46th (Inter) National Systems Conference on
Evolution of Homo Sapiens to Homo Spiritualis for Better Worldliness

NSC-2023

June 27-29, 2023

Dayalbagh Educational Institute

in collaboration with

Systems Society of India

Abstract Proceedings

Dayalbagh Educational Institute (Deemed to be University)
Dayalbagh, Agra - 282005, Uttar Pradesh, India
http://www.dei.ac.in

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Foreword

The Dayalbagh Educational Institute (DEI), in association with Systems Society of India (SSI), organised the 46th National Systems Conference (NSC-2023) on **Evolution of Homo Sapiens to Homo Spiritualis for Better Worldliness** from June 27th to June 29th, 2023 at Dayalbagh Educational Institute, Agra, INDIA along with the 5th International Conference Dayalbagh Science of Consciousness. The conference was held in hybrid mode with participants from different institutions within and outside the country.

A call for papers was sent out in February 2023, there were 140 papers submitted from different Institutions globally. After the review, 40 papers for the oral presentations and 59 papers for the poster presentations were selected out of which 46 posters were presented. The oral presentations were divided into 6 categories, namely, Consciousness based and Literary Systems, Engineering Systems, Agroecology-cum-Precision Farming Systems, Environmental Systems, Healthcare and Education Systems, and Information and Communication Systems. Majority of papers in oral and poster sessions were presented in person, some papers were presented in virtual mode either online or through a pre-recorded video followed by a live audio interaction with Q&A. The best paper award for each category of the oral presentations was adjudged by the two session chairs and for the poster session the best paper was selected by four session chairpersons.

As both the conferences, National Systems Conference (NSC) and Dayalbagh Science of Consciousness (DSC) are combined, giving opportunity to the participants of each conference to attend proceedings of both the conferences. Some sessions such as opening session, awards declaration, cultural program, panel discussion and closing session were combined with DSC. At the opening session on June 27, 2023, President SSI gave a welcome address with a brief account of the conference. The conference had three plenary talks by the internationally reputed systems scientists in different areas — Dr. Alfy Gathorne-Hardy, University of Edinburgh, UK, Prof. Rajeev Varshney, Murdoch University, Australia, and Prof. Dr. Nancy J. Cooke, Arizona State University, USA. The combined panel discussion was moderated by Mr. Gur Saroop Sood, President RS Sahba & President General Body DEI (Deemed to be University) with eminent panelists of both the conferences. An award ceremony was held for the SSI awards and the best papers awards on June 28, 2023. A short cultural program presented by the students of DEI, was held on June 29, 2023, the last day of the conference.

We are forever grateful to Most Revered Prof P S Satsangi Sahab for His continuous guidance and direction in all our endeavors.

Organizing Committee

NSC-2023

Program Schedule for Contributed Papers

DAY – 1 (Tuesday, 27 June 2023)

07:00 AM – 08:00 AM (IST)

Oral Presentations Session 1: **Consciousness-based and Literary Systems (6 Oral Presentations)**

Chairs: Prof. Sukhdev Roy, Prof. Vandana Sharma

08:00 AM – 09:00 AM (IST)
Oral Presentations Session 2: Agroecology-cum-Precision Farming Systems (6 Oral Presentations)
Chairs: Prof. GP Satsangi, Dr. Bhupinder Singh

09:00 AM – 10:00 AM (IST)
Oral Presentations Session 3: Engineering Systems (8 Oral Presentations)
Chairs: Prof. DK Chaturvedi, Prof. D Ganeshwar Rao

DAY – 2 (Wednesday, 28 June 2023)

07:00 AM – 08:00 AM (IST)
Oral Presentations Session 4: Environmental Systems (6 Oral Presentations)
Chairs: Prof. Rohit Srivastava, Prof. Shabad Preet

08:00 AM – 09:00 AM (IST)
Oral Presentations Session 5: Information and Communication Systems (6 Oral Presentations)
Chairs: Prof. Sandeep Paul, Prof. GS Sailesh Babu

09:00 AM – 10:00 AM (IST)
Oral Presentations Session 6: Healthcare and Education Systems (8 Oral Presentations)
Chairs: Dr. Anjoo Bhatnagar, Prof. Nandita Satsangee

07:00 AM – 10:00 AM (IST)
Poster Presentation Session (46 Posters)
Chairs: Prof. Pravin Saxena, Prof. K Santi Swarup, Prof. Kamal Srivastava, Prof. Rajeev Kumar Upadhyay

SESSION 4: ENVIRONMENT SYSTEMS

SESSION 5: HEALTHCARE AND EDUCATION SYSTEMS

SESSION 6: INFORMATION AND COMMUNICATION SYSTEMS

POSTER PRESENTATION

ORAL PRESENTATIONS

SESSION 1

CONSCIOUSNESS BASED AND LITERARY SYSTEMS

Better Worldliness: A Way of Lifelong Development from Maternity to Eternity

Ira Das
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Abstract

In Dayalbagh, India, a theory of Better Worldliness is given by Most Revered Prof. Prem Saran Satsangi, Chairman, Advisory Committee on Education Dayalbagh to describe a way of life which is best for development of human potential from birth till death. Those who lead this lifestyle achieve better worldliness, while doing their duties in this world but remaining detached to it at the same time. The stages of lifelong development is described under ten headings: (1) Marriage in Fields (2) Prenatal Development (3) Birth of Superman (Girl or Boy) (4) Upbringing of Superman in the Agricultural fields (5) Superman Phase II: Nursery and Primary school children (6) Secondary and Higher Secondary School Children (7) Job Oriented Higher Education, University Education and Vocational Training (8) Adulthood (9) Old Age (10) Eternity. The author has also mentioned the psychological influences of this evolutionary scheme by Most Revered Professor P.S. Satsangi, Chairman Advisory Committee on Education upon Physical, Cognitive and Spiritual Development of Superman (a race on planet Earth, who will serve humanity).

