per standards for Tension test, three point bending test and hardness test. Tensile and hardness tests are conducted on 30% of volume fraction of fibers (Banana and E glass). Results of tensile test is obtained experimentally results reveal that hybrid combination of banana and E glass fibers are 56% stiffer and intern increases the elasticity and UTS. It was observed that by combining the E-glass fabric with the banana fabric in the composite laminate mechanical properties of the laminate are improved.

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MEIJ-14

Effective Rotordynamics Analysis of High Speed Machine Tool Spindle – Bearing System

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Materials Today Proceedings, Elsevier Publications, Volume 46, Part 18, 2021,
Pages 8905-8909

Abstract

The work is focused on computation of high speed rotor bearing system using XLrotor. The spindle-bearing system which is considered as the most significant component of machine tool, due to its dynamic behavior at varying speeds affects machining productivity and quality. Therefore at design and development stage it is necessary to know the dynamic forces acting on rotor model that causes resonance. The XLrotor advanced computational method is adopted for analysis to assess, investigate and evaluate the performance of spindle- bearing system. The XLrotor tool performs effectively the complete rotordynamic analysis which determines Undamped Critical Speeds (UCS), Campbell diagrams, Imbalance Response and Load on Bearings at Imbalance. For rotor model, the balance correction masses and locations is calculated from measured vibration signature and balancing is carried out for spindle – bearing system as part of corrective measure using XLrotor.

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MEIJ-15

Experimental Determination on the Performance and Emission Characteristics of Delonix Regia Oil Methyl Ester and Its Blends on Single Cylinder Diesel Engine

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Materials Today Proceedings, Elsevier Publications, Volume 45, Part 9, 2021,
Pages 8120-8124

Abstract

In general the fossil fuels contribute nearly 80% of the world's energy needs. The fossil oils are fuels that are derived from ancient animals and micro- organisms and its formation in general requires millions of years and thus they are said to be non-renewable energy sources. India depends on other countries for the import of petroleum resources and huge amount is being spent every year. As India is rich in agricultural resources, it is very easy to derive biodiesel from vegetable oil/plant seed. In this paper

the performance and emission characteristics of delonix regia oil methyl ester and its blends are investigated experimentally on a single cylinder diesel engine running at a constant speed of 1500 rpm from no load to full load in the incremental of 20%. The seed has an oil content of 27% respectively. It is observed from the result that the blend B25 resulted in better brake thermal efficiency which is closer to that of diesel and better than the other blends. The blend B25 also resulted in relatively less exhaust emission when compared with diesel.

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MEIJ-16

Fabrication and Characterization of Hardness and Microstructure of Large Sized Al2014-SiC Composite

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Materials Today Proceedings, Elsevier Publications, Volume 46, Part 18, 2021,
Pages 9102-9106

Abstract

Al-SiC is widely used in structural, aerospace and marine applications. In this paper Hardness and microstructural properties are analysed. Fabrication of composite is done by taking Aluminum 2014 as a matrix and SiC as reinforcement using vortex flow casting method, Four samples are fabricated out of which two samples for Al 2014 grade without reinforcement and AlSiC respectively. Each samples are tested for hardness and micro structure on the surface and cross sections. Results are calculated and tabulated. It is found that Al-SiC gives better hardness and micro structural property when compared with Aluminum 2014 grade. Reciprocating sliding wear test revealed that the SiC reinforced composite possesses highest coefficient of friction when compared with the base alloy (Al2014).

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MEIJ-17

Thermal Integration of Reheated Organic Rankine Cycle (RH-ORC) With Gas Turbine Exhaust for Maximum Power Recovery

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Thermal Science and Engineering Progress, Elsevier Publications
Volume 23, 2021, 100876

Abstract

Reheating is a potential modification to the organic Rankine cycle architecture. Reheated ORC (RH-ORC) is integrated as bottoming cycle plant for topping high efficiency, recuperated gas turbine cycle with low exhaust temperature in the present study. The exit temperature of the working fluid after internal heat exchanger (IHE) sets the initial qualifying criterion. Cyclopentane, hexane and benzene qualify as potential working fluids and ORC with saturated operating conditions with these working fluids is considered as base cycle. For a power generating cycle, power recovery becomes priority over efficiency when connected to a waste heat recovery source. The performance of RH-ORC is studied at various reheat pressure ratios for different temperatures. Specific network output of base cycle increases by retrofitting reheating and it leads to enhanced power recovery. Benzene, at a reheat pressure ratio of 0.558 produces maximum power output of 1292.033 kW and 4772.631 kW from the integration of SM-50 and Rolls-Royce WR-21 for a case of reheating at a temperature of 557.15K. The power recovery potential improves when reheating is carried out to a higher temperature. There is an increase in exergy efficiency because of reheating.

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MEIJ-18

Effects of Axial Conduction and Internal Radiation on Thermodynamic Optimization of a Tubular Space Radiator

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Thermal Science and Engineering Progress, Elsevier Publications
Volume 22, 2021, 100834

Abstract

Traditionally, the analysis of space radiators is loaded towards mass optimization. However, space radiators ought to be thermodynamically optimized for usage on extra-terrestrial bases, where energy resources are at a premium. Hence, a tubular space radiator is presently considered for thermodynamic optimization. The mathematical model of a tubular space radiator, accounting for the axial conduction and internal radiation inside the tube, using radiosity-irradiation method has been developed. Using

a finite difference scheme and Gauss-Seidel method, the temperature profiles of tube and working fluid, and the rate of entropy generation due to heat transfer as well as fluid flow are calculated. The effects of thermal conductivity of tube, internal surface emissivity and thickness of tube on total entropy generation are investigated through a parametric study. It is found that, when the outside surface emissivity is low, the total entropy generation increases by 19.6% with variation of inside surface emissivity. The total entropy generation changes, as high as 80%, with the variation of thermal conductivity of tube. It is also found that there exists an optimum diameter of radiator tube for which the entropy generation is a minimum, and a correlation is developed for the same. Owing to internal radiation and axial conduction in the tube, the optimum nondimensional diameter would change as high as 27%, when compared to a case where both effects are absent. Hence, the effects of internal radiation and axial conduction in the tube cannot be ignored for a tubular space radiator.

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MEIJ-19

Influence of Change in the Apparent Contact Area, Temperature and Vacuum on Tribo Response of Al6061 and EN8 Pair

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Indian Journal of Science and Technology
14(28), Pages: 2368-2379, 2021

Abstract

Objective: Aluminium and its alloys components are used in aero and space industries where in many cases trioboloading prevails. In space application, in addition to tribo loading, the components should also perform in the absence of atmosphere. In the present investigation, attempted has been made to simulate the field conditions in the laboratory by sliding Al6061 alloy pin of different diameters in a vacuum at different temperatures using a vertically configured pin-on-disc test rig. Method: The pin diameters were 2, 4, and 6mm and the testing temperatures were 373, 473, and 573K. The normal contact pressure was 0.625MPa and the sliding speed was 0.5ms-1 and both were constant throughout the experiment. The coefficient of friction was monitored using a PC and the worn pin surface was studied in scanning-electron microscope. Findings: The result showed that the coefficient of friction at sliding temperatures 373 and 473K was found to be dependent on apparent contact area i.e., pin diameters 2, 4, and 6mm. The coefficient of friction was found to be 3.27 and 2.69 for pin diameter 2mm at temperature 373 and 473K whereas the coefficient of friction was of the range 1.36 to 0.33 for the pin of diameter 4 and 6mm. The scanning-electron-microscopic study revealed uniform plastic deformation for pin diameter of 2mm and non-uniform plastic deformation accompanied with abrasion extrusion phenomenon for the pin of diameters 4 and 6mm. The coefficient of friction at sliding temperature 573K was found to be insensitive to the apparent contact area. The coefficient of friction was

in the range of 1.24 to 2.30. The SEM study revealed a large scale of non-uniform plastic deformation accompanied by abrasion, tearing of ridges, extrusion of both ridges, and entrapped wear debris. Novelty: It is a generic study for understanding the response of aluminium for tribo loading which.

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MEIJ-20

Survey Paper on Hydraulics System of Aircraft & Landing Gear

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Journal of Fundamental & Comparative Research Vol. VII, No. 3, 2021
ISSN 2277-7067

Abstract

Landing gear is a vital structural unit of an aircraft which enables to take off and land safely on the ground. The landing gear arrangements are used based on the type and size of aircraft. Tri-cycle arrangement with one nose landing gear unit and two main landing gear units are the most common type. During landing, heavy loads which are equal to the weight of aircraft are to be absorbed by the landing gear. Hydraulic systems in aircraft provide a means for the operation of aircraft components. The operation of landing gear, flaps, flight control surfaces, and brakes is largely accomplished with hydraulic power systems. Failures in aircraft hydraulic systems deeply influence the overall failure rate and so the relative maintenance costs. For this reason, overhaul procedures for these components still represents a profitable market share for all MRO stakeholders. Innovative solutions able to facilitate maintenance operations can lead to large cost savings.

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BOOK CHAPTER

MEBC-01

Development of Polymer Composites by Additive Manufacturing Process

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Encyclopedia of Materials: Composites, Elsevier Publications
Volume 2, 2021, Pages 804-814

Abstract

Additive Manufacturing is technology capable of producing engineering components of complex geometries in a single step. The booming interest in Additive Manufacturing (AM) is seeing a rising number of industries and research entities adopting this technology into their manufacturing practices. Engineering applications may need materials with unusual combinations of properties, which cannot be provided only by metals, polymers or ceramics. For such applications, composite materials combining two or more materials allow having the preferred properties combined in a single material. Polymers Parts built by AM process generally possess lack of strength and poor functionality as fully functional and load bearing components. Lower thermal conductivity, poor stiffness, and poor wear resistance of polymer components and prototype parts further limits their application as functional parts for many engineering.

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COLLEGE OF BIOLOGICAL SCIENCES SCHOOL OF BASIC AND APPLIED SCIENCES

Publication Summary

International Journals	**29**	**(BIOIJ-01 – BIOIJ -29)**
Book Chapters	**10**	**(BIOB-01- BIOB-10)**

BIOIJ-01

Microbial production of omega-3 fatty acids: an overview

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Journal of Applied Microbiology, 1-17, 2021, 13645072 (ISSN)

Abstract

The essence of appropriate nutritional intake on a regular basis has a great impact in maintaining fundamental physiological functions and the body metabolism. Considering how pivotal maintaining a nourishing fat diet is to human health, Omega-3 fatty acids have gained a lot of attention in recent times. Omega-3 fatty acids (*n*-3 FAs) such as eicosapentaenoic acid (EPA) and DHA are considered as essential fatty acids (EFAs) offering enormous nutritional benefits: from playing a major role in the prevention and treatment of a number of human diseases, such as cardiovascular disorders and neurological disorders, to having anti-inflammatory properties, to providing joint support, etc. Hence, their incorporation into our daily diet is of great importance. Also, both EPA and DHA have been shown to be therapeutically significant in treating several infectious diseases. EFAs were initially thought to be marine in origin, produced by fishes. Consequentially, this led to the increase in the industrial extraction of fish oils for meeting the commercial need for of *n*-3-rich dietary supplements. Although fish oil supplementation met almost all of the dietary demand for EFAs, they did come with a fair share of drawbacks such as undesirable odour and flavour, heavy metal contamination, extinction of fish species, etc. Oleaginous micro-organisms are a promising alternative for the production of a more sustainable, consistent and quality production of *n*-3 FAs. Thus, the entire review focuses on understanding the eco-friendlier production of *n*-3 FAs by micro-organisms.

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BIOIJ-02

An Overview of Extended Spectrum Beta Lactamases and Metallo Beta Lactamases

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Advances in Microbiology , Vol.11 No.1, January 2021
DOI: 10.4236/aim.2021.111004

Abstract

Antibiotic resistant *β*-lactamases are diverse and complex enzymes produced by most of the Gram-negative bacteria that are mediated by number of plasmids. The impact of these enzymes has posed a major threat to the health sectors and has challenged the available treatment options for both community and hospital acquired infections. These include the uncomplicated most severe life-threatening infections. Moreover, with resistance to the cephalosporin drugs these MDR strains exhibit co-resistance patterns with different class of antibiotics which is a cause of concern that leads to narrow the limited treatment options. It is alarming situation since there is a steep rise in MDR—Beta lactamase pathogens mainly in *Escherichia coli*, *Klebsiella pneumoniae*, *Acinetobacter baumanii* and *Pseudomonas aeruginosa.* Currently, the clinical detection of Extended Spectrum of *β*-Lactamases (ES*β*L) and M*β*L producing pathogens are carried out by antibiotic sensitivity test on the guidelines of Clinical and Laboratory Standards Institute (formerly the National Committee for Clinical Laboratory Standards) since, the other methods being too expensive. The choice of antimicrobial treatment for infections should rely on the clinical data and the tests (AST) in asymptomatic and mild cases. However, this does not imply for critical infections. The last resorts of treatment for ES*β*L pathogens are carbapenem and nevertheless, resistances have also been reported for the same. With increasing resistance rate to the antibiotics, it's very essential to follow the guidelines for detection, implementation of antibiotic rotation to reduce these pathogens, followed by the efficient infection control practices and strategies to avoid such outbreaks.

Keywords

ES*β*L, M*β*L, Nosocomial Infections

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BIOIJ-03

Resistance to Fluoroquinolones and Other Antimicrobials in Culture-Positive Salmonella typhi Isolates in Gulbarga,South India

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DOI: 10.4236/aim.2021.111002

Advances in Microbiology , Vol.11 No.1, January 2021

Abstract

Background: Tabernaemontana alternifolia root is traditionally used and practiced among few Indian tribes as an antidote for snakebites.

Objective:To combat and neutralize Naja naja venom using methanolic root extract of Tabernaemontana alternifolia and to explore its efficacy on venom biomarkers in search of newer herbal antidote or first-aid-point of care for therapeutics. Materialization. Pharmacological activities such as fibrinogenolytic, direct and indirect hemolytic activities for the neutralization of the venom were evaluated. Lethal toxicity annulation studies were performed using themurine model by pre-incubation and post-treatment protocols. Further, the neutralization of edemaand myotoxicity were also evaluated.

Results:Electrophoretic analysis revealed that the complete neutralization of fibrinogen degradation wasobserved at 1:10 (w/w) (venom to extract).T. alternifoliaexhibited an effective dose (ED50) value of87.20mg/mL for venom-induced hemolysis. Venom at 2mg concentration produced 11 mm of hemolyticradiance and was neutralized at 1:20 (w/w) venom to extract concentration. The survival time and theneurotoxic symptoms in mice were concluded to be delayed by both the methods of lethal toxicity inhi-bition using methanol extract. The edema ratio reduced the venom to extract ratio of 1:20 (w/w) from173 ± 45% to 133.61% when subjected to 5mg of venom concentration. The plant extract significantly neu-tralized the myotoxic activity.Conclusion: T. alternifoliamethanolic root extract could be a potent contributor in the effective treatment of N. najavenom-induced toxicity.

Keywords

Salmonella typhi, Fluoroquinolones, MDR, NAR, gyrA, QRDR

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BIOIJ-04

Controlled synthesis of (CuO-Cu_2O)Cu/ZnO multi oxide nanocomposites by facile combustion route: A potential photocatalytic, antimicrobial and anticancer activity

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Ceramics International
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Abstract

Photocatalytic activity of (CuO-Cu_2O)Cu/ZnO hetero-junction nanocomposites along with their luminescent, biological applications in the progress of anticancer and antibacterial agents is investigated. The Cu and Zn bi-components modified (CuO-Cu_2O)Cu/ZnO nanocomposites were synthesized *via* facile combustion route in the presence of controlled fuel to oxidizer ratio and were characterized by X-Ray Diffraction (XRD) patterns, Transmission electron microscopy (TEM), High resolution Transmission electron microscopy (HRTEM), Scanning Electron Microscopy (SEM), X-ray photoelectron Spectroscopy (XPS), Fourier transform infrared spectroscopy (FTIR), photoluminescence (PL) and energy dispersive X-ray (EDX) analysis. The PL and UV–Visible diffused reflectance spectral (UV–Vis-DRS) techniques were used to measure the optical sensitivity and tuning of band gap in the samples. The excellent photocatalytic degradation of Methylene Blue and industrial waste water under Sunlight irradiation depends on the mass ratios of Cu/Zn. The findings show that the addition of a certain proportion of CuO, Cu_2O, ZnO, and Cu can promote efficiency in Sunlight harvesting and separation of charge carriers. Process parameters namely catalyst quantity, dye concentration and a proposal for the mechanism of degradation pathway, experiments for trapping and enhancer are investigated. The study of photoluminescence, CIE and CCT calculations suggests that the present nanocomposite may find applications as phosphor material in warm white LEDs. The second segment of this study deals with the investigation of antibacterial performance of composites upon Gram-negative and Gram-positive bacteria. The results indicate that nanocomposites can be used in antibacterial control systems and as an important growth inhibitor in various microorganisms. The cytotoxic effect of the (CuO-Cu_2O)Cu/ZnO (CCCZ11) nanocomposite was determined by colorimetric and flow cytometric cell cycle analysis. Our experimental results show that the nanocomposite can induce apoptosis and

suppress the proliferation of HeLa cells. The applications of nanocomposites based on Cu, an abundant and inexpensive metal has created much interest in various multifunctional applications.

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BIOIJ-05

Development and validation of multiplex polymerase chain reaction assay for concomitant detection of genus staphylococcus and clinically relevant methicillin resistance determinants

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J App Biol Biotech. Volume: 8, Issue: 5, Sep-Oct, 2020 2020;8(05):1-6.
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Abstract

The increasing emergence of methicillin-resistant staphylococci (i.e., methicillin-resistant *Staphylococcus aureus* [MRSA] and methicillin-resistant coagulase-negative staphylococci [MRCoNS]) has become a threat globally for both human and animal populace. Phenotypic detection of MRSA and MRCoNS is a less sensitive and time-consuming approach which affects the treatment outcome. Thus, a rapid and accurate method is needed for an early diagnosis of MRSA/MRCoNS infections. The present study aimed at standardization and validation of a multiplex polymerase chain reaction (mPCR) assay to detect genus *Staphylococcus* (16s rRNA gene) and methicillin-resistance determinants (*mec*A and *mec*C genes) simultaneously. The assay characteristics were evaluated against 53 well characterized strains comprising of 40 *Staphylococcus* and 13 non-*Staphylococcus* strains.
Among *Staphylococcus* strains, 32 were *mec*A positive and one strain was *mec*C positive. The lower limit of detection of the mPCR assay was 1ng/mL (Genome copies: 16S rRNA = 1.1 × 109; *mec*A = 3.17 × 109; *mec*C = 1.6 × 109), with analytical sensitivity and specificity of 100%. The mPCR assay developed in the study is useful for rapid and accurate diagnosis of MRSA/MRCoNS infections. The assay can be an important diagnostic as well as surveillance tool to investigate the emergence and dissemination of methicillin-resistant staphylococci which is of both clinical and public health significance.
Keywords: Multiplex polymerase chain reaction, Staphylococcus Methicillin resistance, mecA gene, mecC gene.

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BIOIJ-06

Effect of maternal preconceptional and pregnancy micronutrient interventions on children's DNA methylation: Findings from the EMPHASIS study

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***The American Journal of Clinical Nutrition*, Volume 112, Issue 4, October 2020, Pages 1099–1113, https://doi.org/10.1093/ajcn/nqaa193**
Published:05 September 2020

Abstract

Background

Maternal nutrition in pregnancy has been linked to offspring health in early and later life, with changes to DNA methylation (DNAm) proposed as a mediating mechanism.

Objective

We investigated intervention-associated DNAm changes in children whose mothers participated in 2 randomized controlled trials of micronutrient supplementation before and during pregnancy, as part of the EMPHASIS (Epigenetic Mechanisms linking Preconceptional nutrition and Health Assessed in India and sub-Saharan Africa) study (ISRCTN14266771).

Design

We conducted epigenome-wide association studies with blood samples from Indian (n = 698) and Gambian (n = 293) children using the Illumina EPIC array and a targeted study of selected loci not on the array. The Indian micronutrient intervention was food based, whereas the Gambian intervention was a micronutrient tablet.

Results

We identified 6 differentially methylated CpGs in Gambians [2.5–5.0% reduction in intervention group, all false discovery rate (FDR) <5%], the majority mapping to *ESM1*, which also represented a strong signal in regional analysis. One CpG passed FDR <5% in the Indian cohort, but overall effect sizes were small (<1%) and did not have the characteristics of a robust signature. We also found strong evidence for enrichment of metastable epialleles among subthreshold signals in the Gambian analysis. This supports the notion that multiple methylation loci are influenced by micronutrient supplementation in the early embryo.

Conclusions

Maternal preconceptional and pregnancy micronutrient supplementation may alter DNAm in children measured at 7–9 y. Multiple factors, including differences between the nature of the intervention, participants, and settings, are likely to have contributed to the lack of replication in the Indian cohort. Potential links to phenotypic outcomes will be explored in the next stage of the EMPHASIS study.

Keywords :DNA methylation, micronutrient intervention, epigenetics, epigenome-wide association study, RCT

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BIOIJ-07

Enhanced sunlight driven photocatalytic activity and electrochemical sensing properties of Ce-doped $MnFe_2O_4$ nano magnetic ferrites

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Ceramics International , 2020
Volume 47, Issue 10, Part B, 15 May 2021, Pages 14760-14774
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Abstract

This research deals with the facile combustion synthesis of manganese ferrite (MFO) nanoparticle with different cerium concentration and their potential application as an efficient photocatalyst and chemical sensor. The concentration of introduced cerium affects the size, structure, compositional, morphological, optical, photoluminescence and magnetic properties of the ferrite nanoparticle. The X-ray diffraction pattern affirmed the arrangement of cubic spinel structure with the formation of secondary phase CeO_2 as the cerium concentration exceed 3 mol%. SEM micrographs revealed irregular morphology with more number of pores and voids. HRTEM along with SAED pattern revealed the crystalline cubic nature. The optical band gap deduced from UV–Vis-DRS spectra was observed to be in the range 2.3–2.8 eV. PL studies indicated a significant minimization in combination of electrons & holes in $MnFe_2O_4$ on addition of Ce dopant. VSM investigation demonstrated the soft magnetic nature of the prepared sample with moderate magnetization value. An excellent photocatalytic performance of Cerium

doped MFO (3 mol%) towards MB and AR dye degradation was found to be 1.5 and 1.67 times more compared to host matrix under Sunlight irradiation that correlated to reduced band gap, Ce dopant and efficient separation of charge carriers. Cerium doped MFO (3 mol%) have high specific capacitance value of 471.7 and 1546.8 Fg^{-1} for $NaNO_3$ and HCl electrolytes respectively, indicating the pseudo capacitance nature due to which it can be used as a supercapacitor. The synthesized nanoparticles can sense D-Glucose and Paracetamol even at a lower concentration varying from 1 to 10 mM. The synthesized Ce-doped $MnFe_2O_4$ nanomaterials have great potential to be used in the future production of promising active photocatalysts and sensitive chemical sensors for the identification and degradation of toxic industrial dyes for improved safety in the fields of environment and health care.

Keywords: Solution combustion synthesis, Ce doped $MnFe_2O_4$ nanoferrites
Photocatalysis, Electrochemcial sensor, Magnetic material

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BIOIJ-08

Estrogen exacerbates mammary involution through neutrophil-dependent and -independent mechanism

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ELife, 2020, Developmental Biology Immunology and Inflammation

Abstract

There is strong evidence that the pro-inflammatory microenvironment during post-partum mammary involution promotes parity-associated breast cancer. Estrogen exposure during mammary involution drives tumor growth through neutrophils' activity. However, how estrogen and neutrophils influence mammary involution are unknown. Combined analysis of transcriptomic, protein, and immunohistochemical data in BALB/c mice showed that estrogen promotes involution by exacerbating inflammation, cell death and adipocytes repopulation. Remarkably, 88% of estrogen-regulated genes in mammary tissue were mediated through neutrophils, which were recruited through estrogen-induced CXCR2 signalling in an autocrine fashion. While neutrophils mediate estrogen-induced inflammation and adipocytes repopulation, estrogen-induced mammary cell death was via lysosome-mediated programmed cell death through upregulation of *cathepsin B, Tnf* and *Bid* in a neutrophil-independent manner. Notably, these multifaceted effects of estrogen are mostly mediated by ERα and unique to the phase of mammary involution. These findings are important for the development of intervention strategies for parity-associated breast cancer.

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BIOIJ-09

Graphene-based functional nanomaterials for biomedical and bioanalysis applications

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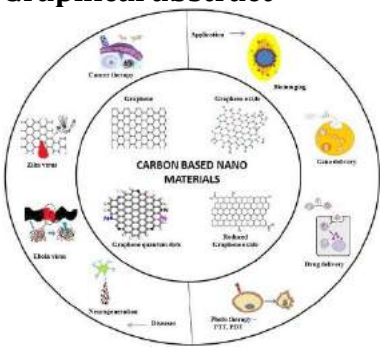
FlatChem

Volume 23, September 2020, 100184

Abstract

Nanomaterials have brought a paradigm shift in the field of science and technology leading to the development of futuristic materials with value addition. Carbon-based nanomaterials specifically graphene-integrated nanostructures have encouraged the field of bioengineering and medicine tangentially with greater insights. The applications are ramified, from disease detection, diagnosis, and treatment further leading to the repurposing of therapy which is increasing with time. Synthesis of graphene with newer strategies with fewer complications has added interest among the scientific fraternity. In this review, we attempt to explore and comprehend the recent advances in the synthesis and encapsulation of graphene-based nanomaterials. Further, the emphasis is laid on the implications of graphene-based nanomaterials for their applications in biomedicine with a prime focus on drug delivery systems. The major therapeutic application of graphene in various diseases like cancer, neuro-regeneration, anti-viral (Ebola and Zika) are described. Future directions, prospects, and limitations are highlighted to strengthen research for elucidating newer inputs and thrusts in the design and development of graphene-derived smart therapeutics which will lead to personalized therapy with better healthcare driving towards the pinnacle of human welfare.

Graphical abstract



Keywords: Carbon nanomaterials, Graphene,Surface modification, Green chemistry, Encapsulation, Biomedicine, Smart therapy, Healthcare

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BIOIJ-10

Large-scale production of enzymes for biotechnology uses

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Current Opinion in Biotechnology
Volume 69, June 2021, Pages 68-76

Abstract

Enzymes are biocatalysts that speed up the chemical reaction to obtain the final valuable product/s. Biotechnology has revolutionized the use of traditional enzymes to be applicable in industries such as food, beverage, personal and household care, agriculture, bioenergy, pharmaceutical, and various other segments. With respect to the exponential growth of enzymes in biotech industries, it becomes important to highlight the advancements and impact of enzyme technology over recent years. In this review article, we discuss the existing and emerging production approaches, applications, developments, and global need for enzymes. Special emphasis is given to the predominantly utilized hydrolytic microbial enzymes in industrial bioprocesses.

Graphical abstract

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BIOIJ-11

Molecular detection of the New Delhi metallo-β-lactamase clinical variant with double mutation- V88L and M154L in *Escherichia coli* isolates from South India

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Gene Reports

Volume 21, December 2020, 100880

Abstract

Carbapenem is usually prescribed as a last resort of antibiotic for treating drug resistant Gram-negative bacterial infections. However, the rise in carbapenem resistance due to the emergence of Zn^{2+} dependent New Delhi metallo-β lactamase (NDM) variants imposes a huge threat to global health. In Indian context, focusing on molecular epidemiology and underpinning the genetic insights of such continuously evolving superbug is perquisite to guide any form of control strategies or therapeutic interventions. Herein, we investigated the occurrence of NDM variants in *Escherichia coli* (*n* = 70) isolated from clinical samples. PCR assay targeting bla_{NDM} gene detected 5 *E. coli* isolates as NDM positive. Sequencing analyses of bla_{NDM} region of the plasmid DNA determined two types of variants viz., NDM-1 (*n* = 3) and NDM-5 (*n* = 2). Notably, NDM-5 variants harbored V88L and M154L mutations, which are known to increase the fitness of NDM-5 variant towards host immune system and zinc starvation. On further characterization, three NDM variants showed the ESBL and AmpC β-lactamase genes, along with 3 different plasmid replicon types (L/M, Y, FIC). Virulence profiling showed traT gene as the most predominant gene among the variants. The emergence of NDM variants especially NDM-5 like variants with critical mutations in enterobacteriaceae increases the significant menaces to the global healthcare. The fact that these NDM variants harboring other antibiotic resistance markers, along with plasmid replicons and virulence genes can be transmitted underlines the gravity of this public health issue.

Keywords : *Escherichia coli,* bla_{NDM-1}, bla_{NDM-5}, Mutation, Antibiotic resistance

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BIOIJ-12

Porous network $ZrO_2/ZnFe_2O_4$ nanocomposite with heterojunction towards industrial water purification under sunlight: Enhanced charge separation and elucidation of photo-mechanism

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Ceramics International

Volume 47, Issue 10, Part B, 15 May 2021, Pages 14845-14861

Abstract

This work majorly aims to synthesize and also investigate the structural, optical, magnetic and optical features of $ZrO_2/ZnFe_2O_4$ nanocomposite. Here, different ratios of novel hetero-junction $ZrO_2/ZnFe_2O_4$ were synthesized by simple and fast solution combustion route. The X-ray diffraction results showed the formation of ZrO_2 and $ZnFe_2O_4$ nanoparticles and $ZrO_2/ZnFe_2O_4$ nanocomposites without any impurity. The formation of hetero-junction effectively inhibits the photo-generated charge carrier recombination. The degradation of Indigo Carmine dye by $ZrO_2/ZnFe_2O_4$ photocatalyst was achieved through synergistic effects with 98% degradation and removal of 77% COD from the industrial dye waste water under Sunlight irradiation. Mixing of ferrites with zirconia greatly improves the photocatalytic activity that has been clearly proposed with the help of mechanism. ZZFO 12 NC exhibits better photocatalytic activity due to the combined facets of photo and Fenton activity. The exposure and enhancement of fingerprints in various surfaces are achieved by a modest, extremely sensitive and eco-friendly method. ZZFO12 NC offer great potential as an active photocatalyst for degradation of 54% of organic pollutant present in industrial waste water under natural Sunlight.

Keywords : Textile wastewater, $ZrO_2/ZnFe_2O_4$ NCs, Charge carrier dynamics, Photocatalysis, Latent finger prints

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BIOIJ-13

Purification and characterization of cellulase from a novel isolate of *Trichoderma longibrachiatum*

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Biofuels
Volume 11, 2020 - Issue 1

Abstract

In the present study, the isolation, purification and characterization of a complex enzyme, cellulase, was carried out using a new local isolate of the fungus *Trichoderma longibrachiatum* (KM274866) from wood chips, with a view to explore its utility in the biofuel industry. The fungus was grown on a selected natural substrate, sugarcane bagasse, based on cost considerations for enzyme production. The enzyme was purified 14.82 fold with a yield of 25.8% and specific activity of 30 U/mg of protein. The molecular mass of the enzyme was found to be 67 ± 1 KDa. The optimum pH was 4.8, but the enzyme was stable at a pH range of 3–6. Optimum temperature was 45 °C, but the stability range of the enzyme was 30–55 °C. Metal ions such as Ca^{2+}, Na^{+}, Mg^{2+}, Zn^{2+} and Fe^{2+} enhanced enzyme activity. Triton X100 in the medium resulted in a significant increase of enzyme activity compared to other group specific reagents. K_M and V_{max} for the enzyme were found to be 0.121 mg/ml and 0.421 μmol/min, respectively, against the substrate carboxy methyl cellulose. As the enzyme is from an inexpensive source, it will be most useful in the preparation of bioethanol for the biofuel industry.

Keywords:

Trichoderma longibrachiatum (KM274866)cellulase,lignocellulosepurification

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BIOIJ-14

Structural and functional characterization of bacterial cellulose from *Enterobacter hormaechei* subsp. *steigerwaltii* strain ZKE7

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***Cellulose* 27, 9181–9199 (2020).**
https://doi.org/10.1007/s10570-020-03412-2

Abstract

The present investigation reports, the bacterial cellulose (BC) a high-purity polymer produced from isolated strain ZKE7. BC production was optimized by Plackett–Burman and central composite designs yielding 18.5 g/l BC with a 4.5-fold enhancement. BC composites functionalized with antibiotics, BC-gelatin hydrogel, BC-Chitosan hydrogel and BC silver nanoparticle composites were developed and evaluated for water retention capability, moisture content and protein adsorption. The drug release behavior of the composites was consistent for controlled drug delivery. Composites were assessed for functional characteristic such as antimicrobial properties. BC composites functionalized with Neotericine exhibited antifungal activity against *Candida albicans.* Other composites showed pronounced antibacterial properties against *Escherichia coli, Bacillus subtilis* and *Micrococcus luteus.* Structural and thermal characterization of BC composites was carried out by FTIR, SEM with energy dispersive X-ray analysis, TGA and differential scanning calorimetry analysis. The results reveal high BC production with excellent properties that can be employed in biomedical field.

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BIOIJ-15

Synthesis of CuO samples by co-precipitation and green mediated combustion routes: Comparison of their structural, optical properties, photocatalytic, antibacterial, haemolytic and cytotoxic activities

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Ceramics International
Volume 47, Issue 7, Part B, 1 April 2021, Pages 10355-10369

Abstract

The goal of this research is to prepare novel, inexpensive, environment friendly and efficient crystalline CuO samples by green mediated combustion and co-precipitation routes towards environmental remediation and biomedical applications. The influence of preparation routes and *Aloe barbadensis miller* (*Aloe* vera) gel on the morphology, size, crystallinity, band gap, defects, photocatalytic, antibacterial, haemolytic and anticancer behaviour of CuO samples were explored. The PXRD, XPS, SEM, TEM, HRTEM and FT-IR were performed to confirm the formation of CuO samples. FTIR studies showed all possible bands of *Aloe barbadensis miller* gel. FTIR displaying the occurrence of new peaks and peak shifts in the CuO synthesized by green mediated combustion route compared to co-precipitation route is an evidence of the effective interactions between CuO and *Aloe* vera gel. The PL and UV–Vis-DRS techniques measured the optical sensitivity and tuning of band gap of the CuO samples. The crystallinity and surface properties dependent photocatalytic activities for decolourization of MB and RhB under both UV and Sunlight irradiation were investigated. The results indicated that green mediated synthesized CuO sample displayed high photocatalytic activity compared with co-precipitation route synthesized CuO sample, which mainly resulted from the low crystallinity and crystallite size (6 nm), narrow band gap (1.73 eV) and lower recombination of charge carriers. These synthesized CuO samples also demonstrate excellent antibacterial activity against the bacteria Gram-positive (*S. aureus*) and Gram-negative (*E. coli*). The present study probes into the cytotoxicity of CuO samples employing root cells of *Allium cepa.* In addition, we report the haemolytic activity on goat and human blood along with the implementation of green synthesized CuO sample using an *Aloe barbadensis miller* extract for the evaluation of anticancer activity in human cervical cancer (HeLa) cells with IC50 value of 310.1 μg/ml. Our studies focus on developing biosynthesized nanomaterials for environmental remediation and biomedical applications.

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BIOIJ-16

Targeting Imd pathway receptor in *Drosophila melanogaster* and repurposing of phyto-inhibitors: structural modulation and molecular dynamics

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Journal of Biomolecular Structure and Dynamics (2020)

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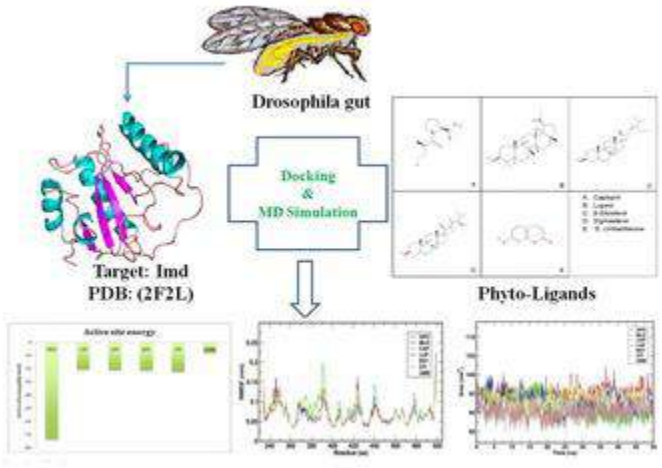
Abstract

Dysbiosis is a major cause of disease in an individual, generally initiated in the gastrointestinal tract. The gut, also known as the second brain, constitutes a major role in immune signaling. To study the immunity cascade, the Drosophila model was considered targeting the Imd pathway receptor (2F2L) located in the midgut. This receptor further initiates the immune signaling mechanism influenced by bacteria. To inhibit the Imd pathway, the crystal structure of Imd with PDB: 2F2L was considered for the screening of suitable ligand/inhibitor. In light of our previous studies, repurposing of anti-diabetic ligands from the banana plant namely lupeol (LUP), stigmasterol (STI), β-sitosterol (BST) and umbelliferone (UMB) were screened. This study identifies the potential inhibitor along with the tracheal toxin (TCT), a major peptidoglycan constituent of microbes. The molecular docking and molecular dynamics simulation of complexes 2F2L-MLD, 2F2L- CAP, 2F2L-LUP, 2F2L-BST, 2F2L-STI and 2F2L-UMB elucidates the intermolecular interaction into the inhibitory property of ligands. The results of this study infer LUP and UMB as better ligands with high stability and functionality among the screened candidates. This study provides insights into the dysbiosis and its amelioration by plant-derived molecules. The identified drugs (LUP & UMB) will probably act as an inhibitor against microbial dysbiosis and other related pathogenesis (diabetes and diabetic neuropathy). Further, this study will widen avenues in fly biology research and which could be used as a therapeutic model in the rapid, reliable and reproducible screening of phytobiologics in complementary and alternative medicine for various lifestyle associated complications.



Keywords: Immunity, Imd, simulation, in silico, dynamics, lifestyle disorder, diabetes, diabetic neuropathy

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BIOIJ-17

SUBSTANCE P FAILED TO REVERSE DEXTRAN SULFATE SODIUM-INDUCED MURINE COLITIS MEDIATED BY MITOCHONDRIAL DYSFUNCTION: IMPLICATIONS IN ULCERATIVE COLITIS

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3 BIOTECH (2021) DOI: 10.1007/S13205-021-02755-2.

Abstract

As controversy exists about the efficacy of substance p (sp) in treating ulcerative colitis (uc) with no previous study highlighting the impact of sp on mitochondrial dysfunction in this diseased condition, it became logical to perform the present study. C57bl/6 j mice were administered with dss @ 3.5%/gm body weight for 3 cycles of 5 days each followed by i.v. Dose of sp @ 5nmole per kg for consecutive 7 days. Histopathological features were noticed in the affected colon along with colonic mitochondrial dysfunction, alterations in mitochondrial stress variables and enhanced colonic cell death. Interestingly, sp failed to reverse colitic features and proved ineffective in inhibiting mitochondrial dysfunction. Unexpectedly sp alone seemed to impart detrimental effects on some of the mitochondrial functions, enhanced lipid peroxidation and increased staining intensities for caspases 3 and 9 in the normal colon. To substantiate in vivo findings and to assess free radical scavenging property of sp, caco-2 cells were exposed to dss with or without sp in the presence and absence of specific free radical scavengers and antioxidants. Interestingly, in vitro treatment with sp failed to restore mitochondrial functions and its efficacy proved below par compared to sod and dmso indicating involvement of o2 •- and •oh in the progression of uc. Besides, catalase, l-name and meg proved ineffective indicating non-involvement of h2o2, no and onoo- in uc. Thus, sp may not be a potent anti-colitogenic agent targeting colonic mitochondrial dysfunction for maintenance of colon epithelial tract as it lacks free radical scavenging property.

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BIOIJ-18

Enhanced degradation of captan by immobilized cells of Bacillus circulans

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JOURNAL OF MICROBIOLOGY BIOTECHNOLOGY AND FOOD SCIENCES (2021) DOI:10.15414/jmbfs.2014.4.2.108-111

Abstract

The possibility of using bacillus circulans in degrading captan was evaluated by comparing the captan degradation rate by freely suspended and immobilized cells on agar, sodium alginate (sa), polyacrylamide (pa) and polyurethane-foam (puf) in batch and repeated batch degradations. Under batch degradations, 50, 60, 72, and 88% of 0.1% captan was degraded by freely suspended cells, agar-, sa-, and pa-immobilized cells, respectively in 72 h; whereas 15, 47.5, 67.7 and 75% of 0.2% captan was degraded by freely suspended cells, agar-, sa-, and pa-immobilized cells, respectively in 72 h. However, 0.1 and 0.2% captan were completely degraded by puf-immobilized cells in 48 and 72 h, respectively. Under repeated batch degradations, puf-immobilized cells were reused more than 40 cycles for 72 h without losing the captan degradation ability, while the cells immobilized on agar, sa, and the pa could be reused for 15, 20, and 25 cycles, respectively. A significant 0.1% captan degradation by puf-immobilized cells was observed at ph 4.0 - 10.0 and 20 - 40 ºc ranges. In contrast, freely suspended cells only degraded captan at optimum ph of 7.0 and 30 ºc. The puf-immobilized cells were able to significantly degrade captan for 120 days at 4 ºc without losing the captan degradation ability; whereas this ability was lost in 120 days for freely suspended cells. Since the application of captan leads to pollution and reduces soil fertility, the use of immobilized cells of bacillus circulans can thus be a better cost-effective strategy to decontaminate captan polluted sites.

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Biotransformation of longifolene by *Penicillium europium*

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Biocatalysis and Biotransformation. (2021)
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Abstract

A fungal species was screened from a forest soil by enrichment agar plating method with longi- folene as only carbon source. It was identified as *penicillium europium*. The isolated fungus trans- formed the longifolene into various metabolites, of which 12 were isolated in pure form. The characterisation of these transformed compounds was carried out by physicochemical methods involving spectral studies. Attempts were made to find out the pathways of the transformation of longifolene with the help of oxygen uptakes studies, tetranitromethane (tnm) tests and structures of acid and neutral metabolites. The biological transformation of longifolene was found to proceed simultaneously by 4 different schemes of pathways. As the longifolene metabolites are playing a big role in perfumery, *p. Europium* can be utilised in the production of necessary raw materials for perfumes.

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BIOIJ-20

Inhibitory Effect of Carissa spinarum Linn Methanolic Leaf Extract Against *Vipera russelli*

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Venoms and Toxins (2021) DOI : 10.2174/2666121701999201216144752

Abstract

Background: carissa spinarum linn has been used as a traditional medicine to treat various ailments, including snakebite. It is found in india, ceylon and thailand.

Objective: the study was performed to determine the inhibiting potential of carissa spinarum methanolic leaf extract on the pharmacological effects of viper venom.

Methods: the dose-dependent enzymatic studies, pharmacological and in vivo studies were conducted using standard methods.