The Pursuit of Completeness in Girish Karnad's Hayavadana

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Abstract

Evolution, whether zoological or spiritual, is the basic requisite for making our existence more and more meaningful. The yearning for attaining perfection with a Sense of Completeness has always provided the needed impetus for this process. However, there are immense delusions regarding the notion of becoming a 'Complete Man.' Girish Karnad's play Hayavadana offers a distinct perspective regarding this. Search for identity, characteristics of true love, and the idea of a perfect man are only some of the issues addressed in the drama. The main plot of the play is based on the story "The Transposed Heads," which originated as a Folk Tale in ancient India and was later elaborated by Thomas Mann in his novella of the same name. Devadatta and Kapila, the two closest friends, both fall in love with Padmini. However, Padmini is torn between the two, as Devadatta possesses a brilliant mind but is physically unattractive, while Kapila is physically strong but not as intelligent as Devadatta. The complexity in the play heightens when accidentally the heads of the two friends get transposed and they are given back life by the divine intervention of Goddess Kali. The current study focuses on one of the central themes of the efforts of the protagonists to attain perfection or completeness. The play teaches us that true completeness can only be achieved by overcoming our feelings of imperfection, embracing our unique qualities, and attempting to attain a bigger purpose in life by rising above our mundane realities. Then only we can truly attain 'Better Worldliness.'

Keywords: Hayavadana, Girish Karnad, Completeness, Transposed, Better Worldliness

Systems Theory and Literature: Application of Interpretive Structural Modeling to Badal Sircar's Bhoma

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Abstract

Systems Theory studies the structure and fundamentals in terms of relationship and integration, through which different aspects and elements emerge leading to the creation of a whole. It is an approach of totality and wholeness which focuses on the relationship and correspondence between the constituent parts of a system. A distinctive feature of the Systems Theory is that it develops across numerous disciplines leading to the attainment of knowledge and perspectives related to the other domains or disciplines. Its concepts are not rigid but flexible in nature because of which it keeps on evolving. It is the Systems Theory that bridges the gap between science and humanities, leading to the elimination of age-old differences and gaps between literature and science. This elimination leads to the evolvement of a new and innovative relation and connection between the two extremely different disciplines i.e., science and humanities. The Interpretive Structural Modeling (ISM) approach is one of the approaches incorporated under the Systems Theory. It focuses on discovering the relationships among the elements, which tend to focus on a specific issue or a problem. ISM is used, when we encounter systems with complex structures and in literature, we quite often come across structurally complex texts. This paper aims at applying the principles of the Interpretive Structural Modeling (ISM) approach to the complex literary system; the dramatic system, Bhoma, in order to resolve its structural complexity. This study aims to analyze and make an interdisciplinary study by incorporating the key elements of the Interpretive Structural Modeling (ISM) approach in literary interpretation.

Keywords: elements, integration, totality, wholeness, complexity

Environmental Awareness, Psychological Wellbeing and Spiritual Values: A Correlational Study

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Abstract

The present investigation attempts to study the relationship between environmental awareness, psychological wellbeing and spiritual values. The sample consisted of 108 undergraduate students from DEI. The tools used in research were 'Environment Awareness Ability Measure' by Jha (2010), 'Psychological Well-Being Scale' by Sisodia and Chaudhary (2012), and 'Spiritual Values Scale' by Nazam, Hussain and Khan (2015), Regression analysis was applied to compute the data. The results indicate that there is a positive relationship between environmental awareness and spiritual values ($r = 0.542$, $p < 0.01$). While positive but low relationship between psychological wellbeing and spiritual values ($r = .005$, $p > 0.05$) was found. Environmental awareness and psychological wellbeing had a significant contribution in the determination of spiritual values ($F = 22.585$, $p < 0.01$).

Environmental awareness is the buzz word which means being conscious of the natural environment and taking initiatives that would protect our mother earth. The call of the day is to know, identify, and familiarize for the conservation, protection, and preservation of the natural environment. DEI focuses on imparting education to the last, the least, the lowest and the lost to raise the level of consciousness of DEI's students creating a breed of superhumans with the ideal of 'Fatherhood of God and Brotherhood of Man' who would be motivated to serve humanity through body, mind and spirit and follow 'Better Worldliness'. The research has its implication in fostering the environmental awareness, psychological wellbeing and spiritual values in the present youth to make this world a better place to live and also crafting a shift from homo sapiens to homo spiritualis.