Results: it neutralized toxic enzymes in a dose-dependent manner with concentrations ranging from 53.3 –1190.4 µg/ml, inhibited lysis of fibrinogen at 1:8 (venom: extract, w/w), and increased the procoagulant activity and lecithin lysis at 1:25 (venom: extract, w/w). The extract neutralized the ld50 of venom in mice and embryos, reduced haemorrhage, myotoxicity and edema induced by the venom in mice.

Conclusion: the observed results confirm that the leaf extract possesses adequate phytochemicals that could neutralize the toxic properties of the venom.

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BIOIJ-21

Properties Of Laccase Of *Bacillus Marisflavi* Strain Bb4 And Its Synthetic Dyes Decolorization Analysis

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Proceedings of the National Academy of Sciences, India Section B: Biological Sciences (2021)
DOI: 10.1007/s40011-021-01235-0

Abstract

In The Present Study, A Bacterium-Producing A Laccase Capable Of Decolorizing A Dye Was Isolated From Bengaluru Soil And Identified As *Bacillus Marisflavi* Strain Bb4 Using By 16s Rdna Sequencing. The Optimum Production Was Seen At 30 °C, Ph 7.0 And 48 H When The Culture Flasks Were Shaken At 100 Rpm With 1% Inoculum Level. A Remarkable Overall 5.2-Fold Increase In Laccase Production Was Attained After Optimization. After $(Nh_4)_2so_4$ Precipitation And Ion Exchange Technique, The Calculated Specific Activity Was 398.2 U/Mg. The Properties For The Purified Laccase Were 52 Kda, 30 °C, Ph 7.0, Stimulated By Cu^{2+}, Strongly Inhibited By Hg^{2+}, No Effect With Mg^{2+}, Zn^{2+}, Co^{2+}, Na^{+}, Fe^{2+}, Mn^{2+}, Edta, Inhibited By Sds, Nan_3, L-Cys, 2-Mercaptoethanol (2-Me), And Dithiothreitol, Oxidize Guaiacol, 2,2′-Azino-Bis(3-Ethylbenzothazoline-6-Sulfonate (Abts), Catechol, And 2,6-Dimethoxyphenol (2,6-Dmp), Has 1.43 µm And 227.3 U/Ml As Km And Vmax, Respectively. The Laccase Of *B. Marisflavi* Was Able To Decolorize Congo Red, Bromophenol Blue, Crystal Violet, And Indigo Carmine Without A Redox Mediator. However, The Abts Was Needed As Redox Mediator To Degrade Malachite Green And Reactive Orange 16 To A Great Extent. The Laccase Of The Present Study Is Therefore A Good Candidate For Textile Industries As Decolorization Agent.

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BIOIJ-22

Extraction and identification of fungal pigment from Penicillium europium using different spectral studies

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Journal Of King Saudi University-Science (2021)
Doi: 10.1016/J.Jksus.2021.101437

Abstract

Objective

There is a growing demand for colourants of natural origin in the food, pharmaceutical, cosmetic and textile sectors. Previously, our group has screened a fungal species from forest soil, identified as *penicillium europium.* The isolated fungus transformed the longifolene into various metabolites, of which 12 were isolated in pure form, with potential to be utilized in the perfumery industry. This study aimed to isolate and identify novel fungal pigments from *penicillium europium.*

Methods

The current study showcases the extraction and identification of fungal pigment from *penicillium europium* using different spectral studies. The strain was isolated from forest soil, western ghats, india, and was found to be capable of using longifolene as the sole carbon source. The yellowish pink coloured pigment-producing fungal strain was identified as *penicillium europium.* Further, the pinkish pigment was extracted, purified, and using spectral studies like uv, ir, nmr and mass, the structure of the pure pigment was identified.

Results

The pure pigment structure was analyzed and tentatively confirmed as 2-(1,5, dimethyl hexyl)-3,5-dimethyl-6-hydro-1,4-benzoquinone having the molecular formula $c_{16}h_{24}o_3$. Toxicity study using ld_{50} on albino rats revealed that the pigment had no toxic effect on rats.

Conclusion

Penicillium europium synthesized pigments could contribute to biotechnology and add value to the food, feed, and pharmaceutical industries. They can be used for various

industrial applications, for example, as dyes for textile and non-textile substrates such as paper, leather, coatings and paints, in cosmetics, and food additives. Negative cytotoxicity result inferred that the pigment could be a potential replacement for hazardous synthetic dyes.

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BIOIJ-23

Potential of herbal cocktail of medicinal plant extracts against BIG FOUR snake venoms from India

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J AYURVEDA INTEGR MED. 2021, DOI: 10.1016/J.JAIM.2021.04.006

Abstract

Background: Venomous snake bites cause acute medical emergencies and are fatal. India accounts for large proportion of snake-bite deaths globally. Medically important 'BIG FOUR' snakes of India are Bungarus caeruleus (krait), Naja naja (cobra), Echis carinatus (saw-scaled viper) and Daboia russelii (Russell's viper). Polyherbal formulations have been proved to be effective in treatment of diseases than a single formulation.

Objective(s): To evaluate aqueous ethanolic extract cocktail of Azadirachata indica, Butea monosperma, Citrus limon, Clerodendrum serratum and Areca catechu for antidote potential against BIG FOUR venoms in ex vivo and in vivo model.

Materials and methods: Anti-hemorrhagic and venom neutralization studies were performed in seven-day old chick embryo model for ex vivo studies. In vivo studies were performed using male Swiss albino mice for antivenom potential of herbal cocktail by performing anti-edematic, anti-hemorrhagic, anti-myotoxic activity, and venom neutralization.

Results: Herbal cocktail exhibited differential venom inhibition potential against four venoms tested. Hemorrhagic activity was completely neutralized by the herbal cocktail; myotoxic activities of krait and Russell's viper venom were neutralized; while anti-edematic activity was observed for krait and cobra venom. Herbal cocktail completely neutralized venom lethality ($3*LD_{50}$) of krait and saw-scaled viper venom.

Conclusion: Inhibitions of various venom components of all four venoms suggests presence of phytochemicals in herbal cocktail with therapeutic properties. Further studies would help in the development of a formulation as a first-aid towards treatment of snake bite victims.

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BIOIJ-24

Structural And Binding Studies Of Cyclin-Dependent Kinase 2 With Nu6140 Inhibitor

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Chemical Biology & Drug Design (2021),
Doi: Https://Doi.Org/10.1111/Cbdd.13941

Abstract

Cyclin-dependent kinase 2 (cdk2) is an established target protein for therapeutic intervention in various diseases, including cancer. Reported inhibitors of cdk2 target the atp-binding pocket to inhibit the kinase activity. Many small molecule cdk2 inhibitors have been discovered, and their crystal structure with cdk2 or cdk2–cyclin a complex has been published. Nu6140 is a cdk2 inhibitor with moderate potency and selectivity. Herein, we report the cocrystal structure determination of nu6140 in complex with cdk2 and confirmation of the binding using various biophysical methods. Our data show that nu6140 binds to cdk2 with a kd of 800 nm as determined by spr and stabilizes the protein against thermal denaturation (δt_m—5°c). The cocrystal structure determined in our study shows that nu6140 binds in the atp-binding pocket as expected for this class of compounds and interacts with leu83 and glu81 with regular hydrogen bonds and with asp145 via water-mediated h-bond. Based on these data, we propose structural modifications of nu6140 to introduce new interactions with cdk2 that can improve its potency while retaining the selectivity.

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BIOIJ-25

Characterization, anticancer, antibacterial, anti-diabetic and anti-inflammatory activities of green synthesized silver nanoparticles using Justica wynaadensis leaves extract

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Materials Today: Proceedings (2020)
Doi.Org/10.1016/J.Matpr.2020.10.048.

Abstract

In this experiment plant mediated method used to prepare silver nanoparticles using *justica wynaadensis* leaf extract. The leaf extract solution reduced and stabilized the $agno_3$ into silver nanoparticles. The synthesis of silver nanoparticles was observed by the colour reaction and monitored by uv–visible spectroscopy in the range of 400 nm to 500 nm for silver nanoparticles. The synthesized nanoparticles were subjected to characterization technique by using x-ray diffraction (xrd), transmission electron microscope (tem), fourier transform infrared spectroscopy (ftir). Tem analysis of the silver nanoparticles were found to be crystalline in structure, varying in size from 30 nm to 50 nm. The biological activities of ag nanoparticles showed significant results against anti-bacterial, anticancer activity (cell line a549). The anti-diabetic and anti-inflammatory activities of *justica wynaadensis* ag nanoparticles also has proved that it is a good alternatives in medicine and industrial application.

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BIOIJ-26

Synthesis of nickel oxide grafted graphene oxide nanocomposites - A systematic research on chemisorption of heavy metal ions and its antibacterial activity

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Environmental Nanotechnology, Monitoring & Management (2021) https://doi.org/10.1016/j.enmm.2021.100486

Abstract

Graphene Oxide-Nickel Oxide (GO-NiO) nanocomposite was prepared by a simple combined hydrothermal method. The nanocomposites were characterized by Field-Emission Scanning Electron Microscopy (FESEM), X-Ray Powder Diffraction (XRD), Fourier Transfer Infrared (FT-IR) Spectroscopy, Transmission Electron Microscopy (TEM), Thermogravimetric (TGA) Analysis, and Energy Dispersive X-ray analysis (EDX). SEM and TEM analysis indicates the formation of flaky structured nanoparticles with sizes ranges from 100 to 200 nm. GO-NiO nanocomposite has exceptional adsorption capacity and very high adsorption rates towards removing Pb^{2+} and Cd^{2+} metal ions. Our work illustrates that the adsorption data were best fit for Langmuir adsorption isotherm among Freundlich and D–R isotherm providing a high adsorption capacity of 208.8 and 324.7 mgg^{-1} for Pb^{2+} and Cd^{2+} metal ions respectively. At the same time, the kinetics followed the pseudo-second-order model and other kinetic parameters like pseudo-first-order, Elovich and Intraparticular diffusions were also discussed. The influence of concentration and pH were studied. The GO-NiO nanomaterial, as formed, was examined for various Gram-positive and Gram-negative pathogenic bacteria.

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BIOIJ-27

Synergistic effect of photocatalytic, antibacterial and electrochemical activities on biosynthesized zirconium oxide nanoparticles

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Eur. Phys. J. Plus **(2021)**
https://doi.org/10.1140/epjp/s13360-021-01606-6

Abstract

Zirconium oxide nanoparticles (Nps) were synthesized by the ecologically benign and efficient green combustion method by using latex of E-tirucalli plant extract as a fuel. The synthesized powder samples were confirmed for their size and shape from X-ray diffraction and scanning electron microscopy. Fourier transform infrared spectroscopy analysis shows the purity of the prepared material. Structural features of the molecules can be identified using Raman spectroscopy. Qualitative and quantitative analysis of the molecule and energy band gap of the material was estimated by UV–Visible absorption spectroscopy. Photocatalysis system for environmental remediation using zirconium oxide Nps was efficiently approached. Also, antibacterial studies of four bacterial pathogens which are harmful to mankind were shown positively from the prepared Nps. The electrochemical property of the synthesized ZrO_2 Nps has been shown by quantifying dopamine at micro-molar concentration levels.

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BIOIJ-28

A Retrospective Study on the Pyogenic Pathogens and Their Antibiotic Susceptibility Patterns along with the ES*β*L Production

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Advances in Microbiology (2021) DOI: 10.4236/aim.2021.116024

Abstract

Pyogenic infections are caused by various pathogens leading to pus formation and that can be attributed due to a wound either through accident or during surgery leading to infection spread. There are pathogenic strains that are not uncommon in hospital settings like *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Acinetobacter* etc., that are multidrug resistant (MDR) and are a cause of concern. The bacteriological profile in the pyogenic infections tends to be same but there is a vast difference with the antibiotic resistant patterns in different hospital settings. Hence, the aim was to study the antibiotic susceptibility profiles and Extended spectrum *β*eta Lactamases (ES*β*L) production in these pathogens. A prospective study was carried out in Silchar Medical College and Hospital Assam, India, over a four-month period from February to May 2021. The samples were processed using Blood and MacConkey's agar. Further, these isolated pathogens were identified by standard morphological, cultural and biochemical tests. The antibiotic susceptibility test was conducted by Kirby Bauer disc diffusion method and ES*β*L production was detected by using combined disk diffusion test. It was observed that the identified pathogens had an incidence rate of 84.2% and further revealed that Gram negative had a higher incidence rate compared to Gram positive with 59.8%. The pathogens isolated from pus samples had a maximum of *Klebsiella sps* (19.64%) and the lowest was *E. coli* with 5.36%. Antibiotic susceptibility test (AST) of Gram-negative bacterial isolates showed the highest incidence with aztreonam (40.6%) and the lowest was observed in Piperacillin/Tazobactam with 7.5%. The only Gram positive was observed in our study, *Staphylococcus aureus* had the highest resistance in amikacin with 80% and interestingly, all the isolates were sensitive to Linezolid with 100%. There is a high rise and spreading with the multi-drug resistance (MDR) strains along with ES*β*L production and it was observed in our studies that these pathogens had an incidence rate of 18.5%. The highest was 58.1% in Pseudomonas sps. None of *Proteus sps* were found to be ES*β*L producers. To combat resistance, the irrational use of antibiotics should be avoided and surveillance of the rising multidrug species regularly helps in implementing better therapeutic options to reduce the morbidity and mortality.

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BIOIJ-29

Green synthesis of MgO nanoparticles using *Phyllanthus emblica* for Evans blue degradation and antibacterial activity

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https://doi.org/10.1016/j.matpr.2021.05.340

Abstract

The eco-friendly synthesis of nanomaterials utilizing plant extract has always been eco-sustainable and enticing. The present study reports the synthesis of MgO nanoparticles named MGN1, MGN2, MGN3, and MGN4 with different fuel ratios using the *Phyllanthus emblica* aqueous fruit juice popularly known as Indian gooseberry. The structure and size of MGN NPs were studied using techniques such as XRD, SEM, and TEM. The FTIR spectrum played a crucial role in showcasing the significant functional groups present in the MGN NPs, by showing the strong absorption in the range 424 cm^{-1}. Under UV light irradiations, photocatalytic degradation of Evans blue (EB) dye was investigated, and the result showed around 90% removal of the dye from the wastewater. Further, the same compound is assessed for antibacterial activity on several distinct pathogenic bacteria using the agar well diffusion technique: *Pseudomonas aeruginosa* (Gram-negative), *Staphylococcus aureus* (Gram-positive), *Acinetobacter baumannii* (Gram-negative), *Escherichia coli* (Gram-negative) and *Klebsiella pneumoniae* (Gram-negative).

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COLLEGE OF BIOLOGICAL SCIENCES
SCHOOL OF BASIC AND APPLIED SCIENCES
BOOK CHAPTER PUBLICATIONS

BIOB-01

A Comprehensive Review on Different Microbial-Derived Pigments and Their Multipurpose Activities

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Microbial Polymers. Springer, Singapore (2021).
Https://Doi.Org/10.1007/978-981-16-0045-6_20

Abstract

Microbial pigments are colored secondary metabolites produced by various kinds of microorganisms. These pigments vary in color from red, green, to yellow, etc. They typify the organism by giving it the color, help in photosynthesis, and play vital roles in pathogenicity. Some of the more important microbial pigments are carotenoids, flavonoids (anthocyanins), and some tetrapyrroles (chlorophylls, phycobiliproteins). They are majorly found in various species of bacteria and fungi. In the recent past, these pigments have been found to be useful beyond their inherent biological relevance. Due to the growing need for natural colorants and dyes in various industries, these microbial pigments are being extensively sought after; in particular, in the food industry as food colorants, in the textile industry as natural dyes, in the medical industry as anticancerous compounds and immunosuppressants, etc. Here, in this chapter, we have outlined what microbial pigments are, their types, their characteristic occurrences along with their multifaceted commercial application. Factors that improve the production of these pigments and the methods adopted for their extraction are also discussed in this chapter. The need for an eco-friendly, but sustainable industry demands that we substitute synthetic coloring agents with these biological pigments.

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BIOB-02

Fungal Chitosan: The Importance And Beneficiation Of This Biopolymer In Industrial And Agricultural Process

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Microbial Polymers. Springer, Singapore (2021).
Https://Doi.Org/10.1007/978-981-16-0045-6_20

Abstract

Chitosan is used as an alternative effective bio-pesticide to manage the crop diseases and to increase the fertility of soil surface. Chitosan is a chitin derivative composed of poly(β-(1–4)-d-glucosamine) isolated from fungal cell walls, crustacean, and shrimp shell. It is a polymer that is non-toxic, biocompatible, and conveniently biodegradable. Chitosan is capable of persuading callose formation in plants, by synthesising phytoalexins to inhibit the growth of parasites in plant cells. In addition, it enhances stomatal conductance and decreases the phase of transpiration without affecting the plants' physical nature. Furthermore, to alter the permeability of the membrane, Chitosan is used as a coating agent for nuts, fruits, and vegetables. It raises sugar and proline concentrations and increases the activity of peroxidase, catalase, phenyl aniline ammonia lyase, and tyrosine-ammonia lyase enzymes. It also has the potential to release the fertiliser in a continuous manner, and it increases the soil water retention property. In addition, chitosan has a high potential to resist pathogenic fungus formation, sporulation, viability of spores, and fungal germination. For four decades, chitosan has been used in a variety of applications for various applications, such as enzyme immobilisation, enhancement of healing activity, heavy metal removal, industrial residue treatment, food preservation, cosmetics, and medical applications. In addition, it is used in the manufacture of vaccines for the adsorption of protein on the surface of the mucosa, value-added product in carbohydrates and applied in different industrial products such as nutrition, biomedical, and prebiotics. In this book chapter, we mainly focus on discussion about the application of chitosan in agriculture and industrial processes.

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BIOB-03

Isolation and Purification of Microbial Exopolysaccharides and Their Industrial Application

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Abstract

Exopolysaccharide is long-chain high molecular weight polymeric carbohydrates composed of monosaccharide units bound together by glycosidic linkage, which are secreted extracellularly by the secreting microscopic cell or organism. These exopolysaccharides can be either homopolysaccharide or heteropolysaccharide in nature. Exopolysaccharide comprises repeated units of sugar moieties attached to the carrier lipid and can be associated with proteins, lipids, organic and inorganic compounds, and metal ions. Bacteria, archaea, yeast, filamentous fungi, and single cell of eukaryotes produce microbial exopolysaccharides. Microbial synthesis of polysaccharides is greatly influenced by environmental factors such as temperature, pH, pressure, salinity, toxicity, and radiation levels across their ecological niche. Due to the very less production time of exopolysaccharides and its simple purification process, these have found various successful applications in various industrial sectors such as pharmacology, diagnostics, nutraceuticals, functional foods, cosmetics, herbicides and insecticides, bioremediation, biotechnology, petrochemicals, dairy industry, and paint industry. Some of the most important exopolysaccharides and its industrial applications are Acetan (as preservative), Alternan (as commercial gum Arabic), Biodispersion (as remediation of oil spills), Cellulose (as non-indigestible fiber), Curdlan (as a food additive and gelling agent), Dextran (as moisturizers), Emulsan (as crude oil recoveree), Gellan (as stabilizer and microencapsulation matrix), Hyaluronan (as for the removal of dead cells in skincare products), Kefiran (as anti-cancer agents), Levan (as viscosifier), Mutan (as adhesives), Succinoglucan (as emulsion stabilizers), Welan (as thickening agents in high-temperature industries), Xanthan (as an emulsifier and suspending agent), and Pullulan (as orally consumable films). These exopolysaccharides are produced by bacterial species such as Acetobacter, Pseudomonas, Leuconostoc, Alteromonas, Alcaligenes, Lactobacillus, Zymomonas, Xanthomonas, Aureobasidium (fungus). These compounds are purified by techniques such as membrane filtration, dialysis, precipitation, various types of column chromatography, lyophilization, distillation, and rotatory vaporization. This chapter describes different isolation and purification techniques for microbial exopolysaccharides.

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BIOB-04

A Comparative Study On Biodegradable Packaging Materials: Current Status And Future Prospects

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Microbial Polymers. Springer, Singapore (2021). Https://Doi.Org/10.1007/978-981-16-0045-6_20

Abstract

An Ever-Growing Call To Contain Pollution Has Led To The Search For Alternate Sources Of Sustainable Industrial Raw Materials. Recently, Biodegradable Waste Materials Have Been Sought After As A Potential Alternative. The Waste From Packaging Materials Is Of Great Concern As It Is Nondegradable. Synthetic Plastics Made With Different Kinds Of Polymers Such As Expanded Polystyrene (Eps), Polyethylene Terephthalate (Pete), Polyethylene (Pe), Polypropylene (Pp), And Polyethylene Terephthalate (Pet, Are Primarily Used For Packaging Materials. These Synthetic Polymers Being Lightweight, Strong, And Economical, Find Use In Equipment Protection, Civil Construction, Food Packaging And Other Packages, Etc. However, After Use, These Packaging Materials Are Discarded. And Since They Are Not Completely Degradable, They Accumulate And Contaminate The Natural Ecosystem. Therefore, It Is Imperative To Seek Eco-Friendly Options. Biodegradable Materials Developed Using Macrofungi Have Shown Their Ability To Convert Agricultural Wastes Into Biodegradable Packaging Materials. Mushroom Mycelia Thus Appear To Be Promising In Creating New Packaging Materials, Which Are Environmentally Friendly And Economical. Hence, This Chapter Attempts To Compile Some Of The Recent Technological Advances Made In Creating Packaging Materials Using Mushrooms For A Sustainable Future.

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BIOB-05

Phyto-Nano-Antimicrobials: Synthesis, Characterization, Discovery, And Advances

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Bentham Science Publishers (2020)

DOI:10.2174/9789811412387120080009

Abstract

Nanotechnology Has Brought A Revolution To The World Of Science And Medicine. With Time, The Dependency On Nanotechnological Advancement Is Increasing. Synthesis Of Nano-Scale Modulators Is A Significant Domain Of Focus That Employs Crude Formulations, Retro-Synthesized, And Pure Chemicals, Mostly From Herbal Sources With Lesser Side Effects. However, All These Methods Suffer From Drawbacks And Limitations. For An Eco-Friendly Nanoparticle Synthesis, Green Chemistry Has Evolved With A Tangential Approach For The Synthesis Of Metals (Au, Ag) And Metal Oxides (Zno, Cuo, Tio). Green Synthesis Uses Plant Extracts (Leaves, Stem, Shoot) And Microbes (Bacteria, Fungi, Yeast) As Reducing Intermediate For The Production Of Nanoparticles.

The Advantage Of These Extracts Lies Within The Phenolic Constitutes Of Aldehydes, Ketones, Proteins, And Other Biomolecules That Implicate The Reduction Of The Nanoparticles.

These Green Synthesized Nanoparticles Have High Efficacy Ranging From Anti-Bacterial, Anti-Fungal, And Wide Applications In Medicine. In This Chapter, We Discuss The Methods Of Green Synthesis, Their Applications, And Prospects. The Current Chapter Will Pave The Way For Future Applications And Better Means For The Synthesis Of Nanoparticles Leading Into A Newer Direction With Varied Recognition In Nano-Life Sciences.

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BIOB-06

Exploration of Dill Seeds (Anethum Graveolens): An Ayurpharmacomic Approach

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Bentham Science Publishers (2020),

DOI:10.2174/9789811441493120020008

Abstract

Since Time Immemorial, Traditional Medicine, Largely Ayurveda, Has Established The Usability And Proficiency Of Many Natural Herbs And Their Formulations In Curing Ailments. However, The Asian Continent Or To Be Specific, India, Could Be Considered As The “Land Of Spices”. The Saga Of Food-Spice-Medicine Recipes Has Been Passed Down To Several Generations With A Motto To “Make Food As Medicine”. One Such Exotic And The Extensively Used Herb Is Anethum Graveolens (Dill). This Herb Has The Potential For Various Bioactivities. The Whole Plant, Used As Vrushya (A Natural Aphrodisiac), Vataghna (Balance Vata) Quenching Excess Free Radicals, Against Vrana (Non-Healing Wounds), Shoola (Abdominal Colic Pain), Cure Disorders And Ulcers In Eyes, Plays A Vital Role In Enema During Panchakarma (Bastikarma), Functions As A Galactagogue, Inhibits Uterine Fibroids, Increases Milk Secretion During Lactation And Above All Enhances The Taste Of The Food. With This Background, A Major Lacuna Is With An Understanding Of The Functionality And Mechanism Of Action At A Molecular Level. Hence, This Chapter Highlights The Therapeutic Potential Of Dill Seeds And Their Probable Targets With Modern Knowledge And Implications Using Ayurpharmacomic Approach (Understanding Classical Herbal Formulation And Exploring Their Pharmacological Attributes With Advanced -Omic Studies As Tools). Further, Virtual Screening Was Performed To Evaluate The Structure-Activity Relationship (Sar) Between Lead Phytobioactives And Their Pathological Biomarkers/Targets. These Studies Will Enable A Better Understanding Of Potential Pathways In Developing Newer Therapeutic Targets For Future Drug Design And Development, Which Would Facilitate Prime Phytobioactive Candidates To Be Subjected To Clinical Trials And Drug Approval.

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BIOB-07

Industrial Production and Optimization of Microbial Enzymes

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Microorganisms for Sustainability, vol 11. Springer, Singapore (2020). https://doi.org/10.1007/978-981-15-1710-5_5

Abstract

Microbial enzymes are the biological catalysts due to their ability to favor reactions more quickly and more efficiently. Various enzymes are produced by microorganisms for industrial uses. They must possess the desired properties like diversified functionality, and stability over pH and temperature ranges. Microorganisms have to produce extracellular enzymes in higher amounts and the produced enzymes have to be safe, stable, and more active. Microbial enzymes with the desired properties can be produced by optimizing fermentation conditions. To make the fermentation cost effective, the utilization of low-cost substrates such as agricultural and spent residues for microbial enzyme production is necessary. Some industrial enzymes used together for the same purpose (like amylase, lipase, and protease used in detergent formulation) are co-produced in a single fermentation to reduce the cost and to maintain the enzyme stability. In addition, for some microorganisms, recombinant DNA technology is used as an alternative strategy for overproducing huge amounts of microbial enzymes with improved substrate specificity and stability. Furthermore, novel techniques like genetic fusion of coding open reading frames or connection of proteins in a posttranslational process are used to manufacture the fused industrial enzymes having combined properties of their parental molecules. The public and private companies have thus to work together with academicians and researchers in order to increase production of microbial enzymes needed by the industries. This chapter reviews the production of industrial enzymes and optimization of culture and fermentation conditions in order to increase production of microbial enzymes in huge amounts.

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BIOB-08

Disease Modifying Potential Of Functional Foods For Neurodegenerative Disorders: Status Update On Regulatory Compliance

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Intechopen (2021)
DOI: 10.5772/INTECHOPEN.97546

Abstract

Progressive loss of functional neurons is typically characterized as neurodegeneration. This is particularly pronounced during aging and results in debilitating conditions such as parkinson's disease and alzheimer's disease. Symptoms appear typically after 70–80% neuronal loss, resulting in irreversible damage. Several drugs have been clinically approved but they only alleviate symptoms and additionally lead to undesirable side effects. Hence there is a dire need for drugs and/or supplements which address this lacuna. Functional foods are known to offer health benefits beyond their attributed nutritional values. Unlike dietary supplements which are made from foods or food-like substances with enriched nutritional value, functional foods are foods that are modified for greater nutritional value. Conceptually, as an expansion of dietary supplements, functional foods are known to be neuroprotective. Here we discuss functional foods which can potentially be used as adjunctive therapy, with a note on the regulatory compliance.

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BIOB-09

A Newer Approach: Microbial Pigments as Biocolors in Food Industries

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Current Research in Biotechnology and Biological Sciences (2021)
Https://doi.org/10.22271/bs.book.19

Abstract

Synthetic dyes are widely used in industries such as food, paper, textiles, pharmaceuticals, agricultural and cosmetics that are matter of concern for human and environmental problems. These toxicological side effects have now led to focus on research for the products from natural resources to be elucidated, specially the bio pigments. Microbial compounds are natural colored substances, produced by microorganisms, especially fungi and bacteria that have potential to meet the challenges faced today. Most of the microbes reported to produce carotenoids belong to *Myxococcus* and others include, *Serratia, Streptomyces* and *Agrobacterium.* astaxanthin, an orange pigment is produced by *Xanthophyllomyces dendrorhous* a red colored alga, *Haematococcus pluvialis* and *Agrobacterium aurantiacum.* A red pigment, prodigiosin produced by microbes such as *Serratia marcescens, Vibrio psychoerythrus, Rugamonas rubra, Streptoverticillium rubrireticuli* has various applications. A pink red pigment from

Penicillium sp., riboflavin from *Ashbya* sps. and various pigments from *Monascus* sps. are used in many food industries. An interesting class of pigment produced by fungi is azaphilones. Others fungi producing pigments include *Chaetomium cupreum, Penicillium aculeatum, Fusarium chlamydosporum,* that are used for microbial pigment production. Microbial pigments are biodegradable and compatible with environment and have applications in food, health, cosmetics and pharmaceutical products too, due to their various activities that includes, antibiotics, anti-cancer, anti-proliferative and immunosuppressive compounds.

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BIOB-10

Nutraceutical Attributes of Tamarindus Indica L. - Devils' Tree With Sour Date

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Bentham Science Publishers (2020)
DOI: 10.2174/9789811468360120030004

Abstract

Tamarindus indica L. (Fabaceae) plant has a dominion for its usage in culinary additional to medicinal and nutritional value globally. It is used as a preservative and savory in Indian dishes from time immemorial. Traditional nutritional constituents and its significance with respect to leaf, flower, fruits and seeds have been reported in folklore and Ayurvedic practice. This chapter primarily focuses on the various bioactivities (anti-microbial, anti-oxidant, anti-inflammatory, anti-cancer, antidote, anti-diabetic) and their probable known mode of action in combating the disorder/disease. Further, the structure-activity relationship (SAR) studies were performed with lead phytobioactives to understand potential pathways. However, with the tamarind fruit and seeds, many controversial myths also exist. This comprehensive chapter depicts and contemplates the unexplored science of this Devils' tree with Sour date which is extensively used in nutritional, pharmaceutical with pharmacological attributes with clinical significance "Making Food as Medicine".

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COLLEGE OF PHARMACEUTICAL SCIENCES
SCHOOL OF ALLIED HEALTH SCIENCES

Publication Summary

International Journals	**17**	**(PHSIJ-01- PHSIJ-17)**
Book/Book Chapter	**1**	**(PHBC01)**

PHSIJ-01

Antihyperlipidemic effect of Tephrosia villosa in acute and chronic hyperlipidemia rat models

Vimal, J. S., V. Murugan, and A. R. Mahesh

Journal of microbiology, biotechnology and food sciences
e4222-e4222, 2021, ISBN 1338-5178, Scopus, WoS
https://office2.jmbfs.org/index.php/JMBFS/article/view/4222

Abstract

Atherosclerosis plays a pivotal role in various cardiovascular disorders. Most of the antiatherogenic currently available drugs are associated with many side effects than plant derived formulations. Tephrosia villosa(Fabaceae) plant is being used traditionally, in the treatment of hyperlipidemia, diabetes, jaundice and used as antioxidant and antimicrobial.The objective of the current experiment is to evaluate the antihyperlipidemic potency of chloroform (CETV) and ethanolic extract of Tephrosia villosa(EETV) in acute (Triton WR-1339 induced) and chronic (cholesterol diet-induced) hyperlipidemia models.Simvastatin, standard drug used to compare the effect of the both extracts at 125mg/kg, 250mg/kg and 500mg/kg b.w). The serum lipid parameters were analysed using enzymatic kits. The preliminary phytochemical screening of extracts of Tephrosia villosashowed the presence of phenols, flavonoids, saponins, coumarins, glycosides and alkaloids. In acute model, the pretreatment with both extracts for 7 days showed significant reduction ($p<0.001$) in serum triglycerides (TG), total cholesterol (TC), very low-density lipoprotein cholesterol (VLDL-C) and low-density lipoprotein cholesterol (LDL-C) levels, and subsequent rise ($p<0.01$) in high-density lipoprotein cholesterol (HDL-C) levels after 24h tritonisation in hyperlipidemic rats. Similarly, in chronic hyperlipidemia model, all the lipid (TG, TC, LDL-C & VLDL-C) levels were reduced significantly ($p<0.001$) with successive rise in HDL-C levelafter 30 days of study with 15 days of extract treatment.The current study indicatesthe antihyperlipidemic activity of Tephrosia villosais probably due to the phenolic constituents in extracts,which may inhibit HMG CoA reductase or activatelipoprotein lipase and lecithin acyl transferase (LCAT). The results would provide a larger insight in design and development of newer therapeutics for a wide arena of lifestyle disorders.

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PHSIJ-02

Assessment of knowledge, attitude, and practice among patients with asthma

Ebrahim, T. A., V. Rajesh, U. P. Nandakumar, C. S. Chacko, and J. J. Joel

European Journal of Clinical Pharmacy, January-March 2021
Volume-23, Issue 1, pg-7-7, ISBN 2385-409X, Scopus
https://www.farmclin.com/seccion.asp?Id=8&articulo=1365

Abstract

To study the knowledge, attitude, and practice of patients with asthma. A prospective observational study was carried out in the outpatient department of pulmonary medicine. Patients of either gender aged 18 years and above diagnosed with asthma and offered their willingness to participate were included in the study. A validated questionnaire was used to assess the patient's knowledge, attitude, and practice. A total of 100 patients were included in this study. The mean baseline value obtained after the knowledge assessment session was found to be 61.5%, while the mean value obtained after attitude as well as practice assessment sessions were 58.4% and 65.4%, respectively. Subjects were found to have a high level of awareness regarding the importance of taking the medications strictly according to instructions provided by the physician. The current study revealed that more than 50% of the study participants have better knowledge, attitude, and lifestyle practice regarding their disease and medications. Since it needs to be improved, further patient-oriented educational programs regarding the disease and medication would be helpful.

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PHSIJ-03

A Comprehensive Study on Principles, And Physiology, Challenges of Delayed Wound Healing by Cellular Migrationand Reactive Oxygen Species Release in SC-1 Fibroblasts

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Journal of Hospital Pharmacy, 2582-0362, Vol 6, Issue 1, Jan-March 20201, pg 1-15

2021
http://www.johp.journalofhospitalpharmacy.in/admin/freePDF/fms816jojtchw1qcysuh.pdf

Abstract

Wounds usually happen after an accident or injury when there is a damage to he integrity of the mucous membrane, skin or tissue, delayed wound healing is when it takes longer for a wound to heal than normal or means that the wound has trouble healing or staying closed. The pathophysiology of delayed wound healing is contributed by complexity of well-orchestrated integration of complex biological and molecular events of cell proliferation, matrix deposition, cell migration and extra cellular matrix deposit (EMD). Wound repair involves various biochemical and molecular aspect and happens in various stages starting with an inflammatory reaction, cell proliferation, made up of various types of cells which also are termed as remodeling. It is the in situ capacity of human and animal body to restore and heal wounds in their body parts, Which is with the help of tissue regeneration and continuous process of repair requiring the collaborative efforts of many different tissues, the capacity may also be impaired by the health conditions and immunity status along with factors like stress, sex,age ,medication history and habits like smoking and alcoholism which further delays wound healing. This review aims to provide an insight on what wound infections are and how wound care can be induced to reconstruct the damaged parts more perfectly, the strategy which may be involved in planned approach for wound healing.

Keywords: Contraction; Collagen; ECF-extracellular; Fibroblast; Matrix Reactive oxygen species; Wounds**.**

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PHSIJ-04

Effect of Tephrosia tinctoria in Triton WR-1339 and High Cholesterol-Diet Induced Hyperlipidemic Rats

Vimal, J. S., V. Murugan, and A. R. Mahesh

International Journal of Pharmaceutical Research, 2021, Vol. 13, Issue 2, pp. 3221-3235, 0975-2366 (ISSN) , Scopus, http://www.ijpronline.com/ViewArticleDetail.aspx?ID=21144

Abstract

Tephrosia tinctoria is widely used traditional medicine as antimicrobial, larvicidal, antidiabetic and many other related diseases. The whole plant of Tephrosia tinctoria extracts were assessed for their lipidlowering activity. Materials and methods: Triton-WR-1339 induced and high cholesterol-diet (HCD) induced hyperlipidemic rats were used to evaluate the antihyperlipidemic effects of chloroform and ethanolic extracts of Tephrosia tinctoria. Hyperlipidemia was induced in rats by single intraperitoneal administration of Triton-WR-1339 200 mg/kg b.w in acute model and by feeding cholesterol 400 mg/kg b.w along with normal diet in chronic model rats. Parameters such as serum lipid profile was assessed to demonstrate the antihyperlipidemic effect of extracts. SOD, catalase, GSH and LPO assays were used to measure the antioxidant capacity of the phenolic constituents present in extracts. Histopathology of rat liver tissue were evaluated. Both the chloroform and ethanolic extracts of Tephrosia tinctoria were effective in lowering the levels of total cholesterol (TC), triglycerides (TG), low-density lipoprotein-cholesterol (LDL-C) levels with consequent increase in the levels of high-density lipoprotein-cholesterol (HDL-C) in acute and chronic hyperlipidemic models. Furthermore, the extracts were effective in increasing the levels of SOD, catalase and GSH, and decreasing the LPO levels. In addition, the protective effects of Tephrosia tinctoria was confirmed by histopathological observations. The effect of the extracts was comparable with that of the standard simvastatin.The results thus obtained were suggestive of hypolipidemic activity of the Tephrosia tinctoria extracts and may be an important source of natural compounds that can be utilized in the treatment of hyperlipidemia.

Keyword: Atherosclerosi s, Antioxidant activity, Triton WR-1339, Lipid profile, Simvastatin.

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PHSIJ-05

Evaluation of appropriateness of intravenous pantoprazole in inpatients of Tertiary Care Hospital

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https://rjptonline.org/AbstractView.aspx?PID=2021-14-3-45

Abstract

Proton pump inhibitors are currently the most effective agents for acid related disorders. Pantoprazole is a frequently used proton pump inhibitor in healthcare practice. To evaluate the usage pattern of intravenous pantoprazole and to assess its appropriateness in accordance with the guidelines and criteria in terms of indication for use, dose and duration of therapy. Methodology: The study was conducted in 141 patients admitted in Sagar hospital, Bengaluru. It was a prospective, observational study for six months. Prescriptions were evaluated for appropriate use of IV Pantoprazole. Results: Out of 141 patients, 32(22.7%) patients were had UGIB and 109(77.30%) patients were Non-UGIB patients. 36.87% of IV Pantoprazole prescriptions were inappropriate either in terms of dose, duration and indication for use. Only 37.58% of the patients with IV pantoprazole therapy were on NPO (Nil PerOs). We observed that all 32 UGIB patients who had clinical signs of gastrointestinal bleeding underwent endoscopy. But endoscopy was not performed in most of the Non-UGIB cases (69/109). Among 72 patients who underwent endoscopy, (45/72), 62.50% patients received IV Pantoprazole prior to endoscopy. Majority (90%) of patients received 40 mg IV pantoprazole twice daily. Conclusion: Institutional guidelines were developed to promote appropriate use of the IV proton pump inhibitor pantoprazole. Inappropriate and unsupervised use of IV pantoprazole can lead to unwanted consequences such as hypersensitivity reactions and prolonged durations of treatment and increased treatment cost. This study suggests that the majority of IV PPI prescriptions were appropriate. But still more satisfactory results can be achieved through adherence of the guidelines.

Keywords: Intravenous pantoprazole , Proton pump inhibitors (PPIs) , Stress Ulcer Prophylaxis , SUP) , Appropriateness

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PHSIJ-06

Formulation and optimization of albumin nanoparticles loaded ivabradine hydrochloride using response surface design

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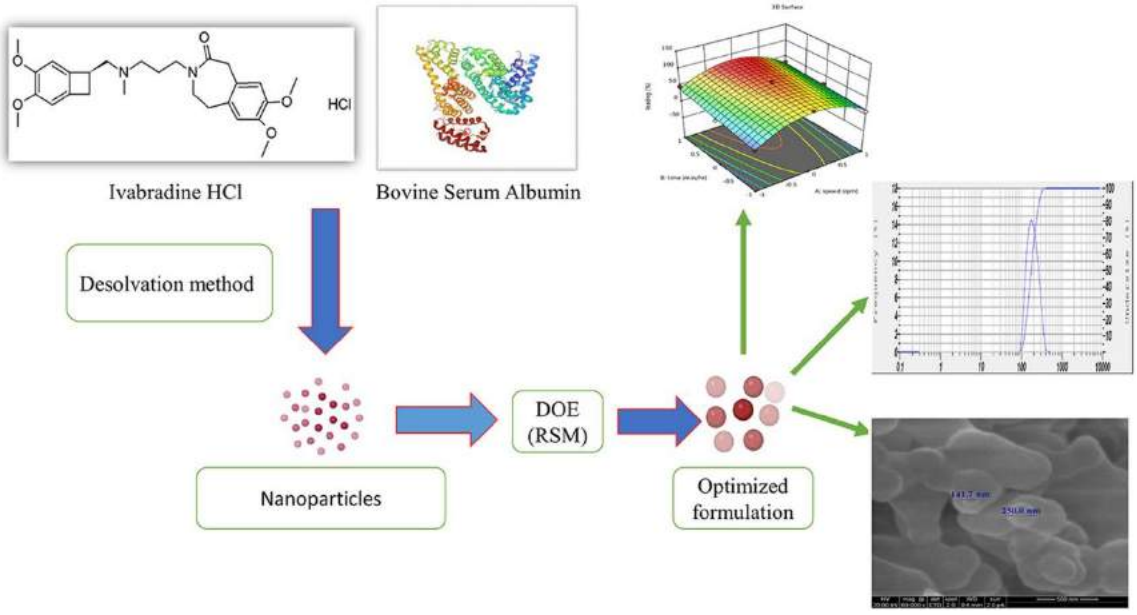
Journal of Drug Delivery Science and Technology, Volume 63, June 2021, 102461, 1773-2247(ISBN), Scopus, WoS, https://www.sciencedirect.com/science/article/abs/pii/S1773224721001416

Abstract

Modified controlled release system for cardio protective drug was developed by preparing Bovine serum albumin nanoparticles (BSA NPs) by desolvation method using Response surface methodology (RSM). Ivabradine HCl (IBH) was used as a model drug and the NPs were prepared to reduce the dose and frequency of administration. Five batches of NPs containing IBH with increasing concentration of polymer were prepared and characterized for % yield, % drug loading, particle size, zeta potential and surface morphology. The formulation for optimization was selected based on the results of process yield and drug loading. Data obtained from the best formulation was used to select the constraints for independent variables, A (Stirring speed) and B (Stirring time) to generate experimental runs. The NPs were characterized for particle size, poly dispersibility index, drug loading, zeta potential, % yield, Fourier transform infra-red spectroscopy (FTIR), drug loading efficiency, in vitro release studies, in vitro release kinetics, differential scanning calorimetry (DSC) and surface morphology was analyzed by scanning electron microscopy (SEM). The optimum concentration of BSA increased the % yield and % drug loading efficiency. The NPs had mean particle size distribution of 137.2–501.8 nm. The particles were in nano size and the zeta potential studies suggested that the NPs possessed negative surface charge indicating high degree of stability. The controlled release of drug suggested Korsmeyers- Peppas model as the possible release mechanism. IBH NPs could be a promising contender for treatment of heart failure.