Keywords: Environmental Awareness, Psychological Wellbeing, Spiritual Values

Human to Superhuman - Evolutionary Early Childhood Development at Dayalbagh Agroecology Fields

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Abstract

India Introduction Early childhood development which starts from conception to eight years of age, of which the first 1000 days are the most critical, because at this impressionable age experiences have lasting signatures on genes with long term implications on society and human capital. Therefore, Early Childhood Development has been placed at the center of the SDG 2030. Goal number 4.2 says All girls and boys have access to quality Early Childhood Development care and Pre Primary education. Unfortunately, COVID 19 pandemic resulted in largest disruption in learning history and devastating consequences for children's wellbeing according to UNICEF data. Awareness and ECD action campaigns are facing difficulty in implementation. In this context, The Sant Su (perman) Evolutionary Scheme of Dayalbagh shows promising outcomes. This Bio-Socio-Cognitive Evolutionary Scheme, rooted in Pure thought and natural surroundings was Graciously launched in January 2017 by Most Revered Prof. Dr Prem Saran Satsangi Sahab. Infants and children as young as 3 weeks to 8 years are enrolled to follow the holistic routine of Dayalbagh and spend 6-8 hours daily at the agricultural fields where they learn and educate themselves by doing, by observing, by exploring and interacting with peers and nature. Present study includes globally registered children in the Scheme along with those participating in virtual mode on E cascade network who visited Dayalbagh in 2021. We used CREDI developed at Harvard for 0-3 years to measure Early childhood. The Superman Scheme children are way ahead on the Early Childhood Development Index. Besides covering all Nurturing Care domains Children at Dayalbagh Agroecology fields, learn different languages specially Sanskrit, self defense exercises, yoga, they inculcate good habits like early rising, less screen time, healthy diet and above all imbibing values and qualities through Intuitive Mentorship.

Analyzing Frequency-Specific Connectivity and Small-World Network Topology During Ultra-Transcendental Meditation: An MEG Study

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Abstract

Graph theory provides a mathematical framework for studying the brain structure and function at different scales, and the WattsStrogatz model suggests that small-world networks with high efficiency for information transmission. Thus, we aimed to investigate the neural mechanisms of ultra-transcendental meditation using graph-theoretic measures. The study involved three groups of participants: advanced meditators (AM), beginner meditators (BM) and control meditators (CM). The participants meditated for ten minutes while brain activity was recorded using MEG imaging. In our previous research we found meditational states to be associated with shift in dominant frequency ($fstart < fmid < fend$) with frequency band-specific hotspots (like hubs of rich- club) organized in an anatomical hierarchy (frontal to parietal). Therefore, to measure connectivity using coherence, we considered the band-specific source localizations along with hotspots as ROI or nodes along with default mode network (DMN), frontoparietal network (FPN), attentional network (AN) and rich-club regions and measured small-worldness. Results showed that meditation may positively impact the small-worldness of brain networks. Specifically, the CM group demonstrated increased small-worldness at theta frequencies within the FPN and DMN & FPN & hotspots networks, suggests experience of increased cognitive control and attentional processes. In contrast, the BM group showed decreased small-worldness at gamma frequencies and increased small-worldness at theta, alpha, and beta frequencies within the FPN network, suggests that BM may experience increased emotional regulation and attentional processes. Finally, the AM group exhibited increased small-worldness at beta frequencies within the DMN network, indicate a heightened sense of self-awareness and emotional regulation during meditation. Overall, study showed the impact on network topology at different stages of uTM practice.

Keyword: Small-world propensity, graph theory, ultra-transcendental meditation, coherence

ORAL PRESENTATIONS

SESSION 2

AGROECOLOGY-CUM-PRECISION FARMING SYSTEMS

FISM-FMICMAC Based Study on the Interactions of Technology Adoption Challenges in Dairy Farming

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Abstract

According to findings from international researches, agribusinesses can improve performance and operational efficiency by adopting technology. India is the largest producer and consumer of milk in the world, but it has issues with per-herd yield, low rates of technology acceptance and adoption, a lackluster health detection system, general farm management, and the accessibility of dairy products on the global market. In India, dairy is a significant part of agriculture, and milk is a basic necessity that provides income to rural and small-town households. The purpose of this paper was to identify and investigate the relationships between the challenges in adoption of technology faced by dairy farms using FISM-FMICMAC techniques of systems approach. Among the 12 identified challenges, Lack of government support followed by lack of educational opportunities in dairy-based education; were found as the most crucial and high driving challenges whereas high cost, huge investment and low acceptance of decision maker were found as the most dependent challenges of technology adoption.

Keywords: Dairy farming, dairy business, technology adoption, Nominal group technique (NGT), Fuzzy interpretive structural modeling (FISM), FMICMAC

Enrichment of Panchagavya Based Organic Liquid Fertilizers and Its Evaluation Through Field Trials

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Abstract

Due to progressive increase of organic waste all over the world, it is needed to develop techniques to reuse these materials. Organic fertilizers are produced from organic wastes and agricultural residues. Liquid organic fertilizers can replace chemical fertilizers which are used excessively nowadays. In Organic farming, these fertilizers are only source of nutrients for the soil. By usage of organic fertilizer we can enhance agro ecosystem, soil biological activities and biological cycles. Panchagavya is a liquid organic fertilizer which is made from cow by-products as cow dung, cow urine, cow ghee, cow curd and cow milk; and some other ingredients. These ingredients in combine also works as insecticides. Panchagavya has micro and macro nutrients as N, P and K. Panchagavya also have vitamin, growth regulators, microorganisms. Physio-chemical properties of Panchagavya says that it contains all the major nutrients as N, P and K but they are in very small portion: Nitrogen = 1.5%, Phosphorus = 0.08% and Potassium = 0.5%. It shows that some nutrient enhancement can be done in Panchagavya. This study was done on the enhancement of nutrients in Panchagavya by adding some additional organic ingredients. Panchagavya gives better growth to plants as it has growth enzymes and microorganisms to rapid cell division and boost the plant growth. The field experiment was conducted at DEI field on the garlic crop in Rabi season of 2022- 23 to study the growth and development in the crop. To evaluate the growth enhancement, foliar spray was done to garlic crop field for samples @3%, 6% and 9% of Panchagavya (P), Panchagavya + Neem(PN), Panchagavya + Ripened Banana(PB) and Panchagavya + Aloe Vera(PA) ; each sample have 2 replications.