Graphical Abstract



Keywords: Bovine serum albumin,Nanoparticles, Ivabradine HCl, Response surface design Desolvation

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PHSIJ-07

The modulatory effect of *Hydrocotyle sibthorpioides* in attenuating the aluminium chloride induced neurotoxicity in rat brain

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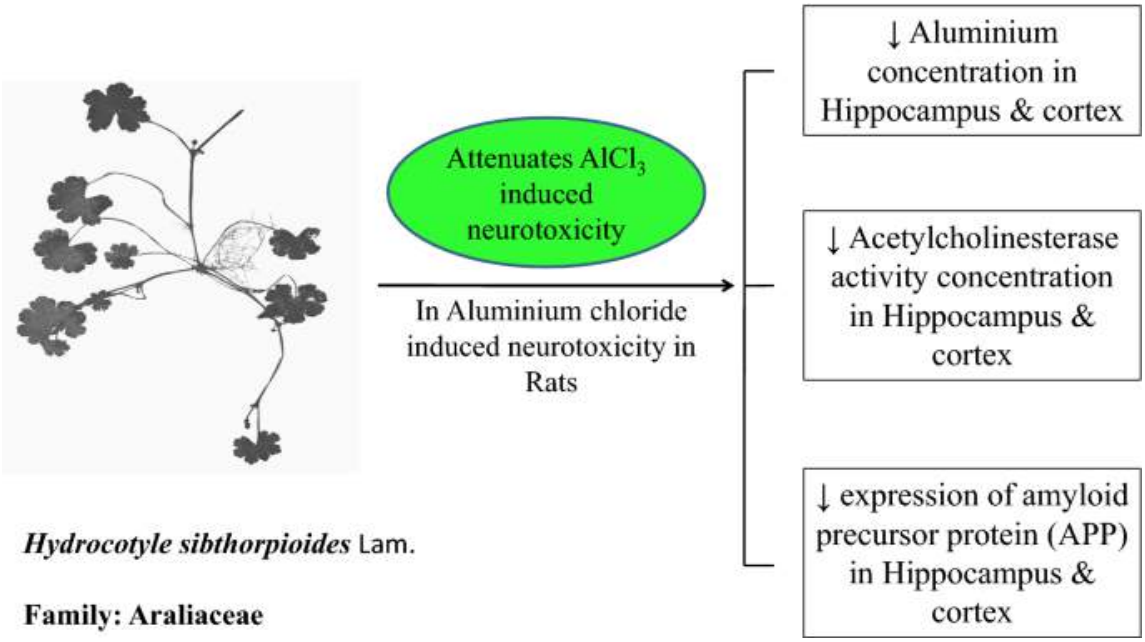
***Advances in Traditional Medicine* (Jan 2021), ISBN 2662-4060, pg.1-13, Scopus & WoS.**

Abstract

Hydrocotyle sibthorpioides Lam. (Family: Araliaceae) is used widely in the preparation of food in different cuisines of the world. The study was designed to explore the protective effect of different standardised extracts of *H. sibthorpioides* on the $AlCl_3$ induced neurotoxicity in Alzheimeric rats. When $AlCl_3$ at a dose of 100 mg/kg body weight was administered i.p. for 60 days showed a significant increase in aluminium (Al) level, acetylcholinesterase (AChE) level and protein expressions of amyloid precursor proteins, β and γ secretase, and β-amyloid ($A\beta_{1-42}$) in the cortex and hippocampus comparing to the control. Moreover, there was a significant reduction in locomotor activity, muscle coordination and cognition and memory. On the other hand, animals

treated with chloroform and methanolic extracts of *H. sibthorpiodes* given at 200 and 100 mg/kg body weight orally with $AlCl_3$ altered the behavioural impairment caused by Al and Al concentration, activity of AChE, synthesis molecules of Aβ generation. The report of histological studies in hippocampus and cortex supported the neuroprotective role of chloroform and a methanolic extract of *H. sibthorpioides*, which conserved a normal histoarchitecture pattern of cortex and hippocampus. Finally, it can be concluded that chloroform and methanolic extract of *H sibthorpioides* can alter memory loss induced by aluminum toxicity by enhancing AChE activity and by its involvement in amyloidogenic pathway.

Graphical Abstract



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PHSIJ-08

Neuroleptic drug-induced hyperprolactinemia and associated neurochemical, hematological and histological changes in rats

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Drug Discovery , 2021, 15(35), 122-131

Abstract

The study aims to validate the dose of haloperidol (HPL) and sulpiride (SPD) needed to induce hyperprolactinemia in both male and female albino rats and to evaluate the neurochemical, hematological and histological changes in the anterior pituitary gland, adrenal gland, and spleen. HPL (1, 2 and 5 mg/kg/day) and SPD (20 and 40 mg/kg/day) significantly ($p<0.05$) increased the serum prolactin (PRL) level. They showed hypertrophic reversible changes in the cells of the anterior pituitary gland. Unlike SPD, HPL showed dose-dependent hyperprolactinemia. So the highest dose of HPL and a lower dose of SPD were used for further study. HPL 5 mg/kg/day for 16 days and SPD 20 mg/kg/day for 28 days significantly decreased dopamine concentration in brain homogenate. They also cause an increase in total leukocyte count (TLC) and a decrease in red blood cell (RBC) count and hemoglobin (Hb) concentration. In addition, Spleen shows signs of infection or inflammation. HPL (5 mg/kg/day) for 16 days and SPD (20 mg/kg/day) for 8 days may be used as experimental models to induce hyperprolactinemia in both male and female rats. The decrease in dopamine level, changes in hematological parameters and spleen inflammation can be used as the markers of hyperprolactinemia.

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PHSIJ-09

A Phytopharmacological Review on Syzygium Cerasoideum

Shaik Sadik, Geetha.K.M, Vasia, Nagaraja Sreeharsha

International Journal of Pharmaceutical Research, vol. 13, issue 1: Advanced Scientific Research, pp. 375 - 382, 2021.

Abstract

Syzygium cerasoideum is utilized for a few maladies remedially. Point of the ebb and flow survey is to look the writing for the pharmacological properties, security/poisonous quality examinations, pharmacognostic studies and phytochemical examination of Syzygium cerasoideum. The ordered information might be useful in support of the experts toward focus on the need zones of investigate however to be found. Absolute information regarding the plant have been assembled from different books, Particulars of pharmacological exercises, phytochemical investigation, harmfulness contemplates and so on were separated since the distributed reports focusing on the security profile of the plant. The plant is wealthy in mixes containing glucoside, ellagic corrosive, quercetin, kaemferol and myrecetin. We recommend that there is a requirement for further examination to detach dynamic standards which give the pharmacological activity. Subsequently recognizable proof of such dynamic mixes is valuable for creating more secure medications in the treatment of different illnesses including diabetes. Security of the entire plant was deduced in the survey. © 2020, Advanced Scientific Research.

Keywords: Syzygium cerasoideum, pharmacological activites , phytochemical analysis, ellagic acid.

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PHSIJ-10

A short review on leptospirosis: Clinical manifestations, diagnosis and treatment

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Clinical Epidemiology and Global Health
Volume 11, July–September 2021, 100741 Available online 20 April 2021

Abstract

In the last few decades, leptospirosis has emerged globally as a fatal infectious disease. Yet, an understanding of the pathogenesis of leptospirosis continues to remain within the grey areas of scientific evidence. In a majority of the cases, the infections are asymptomatic. The benchmark test for leptospirosis is the microscopic agglutination test, commonly known as the MAT test. The standard of treatment is oral doxycycline, although penicillin and azithromycin can also be used. In this review, we aim to elaborately discuss the symptoms, diagnosis and the approved therapeutic regimen of leptospirosis.

Keywords: Leptospirosis,Pulmonary haemorrhage,Renal failure,MAT test
Penicillin G

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Spectroscopic analysis of Netilimicin by derivatization using Quality by Design for bulk dosage forms

Anita, A., and R. Bincy
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Journal of Global Trends Pharmaceutical Science, 2021
Vol.11 (4), pp: 8705 – 8712, ISBN 2230-7346

Abstract

ICH guidelines specifies the pharmaceuticals intended for human use in thecategory of Q 8,10,11 for the efficacy quality and safety of the intended product are in sync with the Quality by Design (QbD) principles, as quality by design isa risk based approach with pure scientific logics to establish a quality targetproduct profile[1] .Spectroscopic method approach for analysis of netilimicin wasperformed as per ICH Q8 (R2) guidelines. Quality by Design (QbD) was alsoincorporated by derivatization for which absorption spectra and absorptionmaxima were used, making it very simple and inexpensive methods.Spectroscopic analysis of netilimicin was performed using UV spectroscopykeeping in view the QbD principles as well as the limitation of beer's law ,theaccuracy and precision of the method used were compared with the standard UVreference method ,for this three simple and sensitive methods were utilized,where pure sample of netilimicin was used in bulk dosage forms . (kumar et al,2018)Ishikawa diagram were used to depict the systemic approach to the study. Various critical parameter were studied for the proposed method, implemanding QbD principlies through spectrophotomerty utilized various method input variables like study of intensity of absorbance, absorbance maxima, spectral shapewhich were the validated as per ICH guidelines .

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PHSIJ-12

Synthesis, Characterization and Evaluation of some newer Pyrimidine derivatives as Anti-inflammatory Agents.

Kalpana Divekar, Rekha. S, Murugan. Vedigounder, Shivaprakash. H
College of Pharmaceutical Sciences, Dayananda Sagar University, Shavige Malleshwara Hills, Kumarswamy Layout, Bangalore.

Research Journal of Pharmacy and Technology. 2021; 14(5):2529-4. doi: 10.52711/0974-360X.2021.00445 Volume - 14, Issue - 5, Year - 2021

Abstract

Pyrimidine is an important baseone of the base formed by hydrolysis of nucleosides. It is an interesting molecule in the medicinal chemistry because of its diversified biological activities. Alloxan which is an oxidation product of Uric acid is also a pyrimidine derivative of interest to a medicinal chemist. Several pyrimidines are reported as antimicrobial, analegesic, anti-inflammatory, antibacterial, and antiparasitic agents. Pyrimidine scaffold is considered as an interesting one due to its various pharmacological properties. In this scheme, an attempt is made to carry out synthesis of some new pyrimidine derivatives. The Starting material Chalcone is synthesized by condensation of various aromatic aldehyde and aromatic ketone. Chalcone is then treated with thiourea and KOH in presence of ethanol to yield pyrimidine derivatives. Then those pyrimidine derivatives were subjected to alkylation and acetylation. The synthesized compounds were characterized and confirmed by IR and ^{1}HNMR spectroscopy and then evaluated for their anti-inflammatory activity. The anti-inflammatory activity of newly synthesized pyrimidine derivatives were carried out by the carrageenan induced rat hind paw edema method by taking Diclofenac sodium as standard.

Keywords: Pyrimidine analogues, anti-inflammatory.

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PHSIJ-13

SYNTHESIS OF 2-(2-(2-(BIS (2-CHLOROETHYL) AMINO) ETHOXY) BENZYLIDENE) BENZOFURAN – 3(2H) – ONE DERIVATIVES ON BASIS OF BENZALDEHYDES AND ACETOPHENONES FOR ITS CYTOTOXIC ACTIVITY

Agasa Ramu Mahesh * and Vedigounder Murugan
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INTERNATIONAL JOURNAL OF

PHARMACEUTICAL SCIENCES AND RESEARCH
2021, Vol. 12(3),pp: 1723-28, ISSN 0975-8232,
http://dx.doi.org/10.13040/IJPSR.0975-8232.12(3).1723-28

Abstract

Benzofuranones and nitrogen mustards have been reported as highly potential alkylating agents; with this evidence, the synthesis of some benzofuranones fused with nitrogen mustards was planned and was subjected to *in-vitro* cytotoxic studies. Substituted benzofuranones were synthesized by condensation of 2-hydroxy benzaldehydes and substituted 2-hydroxy acetophenones and further fused with nitrogen mustards gave high yields of target compounds 2 - (2 - (2 - (Bis (2 -chloroethyl) amino) ethoxy) benzylidene) benzofuran-3(2H)-one derivative. The derivatives synthesized had various halo substitutions such as chloro, bromo, fluro and methyl chloro derivatives. These synthesized compounds were characterized by FTIR, ^{1}H NMR and LCMS spectral studies. Further, the synthesized compounds were subjected to 3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide assay on human lung carcinoma cells, A-549 and breast cancer cells, MCF-7 for its *in-vitro* cytotoxic activity. All the synthesized compounds showed promising cytotoxic activity in which AN– O - 04, (Z) - 2 - (2 - (2 - (bis (2 -chloroethyl) amino) ethoxy) benzylidene) -5 - chloro - 6-methylbenzofuran-3(2H)-oneshowed minimum CTC-50 of 119.32 ± 8.98 and 82.18 ± 6.23 for A-549 and M-549 cell lines respectively which indicates the potency of the synthesized compounds against A-549 and MCF-7 cell lines.

Keywords: Benzofuranone, Nitrogen mustard, Acetophenone, MTT, Cytotoxicity

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PHSIJ-14

Chitosan nanoparticles to enhance nasal absorption and brain targeting of sitagliptin to treat Alzheimer's disease

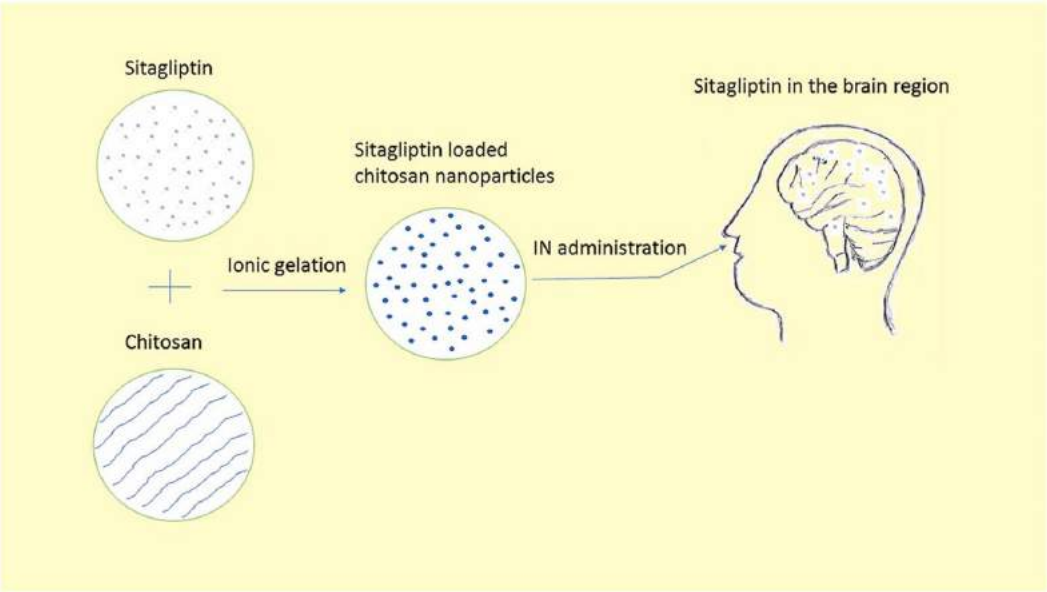
Barnabas Wilson[a] Bashir Nasralla Mohamed Alobaid[a] Kannoth Mukundan Geetha[b] J osephine LenoJenita[a]
College of Pharmaceutical Sciences, Dayananda Sagar University

Journal of Drug Delivery Science and Technology
Volume 61, February 2021, 102176

Abstract

Alzheimer's disease (AD), a highly complex, irreversible, progressive, challenging as well as fatal neurodegenerative disease of the brain, affects 35 million people around the world. It is estimated that 100 million people are expected to suffer from the disorder by 2050. It was found that sitagliptin (SIT), a dipeptidyl peptidase-4 (DPP-4) inhibitor, produced symptomatic relief of AD. Sitagliptin loaded chitosan nanoparticles (SIT-CS-NPs) were prepared and evaluated for their potential to target sitagliptin into the brain following intranasal (IN) administration. The SIT-CS-NPs were formulated by ionic gelation method. The mean size and zeta potential was 188.4 ± 48.1 nm and 20.8 mV respectively. *In vitro* SIT release in pH 6.4 phosphate buffer ranged between 49.55 ± 2.62 %w/w and 73.77 ± 2.12 %w/w for 24 h. Animal studies revealed that SIT-CS-NPs increased SIT levels in the brain by 5.07 fold in comparison with free SIT after IN administration.

Graphical abstract



Keywords: Alzheimer's disease , Sitagliptin, Chitosan nanoparticles,Brain targeting , Intranasal drug delivery

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PHSIJ-15

THE GLYCEMIC IMPACT OF SYZYGIUM CERASOIDEUM IN DIABETIC RATS

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[2] Department of Pharmacology, College Of Pharmaceutical Sciences, Dayananda Sagar University, Bengaluru-78

[3]Department of Pharmaceutical Sciences, College of Clinical Pharmacy, King Faisal University, Al-Ahsa31982, Saudi Arabia

Pharmacologyonline, Vol.3, December 2020, pp412-426

Abstract

This study aimed to evaluate the glycemic impact of Syzygium cerasoideum in normal as well as streptozotocin (STZ) induced diabetic rat model. The glycemic impact of CESC & MESC extracts were evaluated 4h post-administration in normoglycemic rats, and STZ induced diabetic animals over a period of 21 days. Variation of administered doses of CESC and MESC extracts of Syzygium cerasoideum impacted the blood glucose level (mg/dl) of normoglycemic rodents with observable hypoglycemic effects at 2h. Glibenclamide (600µg/kg) showed 32.56% lowering of blood glucose level, while CESC showed 29.33% lowering at a dose of 400mg/kg, and 25.61% lowering was observed in case of 200mg/kg administered dose of MESC. STZ-induced diabetic animals treated with 200mg/kg, 400mg/kg of both extracts demonstrated noteworthy decrease of blood glucose levels during a treatment span of day 21 (CESC200mg/kg:45.56%, CESC400mg/kg: 41.25%, MESC200mg/kg: 46.22%, MESC400mg/kg: 43.24%, respectively).Maximum reduction in blood glucose was observed in CESC and MESC extract dosage of 400mg/kg. However, commercially available, and clinically approved glibenclamide lowered blood glucose by 63.66%. After treatment with the extracts the liver enzyme were diminished in the diabetic rats in comparision to untreated diabetic rats. Untreated diabetic mice exhibited reduced activity of antioxidant enzymes. The level of antioxidant enzymes were normalized in the test animals after treatment with CESC and MESC, with levels at par with glibenclamide treated rats. The diabetic treated experimental group demonstrated a increase in body weight in comparison to the diabetic control group. Combinatorial administration of both extracts at 200mg/kg, 400mg/kg dosages caused critical increment in glycogen level within the liver. Conclusion: Our results show the potential application of CESC and MESC extracts of Syzygium cerasoideum as antidiabetic agents.

Keywords: Hypoglycemic, Streptozotocin, Glibenclamide, Diabetes

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PHSIJ-16

Hepatoprotective Activity of Aqueous Extract of Rhyncosia Beddomei Baker Leaves Against Ethanol Induced Hepatotoxicity

Ashoka Babu V.L[1]* , Mohammad Azamthulla, Shanaz Banu[2]
* [1]Assistant Professor, Faculty of Pharmacy, M.S. Ramaiah University of Applied Sciences, Bangalore, Karnataka, India-560054 [2]Assistant Professor, College of Pharmaceutical Sciences, Dayananda Sagar University, Bangalore, Karnataka, India-560078

International Journal of All Research Education and Scientific Methods (IJARESM), ISSN: 2455-6211 Volume 8, Issue 12, December-2020

Abstract

The present work was carried out to investigate the hepatoprotective activity of aqueous extract of Rhyncosia beddomei Baker leaves in ethanol induced hepatotoxicity. The activity was evaluated against ethanol induced hepatotoxicity through monitoring liver function tests through the measurement of serum enzymes like SGOT SGPT and ALP, total proteins, total bilirubin, triglycerides and liver weight. The extract showed significant hepatoprotective activity at 200mg and 400mg/kg b.w by decreasing the levels of SGPT, SGOT, ALP, total bilirubin, triglycerides and increasing the total proteins when compared to positive control group. The results of the present study indicated that aqueous extract of Rhyncosia beddomei Baker has components that posse's significant hepatoprotective potential.

Keywords: Rhyncosia beddomei Baker, Ethanol, Hepatoprotective activity, Serum enzymes

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PHSIJ-17

Journey of *Hydrocotyle sibthorpioides* Lam.: From traditional utilization to modern therapeutics—A review

Iswar Hazarika,Geetha K. Mukundan,P. Sivakami Sundari,Damiki Laloo,

Phytotherapy Research, 02 November 2020, 0951418X (ISSN)

Abstract

Hydrocotyle sibthorpioides Lam. (Araliaceae) is a short and edible medicinal herb, which is used in the traditional system of medicines. The review aims to report the current information of H. sibthorpioides on the basis of its botanical and taxonomical description, traditional use, active phytoconstituents,pharmacological use and toxicity. The information on H. sibthorpioides with respect to its journey from traditional uses to scientific validation was gathered based on the online survey. The results from the review signify that the plant is used by the different tribes of the world for the treatment of patients suffering from fever, edema, dysentery, rheumatalgia, whooping cough, jaundice, throat pain, psoriasis, herpes zoster infection, hepatitis-B infection, soothing pain, dysmenorrhoea and carbunculosis. It is also used as a brain tonic, detoxifying agent and hepatoprotective agent. Scientific investigation reported that the plant has a significant pharmacological activity, viz. cognitive agent, anti-cancer, antiviral, antibacterial, anti-fungal and hepatoprotective. Moreover, based on the phytochemical aspects, a total of 50 phytoconstituents was identified and isolated from the plant. In conclusion, the outcome of this review will be useful for (a) developing a comprehensive plant profile; (b) assist investigators for exploring further research; and (c) to fulfil the gaps lacking in terms of clinical studies.

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BOOK/BOOK CHAPTER

PHBC01

Pharmaceutical Biotechnology: As per PCI syllabus for B. Pharm 6th semester Paperback – April 5, 2021 vol. 1 ISBN 979-8733546544

Bincy Raj
Dayananda Sagar University, Bangalore, India

Abstract

The main aim of this book is to cover biotechnology portion for 6th semester B. Pharm students and it gives complete information as per PCI syllabus. This book provide excellent readability and student friendly adaptability not only meant for B. Pharm but also to students of various allied courses like BSc (biotechnology), MSc (biotechnology) etc. It is a simple, lucid, brief and focused deliberation of scientific information.

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COLLEGE OF NURSING SCIENCES
SCHOOL OF ALLIED HEALTH SCIENCES

Publication Summary

International Journals	**02**	**(NUSIJ-01 – NUSIJ-02)**

COLLEGE OF NURSING SCIENCES
SCHOOL OF HEALTH SCIENCES
INTERNATIONAL JOURNAL PUBLICATIONS

NUSIJ-01

Effectiveness of Diabetes Education Package on knowledge and lifestyle among prediabetes adults in urban communities, Bangalore

S. Selvam, D[1]., and J. Sharmila[2]
[1]Columbia College of Nursing, Bengaluru, Karnataka
[2]College of Nursing Sciences, Dayananda Sagar University, Bangalore, Karnataka

International Journal of Advance Research, Ideas and Innovations in Technology , 2021 (Volume 7, Issue 3 - V7I3-1936) Available online at: https://www.ijariit.com

Abstract

Diabetes is one among the most problems in health system and a worldwide public health threat that has increased over the past 2 decades. India is that the diabetic capital of the planet-and by 2030, India will have the very best number of diabetic people within the world (WHO). India is that the diabetic capital of the planet, and by 2030; India will have the very best number of diabetic people within the world (WHO) Diabetes is preceded by Prediabetes often leads to type 2 diabetes, stroke and cardiovascular diseases. The objectives of the study were to evaluate the effectiveness of diabetes education package on knowledge and life style among prediabetes adults. Pre-experimental -one group pretest-posttest design was used. The Adults with prediabetes were selected and administered with Diabetes Educational package. The findings revealed that Diabetes Educational Package had significant impact in improving the knowledge and life style among prediabetes adults.

Keywords— Prediabetes, Knowledge, Life Style, Diabetes Education Package

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NUSIJ-02

Knowledge and Practice of Breast Self-examination Among College Students in Private University

Kasimu, F[1]. Odufa., **S. Ramesh**[2], and M. Umapathi[3]
[1]MAHSA University
[2]Associate Professor, Dayananda Sagar University, Bengaluru
[3]SPCINER ,Salem

INDIAN JOURNAL OF APPLIED RESEARCH, Volume – 10, Issue – 10, October - 2020

Abstract

Breast self-examination is a simple, very low cost /no cost, noninvasive with no special material/tool required and it is an effective diagnostic method for breast cancer, which only takes five minutes to apply. The main objective of the study to assess the level of Knowledge and Practice of Breast self-examination among nursing and physiotherapy students in selected Private University in Malaysia. Adescriptive, cross-sectional survey design was adopted for this study and Simple random sampling method was used to select the 85 nursing students from nursing faculty and 85 Physiotherapy students from Allied Medical Science, total of 170 students were included. Validity and reliability were examined with ethical approval from both faculties. Results revealed that overall 81.2% of the respondents had good knowledge towards BSE, The major source of information about BSE (40.0 %) from mass media & classes and 21.2% practices BSE always every month. There was a signi□cant difference between Knowledge & Practice and Academic on BSE. (P= 0.012, p=0.009) respectively. The highest level of BSE practice were from Nursing student and Highest level of knowledge on BSE were from Physiotherapy students. Study concluded that, the overall good knowledge on BSE were identi□ed, but low Practice of BSE was recorded. Mass Media is an important source of information about BSE to improve awareness among students, it is highly recommended to include BSE in the curriculum and BSE Practice among the student must be emphasized.

Keywords-BSE, Practice on BSE, Breast Self Examination, BSE on College students.

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COLLEGE OF PHYSIOTHERAPY
SCHOOL OF ALLIED HEALTH SCIENCES

Publication Summary

International Journal	**01**	**(PHTIJ-01)**

COLLEGE OF PHYSIOTHERAPY
SCHOOL OF ALLIED HEALTH SCIENCES
INTERNATIONAL JOURNAL PUBLICATION

PHTIJ-01

Effect of closed versus open kinetic chain exercise to improve knee muscles strength and balance in elderly population: A hypothetical literature review

Malagondla Yamini[1], Dr. Anil T John[2] and Dr. Jimshad TU[3]
[1]Post Graduate Student, College of Physiotherapy, Dayananda Sagar University, Bangalore, Karnataka, India
[2]Principal and Professor, College of Physiotherapy, Dayananda Sagar University, Bangalore, Karnataka, India
[3]Scientific Assistant Physiotherapy, Department of Physical Medicine and Rehabilitation, Government Medical College, Trivandrum, Kerala, India

International Journal of Physical Education, Sports and Health. Vol 7, 2020, pp. 38 – 43, ISBN: 2394-1693 DOI: https://doi.org/10.22271/kheljournal.2020.v7.i6a.1896

Abstract

Chronic knee pain is becoming a significant social issue with ageing. The loss in muscle strength and balance with increasing age often lead to physical and quality of life impairments, as well as increased morbidity. Since knee pain and impaired balance are major issues affecting the quality of life of the elderly population, a preventive approach is required to decrease the incidence of muscle weakness and decrease proprioception. Objective to compare the effectiveness of open kinetic-chain (OKC) and closed kinetic-chain (CKC) exercise in improving the elderly population's knee strength and balance. Method: A literature review was done where number of previously published articles were searched from various online platforms to find the effectiveness of OKCE versus CKCE in improving knee muscle strength and balance in elderly population. Result Both CKCE and OKCE were found to improve strength in lower leg musculature but OKCE are comparatively more effective strength training program. However, when it comes to improving balance and proprioception, CKCE were found to be more effective. Conclusion: OKCE are better strengthening exercise regimes whereas CKCE are better choice of exercise regimes when it comes to improving balance and proprioception. Keywords: Knee pain, balance, elderly population, open kinetic-chain exercise, closed kinetic-chain exercise.

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DR.CHANDRAMMA DAYANANDA SAGAR INSTITUTE OF MEDICAL EDUCATION & RESEARCH (CDSIMER)
SCHOOL OF MEDICAL EDUCATION & RESEARCH

Publication Summary

International Journals	**05**	**(CDIJ-01 – CDIJ-05)**
National Journals	**12**	**(CDNJ-01 – CDNJ-12)**

DR.CHANDRAMMA DAYANANDA SAGAR UNIVERSITY (CDSIMER)
SCHOOL OF MEDICAL EDUCATION & RESEARCH
INTERNATIONAL JOURNAL PUBLICATIONS

CDIJ-01

The Frequency of micronuclei in oral mucosal smears of female municipal sweepers with betel quid chewing practice

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Journal of Pathology of Nepal,***11*****(1), 1847–1851.**
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Abstract

Background: Oral cancer is common worldwide. Study of micronuclei in exfoliated buccal mucosal cells holds great scope in bio monitoring their carcinogenic potential. Betel quid chewing is one of the most common factors contributing to oral cancers. Ours being a developing country, a study was undertaken among female municipal sweepers, majority of who are betel quid chewers, unaware of the harmful effects of the same. We attempted to cytologically access the presence and compare the proportion of micronuclei in the right, left buccal mucosa and hard palate of female municipal sweepers with and without betel quid chewing practice.

Materials and Methods:

This was a cross sectional study with purposive sampling. Buccal smears were analysed from 30 betel quid chewers & non chewer females for micronuclei. Mean and standard deviation were calculated. Independent T test was used for comparison between groups. P value less than 0.05 was considered statistically significant.

Results:

Frequency of micronuclei in betel quid chewers and non-chewers was 26.80+/-11.96 and 7.76+/-4.73. The frequency of total micronuclei per 250 cells in cases was 9.3+/-5.37 in right buccal mucosa, 9.43+/-5.66 in left buccal mucosa, 9.43+/- 5.66 in hard palate and 3.33+/- 2.88 in right buccal mucosa, 2.96+/-3.31 in left buccal mucosa, and 2.96+/-3.31 in hard palate in controls.

Conclusions:

The mean number of micronuclei in buccal mucosal cells of female municipal sweepers with betel quid chewing practice was significantly higher compared to controls reaffirming their carcinogenic potential and highlighting the need of early screening for oral cancer in susceptible groups.

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CDIJ-02

Post salpingectomy intraluminal endometriosis in a premenopausal lady - an incidental finding often paid less attention to

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International Journal of Reproduction, Contraception,Obstetrics and Gynecology, 2021 Mar;10(3):1221-1223

Abstract

Endometriosis of the fallopian tube is often incidentally picked up in hysterectomy specimens that are sent for histopathological examination for other obvious pathological conditions. Post-salpingectomy endometriosis is one such entity that is known to occur in the tip of the proximal stump of the fallopian tube years after tubal ligation. As mere visualization of the endometriotic lesions is inadequate for an accurate diagnosis, histopathologic analysis of the biopsy samples becomes mandatory for confirmation. We report a case of post salpingectomy endometriosis which was incidentally discovered in a peri menopausal lady who was operated for multiple fibroids of the uterus. This case not only highlights an entity which is challenging to visualize radiologically and suspect clinically, but is also underrecognized, as very little attention is given to the fallopian tube during routine grossing.

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CDIJ-03

Awareness about the concept of Activity Based Costing (ABC) among medical laboratory professionals

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Medica Innovatica, Jan - Jun 2021, Volume 10, Issue 1

Abstract: Background: Medical laboratories are an integral and essential component of the healthcare system. Information about costing and resource management is of paramount importance for providing services at a reasonable price and without quality compromise. Awareness of a scientific method of cost accounting Activity Based Costing (ABC), may contribute significantly to enhance the laboratories capacity to manage its resources efficiently.

Objective: This study was done to know the awareness of Activity based costing.
Materials & Methods: A preformed validated questionnaire was sent to various laboratory professionals affiliated to private and teaching hospital laboratories. 121 responses were recorded, percentages of which were entered in EXCEL sheets, graphically represented and analysed.
Results: Majority of our participants were from medium sized laboratories (40%), working in private sectors, using a combination of automated & semi-automated technologies & not being accredited by regulating bodies. Activity based costing was being implemented in only 14 labs, with more than 70% of respondents not having an adequate knowledge about the same. Inadequate training (44.6%), not being involved in costing (46.3%) and assumed practical difficulties in implementing (9.1%) were some of the reasons cited.
Conclusion: Healthcare providers from the laboratory had limited awareness on costing methods like ABC. Efforts to implement and create awareness about the same if made can upscale quality, and sustainable service delivery in lab services at reasonable costs especially in developing country like ours.

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CDIJ-04

Vitamin D, Oxidative Stress and Cognition in Diabetes Mellitus

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International Journal of Physiology, July-September 2020, Vol. 8, No. 0353

Abstract

Introduction: Diabetes is a very common disease that affects almost all body systems. Of late recent studies have determined that vitamin D deficiency can cause several diseases such as diabetes, cardiovascular complications etc. Oxidative stress is an imbalance between free radicals and antioxidants in the body. Vitamin D is an antioxidant and its deficiency can cause oxidative stress .Thus vitamin D deficiency by itself and by causing oxidative stress can increase risk of developing diabetesHyperglycemia can affect cognition. Oxidative stress too can affect cognition. Studies done studying the role of vitamin D affecting cognition especially in diabetics are very few.Aim: To determine the role of vitamin D in affecting cognition in Diabetic patients. To determine the correlation between vitamin D, oxidative stress and cognition in diabetes .Materials and Method:Comparative cross sectional study100 Diabetes patients were studied.Exclusion Criteria: Hypertensives, alzheimers disease, dementia, bone diseases, epileptics, taking calcium or vitamin d supplements, hypo or hyperparathyroidism, thyroid disorders.After obtaining ethical approval from the institution a structured questionnaire was given to all.Fasting blood glucose levels was determined by GOD-POD Method.Hba1c was determined by Immunoturbidometry.Vitamin D was determined by ELISA method.Oxidative stress (malonylaldehyde) was measured by manual TBARS(Thiobarbituricacid reactive substances method)Cognition was assessed using Montreal cognitive assessment questionnaire.All tests were carried out at the central lab of Sree Balaji Medical College and Hospital,Chennai.Results were analysed using Microsoft excel.Results: A negative correlation was seen between vitamin D and MOCA scores.A positive correlation was seen between MDA and MOCA scores.Conclusion: Vitamin D deficiency causes oxidative stress and affects cognition in diabetics. Vitamin D supplementation can be considered to reduce oxidative stress and thus improve cognition in diabetes mellitus patients.

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CDIJ-05

A Systematic Review of Pandemic COVID-19 Based On Liver Enzymes

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International Journal of Medical Laboratory Research , Vol. 5, Issue 3, December 2020

Abstract

Background and Aim: This article aims to analyze liver enzymes in relation to COVID-19 patients by performing a systematic review of articles which describe the changes in liver enzymes in COVID 19. Abnormalities of liver enzymes associated with Covid-19 has been well documented by a number of articles since the start of the pandemic and could be used to monitor the disease progression .hence, this review was done to understand better the effect of covid 19 on liver enzymes. Methods: A systematic review to describe existing literature with regard to liver enzyme changes in SARS CoV-2 disease to understand the pattern of variations in ALT and AST. Articles for Literature review were accessed from the PubMed and other sources.On the day of admission and during hospitalization, LFT was done in COVID-19 patients. Median age 47 years (Inter Quarantile Range 33-61). The age group and cut off values for LFT is based on the Institutional board of the "National Health Commission of China". Result: We reviewed original articles from 15 International Journals related to COVID-19 and liver enzymes and found that the liver enzymes (ALT, AST) are significantly elevated in pre-existing and non-pre-existing liver disorder in COVID-19 patients. In the present study we have analysed 2811 patients (which were described in the reviewed original articles) with both pre and non-pre-existing liver injury. Out of 2811 patients the AST was elevated in 471 patients and ALT was elevated in 530 patients.Among them 2,279 patients are with pre-existing liver disease, where AST elevated in 371(25.53%) and ALT was elevated in 401(23.87%) patients. 532 patients are with non-pre-existing liver disease, where AST elevated in 100 (26.6%) and ALT in 129 (21.7%) patients. Conclusion: Liver enzymes are elevated both in the pre-existing and non-existing liver disease in COVID-19 patients. Although increase in ALT and AST was more noticed in patients with pre-existing liver disease, a significant percentage of patients without any pre-existing liver abnormalities also showed a high transaminase value.

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SCHOOL OF HEALTH SCIENCES
NATIONAL JOURNAL PUBLICATIONS

CDNJ-01

Can Study of Variations in Platelet Indices in Adult Thrombocytopenias Help to Differentiate the Underlying Mechanism? A Prospective Study

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Journal of Clinical Diagnosis and Research, 14(9):EC01-EC04
DOI:10.7860/JCDR/2020/45302.14028

Abstract

Introduction: Thrombocytopenia (TCP) is defined as a platelet count below 1,50,000 per microliter. This fall can be attributed to increased destruction, decreased production in bone marrow and pooling of platelets. A good knowledge of the cause and clinical course of the underlying pathology as reflected by the platelet indices contributes to the better management of TCP. With the advent of automation in haematology, these indices are now available from the routinely used blood cell counters in the laboratory. Aim: To determine if studying the variation in platelet indices helps to identify the aetiology of TCP. Materials and Methods: The prospective study was conducted in the haematology wing of central diagnostics attached to a medical college in Bangalore, Karnataka, India over a period of three months from June 2019 to August 2019. A total of 598 cases of adult TCPs were encountered, out of which 505 cases met the inclusion criteria and were categorised into three groups, namely- Hyperdestructive (Group 1), Hypoproductive (Group 2) and Abnormal pooling (Group 3). Variation of platelet indices {Platelet count, Plateletcrit (PCT), Mean Platelet Volume (MPV), Platelet Distribution Width (PDW)} were studied not only between the groups but also with the severity of TCPs. Data was analysed using the software Statistical Package for Social Sciences (SPSS) program version 20 and tested for statistical significance using one-way Analysis of Variance (ANOVA) test. A p-value of <0.05 was considered as statistically significant. Results: Of the 505 cases a majority fell under Group 1- 420 cases (83%). A higher value of MPV (11.870±1.3) and PDW (15.63±3.4) were seen in Group 1 compared to Groups 2 and 3. There was also significant variation among the platelet indices (PCT, MPV, PDW) with the severity of TCPs. Conclusion: Platelet counts along with a good knowledge on interpretation of platelet parameters obtained by automated analysers play a pivotal role in determining the aetiology of TCPs, thereby, providing better initial patient management.

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CDNJ-02

A Study of Variation in Adult Thrombocytopenic Histograms

A Graph Often Overlooked

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Annals of Pathology & Laboratory Medicine, Vol 7 No 2 (2020)

Abstract

Background: With the advent of automation in hematology, both platelet indices and their histograms are available from the blood cell counters at no extra cost or time. The variations of histograms in various mechanisms of thrombocytopenias are explored in this study. Methods: Adults with thrombocytopenia determined with (name of the analyser) were categorized into four groups based on the mechanism of thrombocytopenia and variations in platelet histograms were studied in all groups. Data was collated and analysed using Excel. Results: A total of 224 adults with thrombocytopenia were seen, most of them had hyperdestructive type (73.6%) followed by hypoproductive type (16.08%), abnormal pooling (6.3%) and EDTA induced thrombocytopenia (4.01%). The following variations in histogram were seen; Normal curve (8.03%), Curve not touching/reaching the baseline (43.75%), Broad based curve (10.71%), Bimodal curve (7.14%), Curve with short peak (25.9%) and Saw-tooth appearance of curve (4.47%) and correlated with the above mentioned mechanisms of thrombocytopenias using SPSS software version 20. Conclusion: An awareness regarding the variations in the platelet curve ensures a good correlation with its numerical parameters and also with the etiology of thrombocytopenias. With the era of automation taking over in most of the laboratories, it is imperative to have knowledge about these simple yet, often overlooked platelet histograms.

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CDNJ-03

Morphological types of anaemia integrated with distribution of red cell and platelet indices: Study in a rural tertiary healthcare centre

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Indian Journal of Pathology and Oncology, Volume : 8, Issue : 1, Year : 2021, 45-49

Abstract

Background: Anaemia is a critical global health problem. A good morphological subtyping of anaemia can guide clinician in further patient management. With the advent of automation, red cell and platelet indices are available from the routinely used blood cell counters in the laboratory, these supplemented with peripheral smear examination help in a good categorization of anaemia. Aim of this study is to study the morphological types of anaemias in the adults with the Objectives of Categorization of

the anaemias based on morphology and to study the distribution of the red cell and platelet indices in the same.
Materials and Methods: It was a prospective study conducted in the hematology wing of our central diagnostics over a period of three months and a total of 520 cases, which were morphologically classified according to the analyzer indices and peripheral smear. Distribution of the red cell and platelet indices in the different categories of anaemia were also noted.
Results: A majority of the anaemias were microcytic hypochromic in type (67.1%) followed by normocytic normochromic anaemias (26.5%). Increased RDW was seen in microcytic hypochromic anaemias (55%) and normocytic normochromic anaemias (6.9%). The Mean platelet count/ mean platelet volume was increased in microcytic anaemias compared to others.
Conclusion: Anaemias in the rural set up are predominantly of the microcytic in type. A good knowledge of the variation in RBC indices, RDW and platelet /mean platelet volume ratio along with a peripheral smear can help the reporting haematologist identify early stages of iron deficiency anaemia and can give a precise and accurate anaemia categorization at the basic entry level of laboratory investigation.
Key Messages: Interpretation of variation in RBC and platelet indices though often neglected can contribute significantly to categorize the anaemia.
Keywords: Anaemia, Microcytic, RDW, Mean platelet volume, Platelet indices, Analyzers.

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CDNJ-04

Faster reading techniques – A method to ameliorate performance among first MBBS students

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National Journal of Physiology, Pharmacy and Pharmacology, 2021; 11(10)**: 1121-1124**

Abstract

Background: The reading speed depends on the level at which these organs are trained to help the reader use them earnestly. Research related to fast reading courses affirms that the reading speed can be greatly increased without sacrificing comprehension by learning to make use of visual information at a single glance and by ignoring the inner speech. With the change in curriculum by National Medical Commission, adopting faster reading techniques would help in holistic development of future physicians of first contact.