Keywords: Organic waste, organic farming, micronutrients, micro-organisms, biological activities, panchagavya, growth enhancement, garlic

Fortification of Cattle Milk Using Juice and Dried Powder of Beetroot (Beta Vulgaris L.)

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Abstract

The technology was developed to standardize the process of beetroot flavored milk by using beetroot powder and beetroot juice incorporated in mixed (cow and buffalo) milk. Powder of beetroot was prepared manually using tray drying. Experimental samples were analyzed for sensory, physico-chemical and microbiological qualities. The flavored milk samples were stored at refrigerated temperature (4±1°C) before analysis. Excellent quality of flavored milk was prepared with cattle milk (93%) in combination with sugar (3%) and beetroot powder (4%) without using any stabilizer. Sensory evaluation of the standardized product observed good score for colour and appearance (8.70±0.16) and flavour (8.70±0.16) using a 9-point Hedonic scale. Optimized product contained 1.51±0.00% fat, 3.37±0.04% protein, 4.32±0.07% lactose, 88.1±50.9% moisture, 0.81±0.46% ash. Microbial load of the developed product was also found suitable for consumption.

Keywords: Beetroot powder, juice, flavored milk, quality attributes

Permaculture: Transformation of Barren Land into Food Park (Khasra-359) Dayalbagh, Agra

Jeetendra Singh, S.K. Soni, Preksha Shrivastav and Rachna Shrivastav
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Abstract

A green oasis emerges after a period of four years of rigorous work at khasra-359 during the Pandemic by the collective efforts of students and staff of Dayalbagh Educational Institute, Agra district, Uttar Pradesh. As you keep going via the entrance road of Maharaja Agrasen Road, you will see flower wall of distinct colors, Timbers, vegetables at a common space in a Biodiversity Park. You feel like an explorer when you discover two giant sized polyhouses, aromatic garden and a fruit orchard with Mangoes, Phalsa, Citrus, Anjir, Pomegranate, Apple, Banana, Guava, Papaya, Mulberry, Jamun and Chikus two years ago, this was a barren land, but today the 8.6 acres of land is a flourishing farm and a venue of different academic activities of the Dayalbagh Educational Institute. Our primary aim was to create a sustainable agriculture system of harmonious integration to feed the community with quality produce.

Keywords: Permaculture, Ecosystem, Agriculture, Sustainable development, Agroecology

Botanical Diversity Park REI (Dayalbagh): An Initiative Towards the Biodiversity Conservation

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Abstract

Ecosystems are being destroyed by human activities on a global scale, endangering both biodiversity and humanity. It will take significant and widespread environmental changes on the part of humans to slow and reverse this decline. Therefore, environmental scientists are well-positioned to provide intellectual leadership in this field. This perspective seeks to significantly improve the volume and scope of environmental research that addresses this topic. Keeping in mind the importance and usage of such ecosystems, a biodiversity park has been established at Dayalbagh on approximately 12 Acre land. Some ecologically and medicinally important plants have been grown here and described with their Vernacular name, Scientific name, Family, Medicinal properties and importance.

Keywords: Biodiversity, Ecosystem, Garden, Plantations

Smart Crop Health Monitoring System: An AI-Powered Approach to Enhance Agricultural Productivity and Sustainability

Rohit Singh, Rishabh Kumar, Shikhar Pathak, Satyam Sharma and Priya Asthana
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Abstract

Agriculture's productivity and sustainability heavily depend on crops' health. However, monitoring the health of crops can be a daunting task for farmers, as it requires continuous surveillance of crops and interpretation of data. In recent years, advances in technology have led to the development of smart crop health monitoring systems that leverage the power of Artificial Intelligence (AI) to automate the process of monitoring and analyzing crop health data. This paper presents an overview of a smart crop health monitoring system that uses AI algorithms to analyze the collected data and identify any anomalies or diseases affecting the crops. The proposed system can alert farmers in real-time about any crop health issues and provide them with actionable insights to take preventive measures. Additionally, the system can generate crop health reports to help farmers make informed decisions regarding crop management practices, such as irrigation, fertilization, and pesticide application.

Keywords: crop health, Android Application, Machine learning, Rover, Disease detection

ORAL PRESENTATIONS
SESSION 3
ENGINEERING SYSTEMS

Magnesium Ferrite ($MgFe_2O_4$) Thin Films for Photoelectrochemical Water Splitting: Effects of Film Thickness and Annealing Temperature

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Abstract

Photoelectrochemical (PEC) water splitting is fast-growing technology, set to play dominant role in future large-scale production of renewable hydrogen using vast potential of solar energy. MgFe2O4 meets many required material characteristics for efficient water splitting, viz. suitable band edge position, moderate band gap (2.0 eV) and resistance to photo-corrosion. This study reports the synthesis of spinel $MgFe_2O_4$ thin film on conductive ITO substrate by spray pyrolysis, to investigate the effect of sintering temperature and film thickness. The growth of cubic phase $MgFe_2O_4$ was confirmed through X-ray diffractometry, while UV–visible spectrometry indicated threshold wavelength of light absorption falling in the visible range. Thin film samples annealed at 600 °C yielded highest photocurrent density of 2.68 mA/cm^2 at 1 V vs. SCE. Further, films grown through four successive layer deposition yielded best photoresponse.