Aim and Objectives: The objectives of the study were to study the effects of faster reading techniques on reading and comprehending capabilities among students.

Materials and Methods: Students were instructed to read the material given to them within a time limit of 2 minutes and answer the questions at the end of 2 minutes before and after employing fast reading techniques.

Results: The results of the present study showed a statistically significant increase in reading speed and performance of the individuals after delivering instructions pertaining to fast reading techniques.

Conclusion: In the light of our findings, it is recommended that faculty members in medical education need to train and encourage students extensively on the use of faster reading strategies such as skimming and scanning for better academic performance.

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CDNJ-05

Effect of abacus training on critical flicker fusion frequency threshold among primary schoolchildren

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Indian Journal of Physiology and Pharmacology, 2021, 65(2), pp. 115-118

Abstract

Objectives: The concept of neuronal plasticity has been considerably studied to know how long-lasting changes are associated with brain's capacity to be shaped or sculptured by experience. Potential cognitive benefits of abacus training have been proved by various studies indicating it to be a promising tool in improving cognitive abilities including arithmetic abilities, visuospatial and working memory. Critical flicker fusion happens when the individual can no longer differentiate between changing visual stimuli. It can be modulated by behavioural or psychophysical techniques. The objectives of the study were to evaluate the effects of abacus training on critical flicker fusion frequency (CFFF) threshold.

Materials And Methods: CFFF threshold (CFFFT) was measured in 60 school students studying third and fourth standard (30 trained in abacus and 30 not trained in abacus) using portable software-based apparatus.

Results: The mean scores of abacus trained individuals were significantly higher compared to those who were not trained.

Conclusion: Since higher CFFFTs can absorb more visual information, increasing their threshold might lead to cognitive improvement and better academic performance. Abacus trained individuals showed significantly higher critical fusion frequency threshold.

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CDNJ-06

Myths and awareness among rural population about orthodontic extractions during fixed mechanotherapy

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Journal of Advanced Medical and Dental Sciences Research, Volume 9 Issue 5 (May, 2021)

Abstract
Background: India being a developing country, there are still remote villages unaware of the advances in various fields; one such being orthodontics. Myths and misconceptions are present in all cultures, all professions, and on al subject matters. While some dental myths are provincial, others are heard everywhere. Hence; the present study was undertaken for assessing myths and awareness among rural population about orthodontic extractions during fixed mechanotherapy. Materials & methods: A total of 200 rural participants were enrolled in the present study. All the participants belonged in the age group of 20 to 50 years. A questionnaire was framed and was given to all the participants. Informed consent was taken from all the participants. Questionnaire consisted of questions pertaining to the myths and awareness of the participants in relation to orthodontic extractions during fixed mechanotherapy. Results: In answer to question “Is eye sight affected because of extraction”, 57.5 percent of the subjects said yes. In answer to question “Does tooth extraction lead to systemic disorders”, 46 percent of the subjects said yes. In answer to question “Extraction can lead to unaesthetic appearance”, 37 percent of the subjects said yes. In answer to question “Does tooth extraction leads to severe malocclusion”, 29.5 percent of the subjects said yes. In answer to question “Dental extraction is an extremely painful procedure”, 66 percent of the subjects said yes. Conclusion: Rural aged is a deprived lot and a targeted program to infuse scientific dental practices in them is necessary.

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CDNJ-07

Assessment of problems faced by orthodontic patients during COVID-19 pandemic

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Journal of Advanced Medical and Dental Sciences Research; Amritsar Vol. 9, Iss. 6, (Jun 2021): 189-192. DOI:10.21276/jamdsr

Abstract

Background: Different policies and strategies were taken by each affected country to face this pandemic and minimize the number of cases, from partial to complete lockdown, giving that in the absence of a vaccine. The present study was conducted to assess problems faced by orthodontic patients during COVID- 19 pandemic. Materials & Methods: 60 orthodontic patients age ranged 14- 30 years undergoing orthodontic treatment were enrolled and a questionnaire was prepared in the form of google.com/forms which were sent to all participants through watsapp and were asked to respond. Results: Mode of communication was phone call in 62%, SMS in 28% and mail in 10%. 45% were strongly disagree, 20% disagree, 5% were somewhat disagree, 10% were neutral, 7% were somewhat agree, 5% were agree and 8% were strongly agree regarding closing the dental clinics to minimize the spread of COVID-19. 13% patients did not stop visiting Orthodontist whereas 87% had not visited since >2 months. Reason for not visiting orthodontist was clinic was closed by 56%, fear of COVID- 19 spread by 20% and above both by 14%. Problems faced by patient was pricing of wires in 20%, ulcers due to wires in 35% and bracket breakage in 28%. 35% did not communicate, 50% communicated once in a week and 15% once in a month with orthodontist. The difference was non- significant (P< 0.05). Conclusion: Most patients undergoing treatment were concerned about their restriction to orthodontic clinic visits.

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CDNJ-08

COVID-19 Associated Stroke-A Single Centre Experience

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Journal of the Association of Physicians of India, 2021 Jun;69(6):11-12

Abstract

Background and purpose: Various neurological complications have been reported in association with COVID-19. We report our experience of COVID-19 with stroke at a single center over a period of eight months spanning 1 March to 31 October 2020.

Methods: We recruited all patients admitted to Internal Medicine with an acute stroke, who also tested positive for COVID-19 on RTPCR. We included all stroke cases in our analysis for prediction of in-hospital mortality, and separately analyzed arterial infarcts for vascular territory of ischemic strokes.

Results: There were 62 stroke cases among 3923 COVID-19 admissions (incidence 1.6%). Data was available for 58 patients {mean age 52.6 years; age range 17-91; F/M=20/38; 24% (14/58) aged ≤40; 51% (30/58) hypertensive; 36% (21/58) diabetic; 41% (24/58) with O2 saturation <95% at admission; 32/58 (55.17 %) in-hospital mortality}. Among 58 strokes, there were 44 arterial infarcts, seven bleeds, three arterial infarcts with associated cerebral venous sinus thrombosis, two combined infarct and bleed, and two of indeterminate type. Among the total 49 infarcts, Carotid territory was the commonest affected (36/49; 73.5%), followed by vertebrobasilar (7/49; 14.3%) and both (6/49; 12.2%). Concordant arterial block was seen in 61% (19 of 31 infarcts with angiography done). 'Early stroke' (within 48 hours of respiratory symptoms) was seen in 82.7% (48/58) patients. Patients with poor saturation at admission were older (58 vs 49 years) and had more comorbidities and higher mortality (79% vs 38%). Mortality was similar in young strokes and older patients, although the latter required more intense respiratory support. Logistic regression analysis showed that low Glasgow coma score (GCS) and requirement for increasing intensity of respiratory support predicted in-hospital mortality.**Conclusions:** We had a 1.6% incidence of COVID-19 related stroke of which the majority were carotid territory infarcts. In-hospital mortality was 55.17%, predicted by low GCS at admission.

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CDNJ-09

A Community-Based Study of Milk Adulteration and Childhood Malnutrition In Bangalore Rural District, India

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Epidemiology and Society Health Review, Vol. 4, No. 1, 2021, pp. 1-11

Abstract

Background: Milk promotes child growth; however, adulterated milk reduces nutritional value and exposes children to harmful chemicals. Therefore, this study aimed to assess the nutritional status of children aged 1â€“5 years living in the selected study area and test milk samples from the children's households for common adulterants. The study further aimed to explore the association between malnutrition and milk adulteration.

Methods: We used a community-based cross-sectional study design conducted in the service area of a tertiary healthcare institute in Bangalore Rural District, Karnataka state, India. Systematic random sampling was used to recruit 180 children aged 1â€“5 years. Primary data was collected through interviews, anthropometry, and strip tests for milk adulteration. Statistical analysis consisted of descriptive analysis, Chi-square tests, odds ratios, and 95% confidence intervals.

Results: Prevalence of underweight, stunting, wasting, and low Body Mass Index (BMI) was 13.33%, 38.33%, 15.0%, and 26.7%, respectively. General adulterants detected were neutralizers in 97 (53.9%) and maltodextrin in 90 (50%) samples. Higher proportions of stunting, underweight and low BMI were found in children drinking adulterated milk. Low BMI was significantly associated with joint family and lower maternal education.

Conclusion: Our study found a high prevalence of malnutrition in children, particularly stunting. The study also detected widespread adulterants in milk and a potential association with malnutrition. The authors recommend further studies with a larger sample size to accurately delineate the relationship between milk adulteration and malnutrition.

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CDNJ-10

Glutamic Acid Decarboxylase and Islet Cell Cytoplasmic Autoantibodies Positivity in Latent Autoimmune Diabetes of Adults: Need for Early Insulinisation

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Journal of Clinical and Diagnostic Research, 2021 May, Vol-15(5): BC11-BC15

Abstract

Introduction: Latent Autoimmune Diabetes of Adults (LADA) remains a poorly understood disease at both the clinical and research level and usually misdiagnosed as Type 2 Diabetes Mellitus (T2DM) and treated with Oral Hypoglycaemic Agents (OHA). This might lead to accelerated β-cell destruction leading to early insulin-dependency in these patients. Screening of T2DM and determination of C-peptide and insulin antibodies helps to differentiate this disease from LADA. Early insulinisation of these patients prevents β-cell destruction and preserves residual β cell function. Aim: To screen type 2 diabetic patients for potential LADA subjects based on LADA clinical risk score and to confirm them as LADA based on Glutamic Acid Decarboxylase (GADA) positivity and Islet Cell Cytoplasmic Autoantibodies (ICA) positivity. Materials and Methods: The hospital based cross-sectional study was done on 945 T2DM patients attending Out Patient Department (OPD) of Rajarajeswari Medical College and Hospital, Bengaluru, Karnataka, India from March 2017 to May 2019. Patients were screened using LADA clinical risk score and potential LADA subjects were identified and tested for C-peptide, GAD and IC Antibodies to confirm LADA. C-Peptide and GAD antibodies were measured by ELISA method. IC antibodies were observed using immunoflorescence microscopy. Inferential Statistics (Chi-square test, Z test, t-test) by using SPSS V20 and MS Excel was used. Results: Out of 945 T2DM patients, 188 patients (20%) were considered as potential LADA subjects based on LADA clinical risk score. All 188 subjects were tested for C-peptide, GAD and IC antibodies. 36% (68 subjects) of them had low C-peptide levels. Among them four subjects (6%) had high GADA titer confirming them as LADA subjects. Three (4%) of the subjects had low GADA titer, remaining 61 subjects did not show antibody positivity. Only one of them had both IC antibody positivity out of four subjects with high GADA titer. Remaining 64% (120 subjects) had normal C-peptide levels and antibody negative. Conclusion: Using 5-point LADA clinical risk score 20% were identified as potential LADA subjects out of 945 T2DM subjects. 6% of the potential LADA subjects had high GADA titer confirming them as LADA, who may be benefited by early insulinisation.

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CDNJ-11

Vitamin D and glycated hemoglobin levels in non-diabetic anemic patients

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National Journal of Physiology, Pharmacy and Pharmacology, 2021 , Vol 11, Issue 08

Abstract

Background: Glycated hemoglobin (HbA1c) is a form of hemoglobin that indicates average plasma glucose concentration over months formed due to non-enzymatic glycation. According to the previous studies, HbA1c levels have been found to be increased in anemic patients despite the shortened life span of the erythrocytes. Decreased Vitamin D may be an independent risk factor for type 2 diabetes mellitus (T2DM) with higher HbA1c levels. Studies have also demonstrated that in children, decreased Vitamin D levels are associated with increased risk for anemia. Aim and Objective: The aim of this study is to estimate and analyze HbA1c, Hb, and Vitamin D among non-diabetic anemic patients and age- and sex-matched normal subjects. Materials and Method: A case–control study was carried out with inclusion of 50 anemic patients as cases and 50 normal subjects as controls. The patients, who had diabetes, hemolytic anemia, worm infestation, chronic alcohol ingestion, and renal disease, were excluded from the study. Routine blood investigations, the fasting and postprandial glucose and HbA1c, Hb, and Vitamin D levels were measured in all the subjects. Vitamin D was estimated by ELISA. Fasting and postprandial blood glucose levels were determined by GOD-POD method. Hemoglobin (Hb) was estimated by Drabkin's method. HbA1c was determined by immunoturbidimetry. Results: The mean HbA1c (7.4 ± 0.5%) level in the patients with iron deficiency anemia (IDA) was higher than that in the control group (5.2% ± 0.8) ($P < 0.05$). There was no difference in the levels of FBS and PPBS between the two groups ($P > 0.05$). The Hb, serum ferritin, FBS, PPBS, and the HbA1c levels were normal in the control group ($P > 0.05$). The study found negative correlation between Vitamin D and HbA1c in both males and females ($r = -0.4$, $r = -0.3$ $P \leq 0.001$), HbA1c and hemoglobin ($r = -0.4$, $r = -0.3$ $P \leq 0.002$). Furthermore, there was a significant positive correlation between the Vitamin D and hemoglobin ($r = 0.5$, $r = 0.3$ $P \leq 0.001$) values in the study population. Conclusion: HbA1c is not affected by the blood sugar levels alone, and there are many factors to be considered when HbA1c is measured, especially that of presence of iron deficiency. It is essential to rule out IDA before making any decision, based on the HbA1c levels.

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CDNJ-12

Breastfeeding in the first hour of birth: Science and skills

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Karnataka Pediatric Journal, ***2020;35(2):72-5***

Abstract

Immediate and uninterrupted skin-to-skin contact between mother and newborn should be facilitated soon after birth to initiate breastfeeding. It initiates the newborn infant's internal process to go through nine instinctive steps (namely, crying, relaxation, awakening, activity, resting, crawling, familiarization, suckling, and sleeping). Skin-to-skin contact with the mother soon after birth contributes to an early coordination of five senses in the newborn, namely, sight, hearing, touch, taste, and smell. The oxytocin surge in the 1st h of birth makes mother to keep the infant close to her chest and also establishes chemical connection between the two. The colostrum odor increases the amount of oxygenated hemoglobin over the olfactory cortex in the newborn within 24 h of life. The skin-to-skin provides the initial colonization of the baby's microbiome outside the mother. Finally, skin-to-skin contact not only improves the bonding between mother and the infant but also influences infant's self-regulation in the years to come.

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DEPARTMENT OF COMMERCE AND MANAGEMENT
SCHOOL OF COMMERCE & MANAGEMENT

Publication Summary

International Journal	**01**	**(CAMIJ-01)**

DEPARTMENT OF COMMERCE AND MANAGEMENT
SCHOOL OF COMMERCE AND MANAGEMENT
INTERNATIONAL JOURNAL PUBLICATIONS

CAMIJ-01

WHY BANCASSURNCE BUSINESS FOR INDIA?

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[2]Assistant Professor in the Department of Commerce, Dayananda Sagar University

Journal of Science, Vol. 33, Issue 12, Pp: 118-132;
Dec 2020

Abstract

In recent years, bancassurance, a highly suitable channel for distributing insurance products has attracted the attention of the Insurance sector. Banks with their wide network branches can easily connect with a large number of people and offers a great opportunity to increase Insurance business. This add on service also helps the banker to increase its non-interest income. Despite these benefits, the growth of bancassurance is low as compared to developed economies. In the present study, we discussed different models of bancassurance, Eligibility Criteria, and regulatory framework, and the current status of the bancassurance channel in India. The data has been analyzed by using Mean, standard deviation, coefficient of variation, CAGR, AAGR, and T-test. The results revealed that traditional individual agents' contribution is steadily decreased due to the growth of the bancassurance sector. The bancassurance and corporate agent have a dominating role in the insurance business.

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DEPARTMENT OF MANAGEMENT STUDIES (MBA)
SCHOOL OF COMMERCE & MANAGEMENT

Publication Summary

International Journals	**02**	**(MGSIJ-01-02)**

DEPARTMENT OF MANAGEMENT STUDIES (MBA)
SCHOOL OF COMMERCE AND MANAGEMENT
INTERNATIONAL JOURNAL PUBLICATIONS

MGSIJ-01

Digital Forensic Science in Indian Ecommerce Environment

Padmalatha N A
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Psychology and Education Journal, VOL. 57 NO. 9 (2020) 2985-2995

Abstract

In today's environment crimes are becoming more digitised and more sophisticated. This sophistication of crime leads not only users but also companies to lose some important data. Protecting the data and users requires a strong forensic techniques and knowledge of the investigation process. In Indian scenarios, frauds are predominant in domains such as financial services and real estate and infrastructure.

Even though there is a rise in cybercrime activities, most of the times forensic investigation tools were not used. One of the main reasons for the same is the business criticality of the application. Because of which, the system can neither be slowed down nor shut down. This leads to further increase in cyber-attacks to the storage, network and applications of business systems. As per research conducted by previous researchers, India has the internet user base of 450 million. Approximately 15% of the users have a digital experience of more than three years. This makes fraud detection in Indian ecommerce industry all the more relevant.

The research is not intended to provide a complete view of all factors to be considered for forensic tool selection. But it has taken some areas which seems to be important for the choice of the tools. The present study makes a comparison of the select tools based on platform, capability, reporting, and tool support. Among the forensic tools available in the market, the researcher indicates that CAINE and SIFT can be considered important. CAINE forensic platform provides all the forensic tools that are required in the investigation process like preservation, collection, examination and analysis. SIFT provides tools for in-depth investigations for file systems, memory and network investigations.

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MGSIJ-02

The effect of ethical climate on corporate reputation for sustainability of Indian banking

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World Review of Entrepreneurship, Management and Sustainable Development, VOL. 17 Issue 2-3 (2021)

Abstract

Financial Institutions should be founded on fundamentals of ethical code and values that drive core business practices essential for their sustainable development. The study evaluates the ethical climate and its impact on corporate reputation of two largest banks of India - State Bank of India i.e., a public sector bank and ICICI Bank i.e., a private sector bank through an ethical climate and corporate reputation questionnaire. A descriptive design used empirical research to investigate the ethical climate through a sample size of 250 employees from both banks in the tri-city region of Chandigarh. The study provides a comparison on the ethics climate in the public and private sector bank and assists to find some common factors that affect the reputation of banks that is essential for sustainable growth.

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COLLEGE OF JOURNALISM & MASS COMMUNICATION
SCHOOL OF ARTS, DESIGN & HUMANITIES

Publication Summary

International Journal	**01**	**(CJIJ-01)**

CJIJ-01

Unpacking the uses and gratifications of Facebook: A study among college teachers in India

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Computers in Human Behavior Reports
Volume 3, January–July 2021, 100066

Abstract

Although Facebook is increasingly popular among college teachers, very few empirical studies have investigated college teachers' motives behind the usage of Facebook. In order to address this gap, the current study examines college teacher's gratification motives behind the usage of Facebook by applying uses and gratifications theory (UGT). Pilot study revealed six dimensions of gratifications which were rated in importance by survey respondents (N = 645). Factor analysis revealed four different gratifications, namely Social interaction, Information seeking, Affection seeking and Escape. Some of the important findings of the study were: Male teachers tend to use Facebook more for information seeking compared to their female counterparts; Younger college teachers spent more time on Facebook than their older counterparts; affection seeking and escape gratifications successfully predicted the time spend on Facebook by college teachers; advancement in communication technology blurred the boundary between personal and professional use of Facebook. The study's implications can be utilized to refine and develop new features services on Facebook to cater the gratifications of academicians.

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PATENTS

Summary

Patents	**16**	**(DSUIP-01 – DSUIP-16)**

PATENT PUBLICATION

DSUP-01

A System and method for enabling a power divider based on edge coupled microstrip lines

Dr. B.P Pradeep Kumar, Karnataka, India
Dr. Pramod Kochanalli Biligiri Rangaiah, Karnataka, India
Dr.Pushpa mala Siddaraju, Dayananda Sagar University, Bangalore,India
Mr. Dhanraj Saravana Bavan, Chennai, Tamil Nadu, India
Dr. Sunilkumar Siddaramappa Manvi & Mr. Nirmalkumar Siddappa Benni,
REVA Institute of Technology and Management, Bangalore, Karnataka, India
Praveen Kochanalli Biligiri Rangaiah, Dr Ambedkar Institute of Technology, Bangalore

Application Number: 202041036103; Application Type: Ordinary;
Date of Publication: 04-09-2020

Abstract

The present invention relates to a system and method for enabling efficient utilization of power by reducing various losses. More specifically, the invention relates to methods and systems for enabling a power divider based on edge coupled microstrip lines. Particularly, power divider design for frequency band of 1 GHz to 10 5 GHz utilizing edge coupled microstrip lines.

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DSUP-02

Cloud based web service selection: Huddle Particle Swarm optimization system and method thereof

Dr. R.G. Babukarthik & Mr. S. Vignesh, Dayananda Sagar University, Bangalore, India

Application Number: 202041039561; Application Type: Ordinary; Date of Publication: 25-09-2020

Abstract

Huddle Particle Swarm Optimization (HPSO) technique is proposed for web service selection problems based on QoS attributes. HPSO includes Boundary Value Analysis (BVA) techniques and Topological structure of communication among the swarm incorporating security and privacy policy of cloud. The proposed methodology elects optimal web service using 21 QoS constraints in cloud storage. For various classes the optimal web service is selected based on QoS constraints in terms of service id, web service name, web service url with minimum computation time.