Keywords: Layer optimization, sintering temperature, spinel, spray pyrolysis method

Study on Parametric Effect of Low-Cost Extrusion Additive Manufacturing Technology (EAMT) on Properties of Domestic Parts

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Abstract

The objective of this study is to investigate exhaustively the effect of various process parameters, corresponding to distinct climatic conditions, on the mechanical properties of parts manufactured by extrusion additive manufacturing (EAM) for residential applications. Taguchi methodology was utilized to design the experiments, and polylactic acid (PLA) thermoplastic material was used to create the specimens. The processing parameters considered in the study were extrusion temperature (ETP), infill pattern (IPT), infill percentage (IPR), and weather conditions (WC). The findings revealed that environmental conditions, extrusion temperature, and infill parameters are the most significant factors for achieving desired part properties when using open-source AM technology. Bonding between layers is a crucial factor affecting the robustness of FDM elements. Honeycomb pattern and higher extrusion temperature resulted in fewer voids and flows, leading to better strength. Conversely, more voids and flows resulted in reduced strength and modulus. In summary, this study demonstrates that with proper parametric settings, the available equipment can be utilized for targeted applications.

Keywords: Additive Manufacturing Technology (AMT), Process Parameters, Weather Conditions (WC), Mechanical Strengths

Structural Behaviour of Carbon Fibre Reinforced Poly-Ethylene Terephthalate Glycol by Fused Filament Fabrication

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Abstract

Numerous aspects affecting fused filament fabrication have an influence on structural behaviour and become a key factor if such components are designed for industrial use. This work focuses on poly-ethylene terephthalate glycol (PETG) specimens reinforced with carbon fibres (CFs), while also considering how nozzle hole diameter (NHD) and internal filling pattern (IFP) affect structural behaviour, notably flexural strength, compressive strength, and impact strength. High-modulus CFs' reinforcement contributes to the improved structural behaviour of PETG composites. Experimental analysis was used to assess the structural behaviour of CF-PETG specimens. Using statistical analysis on the information acquired from the structural behaviour testing of the specimens, the validity of the experimental investigation was valued. The sample's fracture mechanism was studied using high end microscopy. The composites' strengths enhanced from 35.305MPa to 48.964MPa for compressive strength, 45.758MPa to 65.117MPa for flexural strength, and 23.75kJ/m^2 to 36.54kJ/m^2 for impact strength. Structural behaviour was mostly influenced by NHD and trailed by IFP. The additional structural support provided by CF's rigidity makes it the ideal material for frames, supports, shells, propellers, and tools.

Keywords: structural behaviour, fused filament fabrication, carbon fibre, poly-ethylene terephthalate glycol, nozzle hole diameter, internal filling pattern

Towards Automating Commentary Generation in a Cricket Match Using Video Analysis

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Abstract

Cricket is the second most popular game in the world and this paper aims to automate the process of generating text-based commentary in live cricket matches using video analysis. For improving the amount of detail in the generated text-based commentary to enable the reader to visualize the sequence of events that occur during each delivery as good as observing the match, we propose a solution that successfully detects multiple critical events in a single delivery, such as ball release, bounce point, ball contact by the batsman, and the direction of the ball following the hit. To achieve this, we apply various deep learning and computer vision techniques, including object detection, image classification, transfer learning, and optical flow. Our solution leverages neural network architectures such as Convolutional Neural Networks (CNN), and You-Only-Look-Once (YOLO) to train multiple deep learning models, including ball detector, batsman detector, bowler detector, batsman orientation classifier, hit detector, and scene detector. Our models are trained on a custom dataset, resulting in accurate and efficient event detection during live cricket matches.

Keywords: cricket, live matches, commentary generation, event detection, object detection, transfer learning, YOLO, CNN, image classification, video analysis

Compressive Strength Analysis of Cement Stabilized Rammed Earth Block Reinforced with Jute Fibers

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Nitin Chaudhary, Randeep, Balvinder
Dayalbagh Educational Institute

Abstract

This research work aims to investigate the effect of cement and jute fibers on the locally available soil and to obtain the influence of cement as a stabilizer and jute as a reinforcing material on soil plasticity and strength. Modern rammed earth is generally stabilized with small quantities of Portland cement to improve its strength and durability. However, we have also used jute fibers. The suitability of soil for REB is selected based on preliminary investigation in the geotechnical laboratory such as sieve analysis, Atterberg limit & OMC & MDD as per IS code. UCS & Compressive strength testing is performed to check strength criteria for REB as per IS specification. An Ultra-sonic pulse velocity test is performed to check the proper compaction & homogeneity of REB. This work presents experimental results illustrating the performance of cement content and extent of jute fibers that maximizes the unconfined compressive strength and compaction parameters of an engineered cement-stabilized rammed earth reinforced with jute fibers. 10% cement content gives a significant improvement in UCS and compressive strength. The jute percentage varies from 0.5 to 1% in different combinations which gives marginal improvement in UCS but not in compressive strength. An Ultra-sonic pulse velocity test result also shows good compaction characteristics.

Keywords: Rammed Earth Block (REB), Atterberg Limits, Optimum Moisture Content (OMC), Maximum Dry Density (MDD), Unconfined Compressive Strength (UCS), Compressive Strength, Ultrasonic pulse velocity (USPV)

A Comparative Analysis of GA and PBIL for Solving the TSP

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Abstract

The traveling salesman problem (TSP) is a wellknown combinatorial optimization problem that has been extensively studied in the literature. In this research report, we compare the performance of two widely used optimization algorithms, Genetic Algorithm (GA) and Population-Based Incremental Learning (PBIL), in solving TSP. Our main goal is to find out which algorithm is best suited to find the optimal TSP solution. To assess the performance of GA and PBIL, we benchmark against several reference TSP instances, including symmetric and asymmetric instance s. We evaluate algorithms based on the quality of the generated solutions, the number of function evaluations required, and the computing time. In addition, we perform statistical tests to determine the statistical significance of observed performance differences. Our experimental results show that GA and PBIL are efficient algorithms for solving TSP cases. However, PBIL generally outperforms GA in solution quality, especially in asymmetric cases. On the other hand, GA requires fewer function evaluations and less computing time than PBIL.

Keywords: Travelling Salesman Problem (TSP), Genetic Algorithm (GA), Population-Based Incremental Learning (PBIL), Optimization, Symmetric TSP, Asymmetric TSP, Comparative Analysis, Solution Quality, Function Evaluations, Computational Time

Applying Systems Approach to Engineering Pedagogy for A Sustainable Future

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Abstract

The goal of engineering education should be focused around imparting a solid knowledge foundation, inculcating understanding, developing skills to apply theoretical knowledge to practical use, researching and then procreating something useful to mankind. The current curriculum design has created a gap between textual knowledge and real-world practical demands due to a fragmented learning approach. The application of systems approach helps in visualizing engineering as a horizontal part/sub-system of a whole/super-system of holistic education as well as an interconnectedness of multidisciplinary systems based on a "Many to Many" relationship. It also models the engineering system as an individual vertical sub-system composed of the further subsystems of pedagogy, instructor, and learner. The aim of the proposed system model is to create a flexible education structure to induce an ability to create better awareness and understanding of real-life problems, skills to solve them based on critical thinking and analytical abilities using multiple horizontal subsystems leading to a meaningful and sustainable technological growth in the future. In order to attain this objective of the proposed model, modifications are required in each sub-system, such as in the engineering pedagogy, with a broad stable theoretical base with research and design contribution aspects at the apex, based on blooms taxonomy.

Keywords: Engineering education, Theoretical knowledge, Curriculum Design, Many to Many, Systems Approach

Circumventing the Health Hazards of Whole-Body Vibrations via a Vehicle Speed Advisory System

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Abstract

Chronic exposure to large Whole-Body Vibrations (WBV) is detrimental to human health. There is strong epidemiological evidence linking prolonged and intense WBV exposure to musculoskeletal disorders such as lower back pain, sciatica, intervertebral disc disorders, fatigue, and reduced alertness. Evidence also associates WBV with gastrointestinal disorders. These are attributed to the inability of existing vehicle suspensions to attenuate vibrations adequately on all road profiles. The primary objectives of the suspension system are road handling and ride comfort. In this work, a 3-DOF (Degrees of Freedom) road-vehicle-human system is formulated based on the parameters of the 'golden car' used in the International Roughness Index (IRI). The parameters of this car are used in the evaluation of road profiles. Various velocity vectors and road classes (A to E) defined in ISO 8608 are used as inputs. Threshold values of the objectives form the basis of the speed advisory. Existing literature on Intelligent transportation systems and speed management indicates limited guidance on speed advisory strategy to mitigate the WBV health hazards. In this paper, Vehicle Speed Advisory System (VSAS) is proposed by developing a methodology for modelling the system, analyzing the suspension system objectives at different speeds and on major road classes A to E and rendering guidance to the drivers. This methodology is applied to the parameters of 'golden car' which is used in the evaluation of road profiles as per the International Roughness Index. VSAS framework can be adopted by existing vehicle users to reduce human health hazards. This is the main contribution of this paper.

Keywords: Whole-Body Vibrations, Passive suspension system, Vehicle speed advisory

ORAL PRESENTATIONS
SESSION 4
ENVIRONMENT SYSTEMS

Changes in Temporal Distribution of Rainfall using Precipitation Concentration Index in a Watershed of Mahanadi River Basin

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Abstract

Changes in rainfall pattern in Rampur watershed of Mahanadi river basin over 1983-2015 period was investigated using Precipitation Concentration Index (PCI) approach. PCI classification was characterized on uniform, moderate, irregular and strongly-irregular basis for annual and seasonal time-scale for 9sub-watersheds (SWS). Statistical methods like Mann-Kendall (MK) and Modified Mann-Kendall (MMK) tests were applied with 95% significance level over whole period to determine PCI trends. Magnitude of entire time-series was assessed by Sen Slope estimator (SSE). Arc-Map10.1 was used to determine spatial patterns of PCI trends over whole watershed by applying IDW interpolation technique. Results obtained from 9SWS showed strongly-irregular PCI classification for most of years in annual time-scale; whereas in seasonal time-series, PCI values was increasing and decreasing. Similar PCI trend for all 9SWS was observed for monsoon, post-monsoon and winter seasons in both MK and MMK. SSE for monsoon and winter season gave all positive values for all SWS while post-monsoon season showed no trend. Highest value of coefficient of variation (CV) was detected in winter season and lowest was detected in monsoon season.

Keywords: Precipitation changes, Precipitation Concentration Index (PCI), Trend Analysis, coefficient of variation (CV)

Atmospheric Effects on the Cosmic Ray Detectors at DEASA

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Abstract

Abstract Investigations of the physical behaviour of the cosmic ray variations in various time scales are an important aspect in cosmic ray astronomy. In other words, the modulation of cosmic rays is an important tool for investigating disturbed behaviour in the heliosphere. Longer time scales are related to solar activities of the solar cycle, while shorter time variations can be associated with Earth's atmospheric phenomena.