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DSUP-03

Santulan: A device for Car safety

Dr. Shashikumar G Torad, KLE Technological University, Karnataka
Dr. Geeta R. Bharamagoudar, KLE Institute of Technology, Karnataka
Dr. Parashuram Baraki, Proudhadevaraya Institute of Technology, Hosapete
Er Dr Srinivas Deshpande, KCT Engineering College, Karnataka
Dr. Chatti Subbalakshmi, Guru Nanak Institutions Technical Campus, Telangana
Dr. Rajesh T. M, Dayananda Sagar University, Bangalore, India
Sangeeta P. Sangani, KLS Gogte Institute of Technology, Karnataka
Mr. Mo Mallamma C G, Sambhram Institute of Technology, Karnataka
Mohan Kumar T G, Meenakshi Institute of Technology, Karnataka
Veeranna Kotagi, East West College of Engineering, Bangalore

Application Number: 202041053586; Application Type: Ordinary; Date of Publication: 18-12-2020

Abstract

The invention discloses a device which reads the total weight of car using sensors and generates the maximum speed at which the car should move in order to move swiftly. It has been many times reasons for road accidents due to overweight and losing control over vehicle. This invention gives a clear idea using Artificial intelligence and prompts the driver with suggestions to drive on relevance to the weight of the car and strength of vehicle.

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DSUP-04

Automatic Signal Alert for Preventing Accidents

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Arati Shahahapurkar & Kavita D. Hanabaratti, Gogte institute of technology
Dr.C.Umarani, Jain (Deemed-to-be) University, Bangalore
Ashok Kumar C N, Vemana Institute of Technology, Bangalore
Dhanya Prakash R Babu, ACS College of engineering, Bangalore
Veeranna Kotagi, East West College of Engineering, Bangalore

Application Number: 202041054009; Application Type: Ordinary;
Date of Publication: 18-12-2020

Abstract

The invention capable of Automatic Signal Alerting for Preventing Accidents in Hair Pin Bend Roads, The system ensures alerting Red signal if any vehicle is on other side of road and generates Green signal if no traffic on other side .The system uses Artificial Intelligence & IOT Sensors for accuracy & reliability of signaling process. Hairpin bend accidents occur mostly because of the driver unable to see the vehicle coming from the opposite sides of the road curves. Our system uses sensors to detect any vehicles reaching hair pin bend and alerts immediately on other side vehicles by red signal and also producing alert sound. If hair pin bend road is clear other green signal is produced. Thus this system provides safety for drivers to prevent accidents and ride.

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DSUP-05

Wild life intrusion detection system empowered with Artificial intelligence

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Suresh Delampady, RNS Institute of Technology, Karnataka
Vaibhav A Meshram, Dayananda Sagar University, Bangalore, India
Piyush Kumar Pareek & Aravind K, East West College of Engineering, Bangalore
Bibhu Kalyan, Sri Sri University, Karnataka
Sharada KA, K.S.School of Engineering and Management
Poornima G, Visvesvaraya Technological University
Praveen Naik, Christ (Deemed to be University), Bangalore

Patent Number: 2021100064; Application Type: Ordinary;
Date of Publication: 31-03-2021

Abstract

The invention Discloses a system which identifies animals near fence and alarms sound which is unpleasant to the particular species of animals to ensure it stays in its region and thereby being in a secured place. The invention uses Machine learning algorithms

and plays the sounds which is unpleasant to the species respectively. This Invention ensures safety of animals by continuous monitoring and alarms them from crossing the fence. Incase animals crosses the fence respective personnel are also alerted for further action.

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DSUP-06

A System and Method for Preemies Monitoring

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Mr. Rajeev Kamal, Bangalore, Karnataka, India
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Dr. Surendiran J, Thirunagar, Villupuram
Mr. Dhanraj Saravana Bavan, Chennai Tamil Nadu, India
Mr. Abdul Saleem, HKBK college of Engineering, Karnataka
Dr. Pramod Kochanalli Biligiri Rangaiah, Bangalore, Karnataka, India
Dr. Imtiyaz Ahmed B.K, Govindapura, Karnataka, India

Application Number: 201941040472; Application Type: Ordinary; Date of Publication: 09-04-2021

Abstract

The present invention relates to a system and method for premises health care. More specifically, the invention relates to methods and systems for detection and remedy of health problems like jaundice, hypothermia, apnea and tachypnea based on neonatal monitoring and photo radiation theory.

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DSUP-07

Method for Plant Disease Detection Using Machine Learning and Methods Thereof

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Dr.Narasimha Murthy M S, BMS Institute of Technology & Management, Bangalore
Dr.Kamalakshi Naganna, Sapthagiri College of Engineering, Karnataka
Dr. Deepa. S.R, K.S., Institute of Technology
Dr. Dayanand Lal N, Mrs.Neeta K S & Mrs.Neeta K, GITAM University, Bangalore
Mrs.Vaishali B Kosamkar, Kutchhi Engineering College
Chembur Mumbai
Dr.Chethana Sridhar, Memorial R V College, Bangalore
Dr.Piyush Kumar Pareek, EWCE, Bangalore

Application Number: 202141010619; Application Type: Ordinary; Date of Publication: 19-03-2021

Abstract

Leaf infections may occur as a result of changes in the climate, such as heavy rains or dramatic temperature changes, or as a result of poor maintenance or the presence of insects or pesticides. When disease-causing species such as bacteria, viruses, and other pathogens enter the leaf tissue, they spread, weakening the leaf and causing degradation. For example, disease outbreaks that result in large-scale death and famine are common. Our goal is to create a disease diagnosis and prevention software. To this end, we're creating a web-based framework and an android app that uses image processing and machine learning to search for plant diseases.

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DSUP-08

A Multi-Faceted Optimization Algorithm for Deep Learning Alternative to Gradient Descent

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T. Subramani, Tamilnadu, India
Jaishri Gothania, Faridabad, Haryana, India
Swapnil M Parikh, Parul University, Limda, Waghodia, Vadodara
Dr. Khalid Mohammad Kaleem, SNNPR Ethiopia
Nitin Purohit, Ethiopia
Parvendra Kumar, Ethiopia
R.G. Babukarthik, Dayananda Sagar University, Bangalore, India
Rituraj Jain, Wollega University, Nekemte Ethiopia
Kiran Kumar Chandriah, Bangalore, Indi**a**

Australian Government IP Australia, Patent Number: 2021100738; Application Type: Ordinary; Date of Publication: 06-02-2021

Abstract

Gradient Descent is the popular optimization algorithm used in deep learning and it is stated as a first-order optimization algorithm. The parameters updates are performed in first order derivatives. The direction of the steepest descent is identified by updating the parameters in the opposite direction of the objective function. The major disadvantage is that it will slow the process for the larger dataset and once all the examples processed, then only learning is performed. To overcome the above drawback, as an alternative to gradient descent, the Huddle PSO is proposed. The Huddle PSO is a modified form of PSO, where a single swarm is divided into multiple sub swarms and it is compatible with optimization problems having multiple constraints, to balance both exploration and exploitation. Each sub swarm focuses on a specific region, diversification method is to choose and initiate the sub swarms, the main aim is to increase diversity and concentrate on the optimal value. TSP is solved using PSO by preserving diversity that is by updating the capacity of memory to every particle in PSO and thereby performance is improved for smaller TSP problems.

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DSUP-09

Grading of Facial Emotions Using Multimodal Approach

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Dr Rajesh T M & Dr Shaila S G, Dayananda Sagar University, Bangalore, India
Dr Pritee Parwekar, SRM Institute of Science and Technology, Delhi-NCR
Dr Piyush Kumar Pareek, EWCE, Bengaluru Karnataka

Intellectual Property India, Application Number: 202141020173; Application Type: Ordinary; Date of Publication: 07-05-2021

Abstract

Emotion analysis is an area which is been widely used in forensic crime detection domain, mentoring device for depressed students, psychologically affected patient treatment. Although significant work has been done in this area, the current system helps only in identifying the emotions but not in identifying the level of emotions like whether an individual is truly happy /sad or pretending to be happy/sad. Instead of classifying the image of the face into one of the categories of facial expression, we need to assess the depth of facial expression. In this proposed work using pre-processed video images, algorithms such as LBP and Euclidean distance are fused to extract emotional features and obtain up to 19 features of the human face. We reconstructed the traditional local binary model (LBP) function operator by merging the algorithm and combining the abstract facial expression characteristics learned from deep convolution neural network. These 19 features are used in the Confusion Matrix for grading analysis of emotions such as Grades 1, 2, and 3, with features generated automatically by CNN. The combination of emotion analysis and data analysis provides a suitable emotional identification and verification system for grading the emotion in a given image.

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DSUP-10

Gardening Robot

Dr. Rajesh T M, Dr. Shaila S G, Dr. Girisha S G & Prof. Shivaprasad Ashok Chikop,
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Rajlakshmi Ghatkamble, CMR University, Bangalore
Dr.C.Umarani, Jain (Deemed-to be) University
Dr. Raghavi K Bhujang, ISBR Business School, Bangalore
Mr. Siddharth Ajmera, Radhakrishnan Institute of Technoloy, Jaipur
Veeranna Kotagi, East West College of Engineering, Bangalore

**Intellectual Property India, Application Number: 202041055966;
Application Type:
Ordinary; Date of Publication: 01-01-2021**

Abstract

The invention discloses a lightweight portable robot we designeda mechanical machine that can sow and seed the plants at the same time. The product is available to the gardeners at affordable prices. This saves the garden when there exists non-availability of labors. Also, automatic watering technique using multimodal approach helps in the field of gardening by avoiding the time constraint, unnecessary loss of water and drying of plants. This robot will also help in getting rid of over grown grass in the garden.

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DSUP-11

Accident Surveillance System in Nh4 Using Video Analytics

Dr Rajesh T M, Dr Shaila S G, Dr Mallanagouda Patil, Prof. Shivaprasad Ashok Chikop,
Prof. Nazmin Begum, Prof. Bindu Madavi K P & Prof. Lavanya B Koppal,
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**Intellectual Property India, Application Number: 202141002013;
Application Type:
Ordinary; Date of Publication: 22-01-2021**

Abstract

Nowadays the usage of vehicles in this busy world is tremendously increased. Due to the lack of smooth and safe driving awareness, there is a drastic increase in accidents on national highways. Traffic rules are not strictly followed by everyone, especially by illiterate drivers. So, there are some possibilities for hit and run cases. Hit-and-run cases have become a frequent norm for road accidents. This has to be avoided and we need to identify the real victims who are involved in the crime. In this novel work, we have addressed the problems faced in the forensic crime detection domain mainly the Hit and Run case scenario & also we have introduced some novel solutions to identify the

victims using video analytics on NH4 tolls. Installation of CCTV cameras on toll gates helps identification of the victim's vehicle. In this novel method, we have a technique to detect and identify a victim's vehicle that is involved in a hit and run case. Gaussian mixture analysis is used to detect the object. To recognize the object SURF , SIFT and Classification algorithms are used.

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DSUP-12

Automated location identification system using text and image data

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Vindhya P Malagi,
Parashuram Baraki, Proudhadevaraya
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Veena RS, Karnatka, India
Latha PH, Karnatka, India
Chitra Shashidhar, Karnatka, India
Aditya Pai H, Karnatka, India
Chandramma R, Karnatka, India
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Australian Government IP Australia, Patent Number: 2021100154; Application Type: Ordinary; Date of Publication: 15-04-2021

Abstract

The process of recognizing of text from image is considered as a difficult task in the image processing. Text recognition is an important task of computer vision because it is inclusion of the success of certain applications in computer vision. A number of algorithm and system has been put forward but still a challenging task because of illumination changes, background subtraction & occlusion. The character/text recognition applications in OCR domain are becoming popular. Content based image processing which involves the complexity of extracting the text from the images. The character recognition in natural scene images is one of the part of forensic crime detection area which is been widely used in detecting the places based on characters/text present in the images. Characters are gradually extracted from the images using the information of segmentation and recognition. Different methodologies being used such as data acquisition, preprocessing, feature extraction identification and classification. Before these methods can be used, the source material must be scanned using a scanner to read in the page. Software to recognize the images is also required .There are many factors such as noise, various

font sizes, broken lines or characters, quality of the image, and the exposure of the image to the light problems in segmentation that influence recognition process and also extracting the text from the complex background images.

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DSUP-13

Robo Umpire

Dr. Rajesh T M, Dr. Shaila S G, Dr. Girisha G S, Prof. Shivaprasad Ashok Chikop & Prof. Sharanabasavaraj, Dayananda Sagar University School of Engineering, Bangalore, India
Rajlakshmi Ghatkamble, CMR University, Bangalore
Dr.Sunanda Dixit & Dr.MANOJ H M, BMS Institute of Technology and Management, Bangalore
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Veeranna Kotagi, East West College of Engineering, Bangalore

Intellectual Property India, Application Number: 202041056016; Application Type: Ordinary; Date of Publication: 01-01-2021

Abstract

Cricket is the game which is been widely loved by corers of Indians. According to the survey, 90% of Indians are fan's of cricket and cricketers. Many cricketers have got their own fan following clusters. During cricket match, when batsmen gets out because of the error in the decision taken by umpires, it will not only effect the result of the match but will also hurt the sentiment of the batsman and cricket fan's. During last world cup, nearly 26% of the no ball (Stepping over the line or with respect to batsmen height) and wide ball decision are given wrong due to the lack of accuracy in umpire's decisions and more often it is left unobserved by umpires. A no ball or a wide ball can change the result of a whole match. To overcome from this problem we have developed the ROBO UMPIRE which works on computer vision and IoT.

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DSUP-14

Animal Surveillance System Using Video Analytics

Dr Rajesh T M, Dr Shaila S G, Dr Mallanagouda Patil, Prof. Shivaprasad Ashok Chikop, Prof. Bindu Madavi K P, Prof. Nazmin Begum & Prof. Lavanya B Koppal, Dayananda Sagar University, Bangalore, India

Veeranna K, East West College of Engineering, Bangalore

Intellectual Property India, Application Number: 202141002027; Application Type: Ordinary; Date of Publication: 22-01-2021

Abstract

One of the key areas focused on by the agriculture, environment and Tourism ministries is the protection of our natural resources. Knowing the count of particular animal species we have and where they are found allows us to effectively manage and benefit the animal species. The main aim here is to sustainably manage wildlife. The ability to involuntarily and accurately gather camera trap image data, also a motion sensor is also present for collecting the movements of wildlife. Although, extracting data from these images remains a costly, sustained, physical task. It's noticeable that such information can be automatically extracted by using machine learning. A promising alternative is offered by computer vision, which typically provides a low cost and non-contact displacement measurement that converts the movement of an object, mostly an attached marker, in the captured images into structural displacement.

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DSUP-15

Big data Performance Enhancement using Machine Learning Spark-ML Pipeline Auto Parameter Tuning

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SARAVANA M K, Harish & Srindhi Kulkarni V, Jyothy Institute of Technology, Bangalore
Veeranna Kotagi, East West Collge of Engineering, Bangalore

Intellectual Property India, Application Number: 202041057025; Application Type: Ordinary; Date of Publication: 01-01-2021

Abstract

The Big data is not only complex, huge data also variety of data which is very difficult to analyze and process efficiently using traditional systems. To analyze and process big data efficiently, we have recently many frameworks like Hadoop, Spark, flink. Some of

the languages to process big data are java, Scala, Pig, NoSQL, mango DB Hive Habse. Spark is developed using scala, one of the languages which reduce the unnecessary code of Java for processing, Py-Spark is one of the python and spark frame work for processing big data efficiently using Python that is python with spark. Spark-R is also a language for processing big data it's a spark on top of R language. Here with spark mllib or SparkMl, mlflow pipelined Auto parameters tuning enhances the processing performance of big data.

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DSUP-16

Robo: Care Taker

Rajesh T M & Shaila S G, Dayananda Sagar University, Bangalore, India
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Sangeetha V, Karnataka, India
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Aditya Pai H, Karnatka, India
Santosh Kumar J, Ks School Of Engineering and Management, Bangalore
Krishna S. Gudi, Karnatka, India
Piyush Kumar Pareek, East West College of Engineering, Bangalore

Australian Government IP Australia, Patent Number: 2021100004; Application Type: Ordinary; Date of Publication: 18-03-2021

Abstract

In the present practice's parents are not able to give their valuable time for their babies. This research proposal, brings the intelligence Toy for babies. Toys have a very important role in society. Play is a vitally part of every child's life, providing not only entertainment but also influencing the psychological, and social development of a child. Throughout the years, toys have reflected every generation's advances in technology. In this proposal Internet of things, Sensing, facial & emotional analysis and behavioral analysis (Video Analytics) are used to expand the capabilities of existing toys to act as virtual parent. The Toy is equipped with the Intelligent Sensors, Cameras. The proposed framework is a first stage towards, protecting itself (Toy) from baby and side walls. The second stage is to analyze the mood of a baby by applying facial & emotional analysis and then it will take a decision to teach a baby with basic words and playing songs. The Third stage is to providing alarms to parent to check whether baby have harmful things in its hand with the help of behavioral analysis. The last stage is to detect the temperature, humidity and toxic smoke detection to keep the environment clean and friendly for a baby. The aim is to provide a toy which will take care, entertain, educate, protecting by alarming the parents in difficult situation of a baby.

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Funded Research Projects

SL. NO	Project Title	Funding Agency	Principal Investigators	Project Duration	Total (Estimated in lakhs)	Dept. / School
1	Telltale of Galactic Black hole X-ray binaries from AstroSat archival observations.	ISRO-SSPO	Dr. Radhika D.	2018-19 (3 years)	24.00	SOE-PHYSICS
2	Investigation of spectro-temporal variabilities of stellar mass Black Hole X-ray binaries using Astrostat.	ISRO-RESPOND	Dr. Radhika D.	2019 (3 Years)	20.82	
3	Investigations on reduced graphene oxide in the aspect of its possible application for the development of a radiation sensor.	SERB	Dr. Baishali Garai	2016-17 (3.5 Years)	35.98	
4	Design and development of a miniaturized low cost graphene based radiation detector for space applications	ISRO-RESPOND	Dr. Baishali Garai	2017-18 (3 Years)	18.94	
5	Development of a miniaturized low cost graphene doped Pd/Pdox /Sic Schottky diode gas sensor and their adaptability in Environmental control system (ECS) for Aero Space applications	DRDO-AR&DB	Dr. K. Vijaya Kumar	2021 (2 Years)	10.55	
6	Functionalized meso/microporous nanostructured metal oxides sendor for screening dispersed heavy metal ions: One-shot disposable sensor strips.	DST-SERB	Dr. Ashoka S	2017-18 (3 Years)	26.45	SOE-CHEMISTRY
7	Crystal Engineering Of Nutraceuticals As New Chemical Entities	DST-SERB	Dr.K.Anand solomon	2016-17 (3 Years)	30.98	

8	Design And Development Of Smart Robotic Based Magnetically Impelled Arc Butt Welding Equipment For Joining Ferrous And Non Ferrous Tubes	DST	S. Arungalai Vendan	2019 (3 Years)	47.88	SOE-ECE
9	Corrosion testing of fiber metal laminates using droplet cell microscopy	SERB (CRG grant)	Dr. Viswanathan R	2020 (3 Years)	20.46	SOE-MECHANICAL
10	Separation of Biobutanol via scalable approach of pervaporation: To be a "Viable Biofuel for Future"	Science and Engineering Research Board (SERB)	Dr. Santosh Choudhari/ Dr. Nataraj Sanna Kotrappanavar, Jain University	2018-19 (3 Years)	40.96	SBAS
11	Immobilized microbial consortium for pesticide bioremediation in ginger cultivated soils of Karnataka	Vision Group on Science and Technology - KFIST Level (1)	Dr. Shobha K. Jayanna	2017-18 (2 Years)	20.00	
12	Assessment of nutritional status of pulmonary TB patients who have received Nikshay Poshan Yojana scheme residing in Ramanagara district, India by using N-TB mobile application- A cross-sectional study	SAARC TB and HIV/AIDS Centre | STAC, NEPAL, Deputy Director-General, The Central TB Division, Ministry of Health & Family Welfare, Government of India	Dr. Santosh K Yatnatti	2021-2022	USD 1154 (INR 85384)	CDSIMER
	Total Funding : INR 297.87 Lakhs					

Consultancies & Trainings

Sl. No.	Name of the Faculty	Consultancy Awarded Agency	Type of work
1.	Dr.Sreenivasa Rao Amaraneni	Eureka Forbes Ltd/ Aqua diagnostics Ltd Bangalore	Consultancy on Copper Cartridge
2.	Dr.Sreenivasa Rao Amaraneni	Logic Water India	Electroanalyzer
3.	Dr.Rajagopal	Elcinotech Solutions Pvt Ltd	Design And Development Of High Speed Impeller For Centrifugal Pump (90011000 1001)
4.	DSU	Buhler India	Corporate Training Programme On 'Autocad'.

Summary of Publications, Sponsored Projects & Consultancies 2020-2021

Schools	School of Engineering	School of Basic & Applied Sciences	School of Allied Health Sciences	School of Medical Education & Research (CDSIMER)	School of Commerce & Management Studies	School of Arts, Desugn & Humanities	TOTAL
International Journal Publications	80	29	20	05	03	01	**138**
National Journal Publications	05			12			**17**
International Conferences	22						**22**
National Conferences	42						**42**
Book Chapter(s)	07	10	01				**18**
Patents	16						**16**
Total	**172**						**172**
Sponsored Projects	09 **ISRO:03** **DST:06**			01 **SAARC TB and HIV/AIDS Centre | STAC, NEPAL & MoHFW, GOI**		02 **SERB:1** **VGST:1**	**12**
Consultancies Trainings	02 02						**04**

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