In this paper, the atmospheric temperature and pressure effect on count rates of DEASA detectors for 7 hours daily spanning 170 days from January to June 2022. These detectors have been calibrated since January 2022 and are located at Agra, India (27.18O N, 78.02O E, 170 m above sea level) where the geomagnetic rigidity cut-off value is 22 GV. The barometric coefficient obtained from the graph of atmospheric pressure vs count rates is -1.14 /mbar and the temperature coefficient is 0.4/ OC. The skewness and kurtosis for pressure distribution were -0.91 and -0.18, for temperature distribution were 0.40 and -1.05, and for count rates were -1.22 and 1.23.

Further, linear regression analysis has been performed, and a scatter plot between relative intensity vs time, relative pressure vs time, and relative temperature vs time. Added graphs between the relative intensity of cosmic ray flux and pressure and temperature respectively are shown and coefficients are compared with other experiments.

Keywords: Atmospheric studies, air shower mini array

The Impact of Biomass Burning on the Oxidative Potential of $PM_{2.5}$ at Dayalbagh Agra

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Abstract

Biomass burning (BB) emissions are the major contributor to the gradually deteriorating air quality. Thus, the objective of the present study is to investigate the impact of biomass burning during both the haze and non-haze periods in the winter season. The meteorological parameters like relative humidity (RH), temperature (T), solar radiation (SR) and wind speed (WS) were studied to determine the effect of long-range transported biomass burning aerosols during the study period. Furthermore, the satellite retrievals for the estimation of the burning period were also taken. The $PM_{2.5}$ samples were collected on quartz filters during the winter (1^{st} January to 30^{th} January, 2019 and 5^{th} November to 31^{st} December, 2019) season at a suburban site of Agra. The elemental composition of $PM_{2.5}$ samples was analyzed using ICP-OES, and the associated oxidative potential was assessed through the dithiothreitol (DTT) assay. Total $PM_{2.5}$ mass concentration was found higher in haze period (236.6 ± 19.9 μgm^{-3}) than non-haze period (137.1 ± 45.7 μgm^{-3}). Among the metals, K was recorded as the leading trace metal in $PM_{2.5}$ during the study period as it is an important marker of biomass-burning activities. The linear correlation analysis reveals a strong correlation between metals such as Cr (0.6), Cd (0.5), and Ni (0.5) and the DTT activity of $PM_{2.5}$, indicating risk to the human respiratory tract as a result of their contribution to the increased toxicity of $PM_{2.5}$ during the study period. Thus, it is necessary to implement effective mitigation policies to reduce these emissions.

Keywords: Biomass Burning, Haze Period, Oxidative Potential, Trace Metal

Health Risk Assessment of Volatile Organic Compounds from Rural Kitchens

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Abstract

Volatile organic compounds (VOCs) are hazardous pollutants released from various anthropogenic and natural sources that affect human health and play an important role in photochemical ozone (O_3) formation. The present study mainly focusses on the health risk assessment of BTEX at a rural site of Agra during the study period, January to February 2020. Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) samples were collected over activated charcoal tubes and analysed using Gas Chromatograph coupled with mass spectrometer and flame ionization detector (GC-MS/FID). BTEX concentrations ranged from 30.1 to 98.2 µg/m^3 with an average concentration of 69.1 ± 26.5 µg/m^3. Toluene was the most abundant species during sampling period with average concentration 23.0 ± 9.5 µg/m^3. The lifetime cancer risks for benzene were higher 8.6×10^{-6} for adults in rural site which was more than the acceptable value 1×10^{-6}. The hazard quotient was in the acceptable limit (HQ < 1).

Keywords: Health Risk Assessment, Interspecies Ratio, Rural Kitchens, Volatile Organic Compounds

Garbage Disposal Detection from Mobile Vehicles

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Abstract

Illegal disposal of waste materials is a significant contributor to the spread of diseases, as well as environmental pollution and resource waste. As a result, the development of waste prevention strategies and models is a crucial research area. This exhibit focuses on detecting roadside waste in real-time by passengers in mobile vehicles. The proposed model involves three primary steps: vehicle detection, frame extraction and analysis, and garbage detection. The first step involves using the Haar cascade classifier method to detect the target vehicle's frame. Next, the background subtraction method and frame differentiation are used to detect foreign particle movement originating from the vehicle. Finally, debris is detected by analysing the nature of the foreign particle curve obtained from processing successive images of the target vehicle. The test results indicate that if a parabolic or linear curve is observed in motion in the vicinity of the detected vehicle, this is considered debris-induced motion. The results show a very high recognition rate.

ORAL PRESENTATIONS

SESSION 5

HEALTHCARE AND EDUCATION SYSTEMS

Reinforcement Effects on the Flexural Behaviour of Polymer Composite

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Abstract

The loss of a lower limb exacerbates immobility. Efforts have been made to prepare for such calamities regardless of time or location. Prosthetic feet are medical equipment that helps amputees regain mobility and independence by acting as a substitute for a lost limb. Producing foot prostheses for end-users has become difficult because of the diverse printing settings, materials, and post-processing techniques. The flexural behaviour of PLA-CF fabricated via FFF is examined, along with the effects of control factors like NHD (0.20mm, 0.40mm, and 0.60mm) and IFP (RLR, honeycomb, and Triangle). Flexural tests, as well as failure morphology, were performed on build samples. Taguchi ANOVA was used to analyse flexural test data to learn how flexural behaviour varies with the stated control factors. Based on the research results, a prosthetic foot is created utilizing FFF to reduce costs.

Keywords: Fused Filament Fabrication; Taguchi; PLA; Compressive Strength; Flexural Strength

Working Memory and Mathematical Abstraction Ability of Middle School Students

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Abstract

Mathematical modelling based on abstraction is a widely used tool in major scientific research, inventions and applications. Numerous studies have found working memory to be important in many areas of academics, and extensive research has connected working memory to performance, specifically in mathematics. This led us to believe that working memory may play a crucial part in determining the mathematical abstraction abilities of school children. The present study examined the relationship between working memory capacity and mathematical abstraction ability of middle schoolers. A test for mathematical abstraction ability and a performance task for working memory capacity were administered on a sample of 218 students of middle school. The results indicate significant correlation between the working memory and mathematical abstraction ability indicating the interventions targeted at improving working memory can have transfer effects on mathematical abstraction ability.

Keywords: Working memory, mathematical abstraction ability, middle school students

Novel Method for Large Volume Suppression and Synchronized Excitation of Human Heart with Light

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Abstract

High-fidelity excitation and large volume suppression of heart tissue is a major challenge in cardiac optogenetics. Although newly discovered powerful opsins that include ChRmine, a marine opsin gene from Tiarina fusus have significantly improved the excitable tissue volume, it is important to study the effect of lower irradiances in deeper areas. In the present study, a novel method of gradient opsinexpression has been reported for enhanced volume suppression and synchronized excitation in ChRmineexpressing human ventricular cardiomyocytes. Theoretical simulations have shown that light attenuation in cardiac tissue results in desynchrony due to change in action potential latency under pulsed illumination in opsin-expressing cardiomyocytes. On suppressing the activity using sustained illumination, lower irradiances in deeper areas cause unwanted excitation. It is shown that gradient opsinexpression in different layers of cardiac tissue significantly enhance the targeted tissue volume. It also results in synchronized excitation and eliminates unwanted excitation in deeper regions. This novel method would be very useful for effective treatment of cardioversion and tachycardia, and for extending the scale of cardiac optogenetics.

Keywords: Cardiac optogenetics, Cardiomyocytes, ChRmine, Excitation, Suppression

Anthropometric Study of Different Diet Consuming Population

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Abstract

Anthropometric profile and food intake behaviour plays an important role in monitoring health conditions and nutritional status of diet consuming population. The aim of the study was to find out the anthropometric measurements of people consuming vegan, lacto-vegetarian and non-vegetarian/ Omnivorous diet. Impact of different diet consuming population was calculated on health aspects in terms of BMI. Hence, in this regard a survey was conducted of total 139 respondents to calculate BMI of lacto vegetarian, vegetarian and non-vegetarian groups of categories. The survey reflected BMI rate of lacto-vegetarian was better (75%) than other diet consuming population also shows that vegan diet is more prone to have underweight issues in females (41.7%). The study also depicts that male group of non-vegetarian / omnivorous categories are higher risk of obesity and overweight issues, therefore suggesting them to consume plant-based diet with dairy food as dietary intake in order to maintain normal BMI.

Keywords: Lacto-vegetarian, Vegan, Omnivorous, BMI

Nutrition as a Key Component in Enhancing Cognitive Ability

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Abstract

Cognitive ability can be affected by elements of the diet. Lower GI meals seem to enhance concentration, memory and operational capacity, while others rich in simple sugars are associated with hardship in attention and awareness. Our brain needs a constant pool of amino acids for the synthesis of neurotransmitters, particularly serotonin and catecholamines. Inferior grades of serotonin are correlated to reduced understanding, logic and memory. The quality and type of dietary fat can also affect intellectual and mental capacity. High saturated fat consumption is related to cognitive degeneration while the consumption of polyunsaturated fatty acids (docosahexaenoic acid) has advantageous effects in their deterence. It is advocated to ingest diets with a fair ratio (5:1) of omega-6: 3 fatty acids (Mediterranean and Vegetarian diet) since they are associated with better memory span and descending risk of cognitive deterioration. Vitamins B1, B6, B12, B9 (folic acid) and D, choline, iron and iodine ply neuroprotective effects and enhance academic version. In resemblance, antioxidants (vitamins C, E, A, zinc, selenium, lutein and zeaxanthin) have a very important role in the protection against oxidative stress associated with mental deterioration and in the advancement of cognition. Presently, there is a high consumption of diets rich in saturated fats and purified sugars and inferior intake of fruits, vegetables and water that can negatively affect mental ability. Fair nutrition is essential to optimize brain process and stem cognitive degeneration.

Keywords: Cognition, Nutrition, Mediterranean Diet, Vegetarian Diet, Dementia, Cognitive Impairment

CSR in Educational Infrastructure: Mapping Initiatives to Outcomes

Abstract

Corporate Social Responsibility in school education takes multivarious forms. The present paper aims to identify the CSR initiatives associated with infrastructure development undertaken by twenty-one firms in the state of Uttar-Pradesh in India. Further, it identifies associated outcomes, utilizing a Nominal Group Technique (NGT) Workshop, organized at the Dayalbagh Educational Institute (Deemed to be University). The initiatives spanned the development of physical infrastructure, IT infrastructure, and the construction of their schools by the corporates in the form of corporate social responsibilities for the select companies. The firms were identified from Prowess as those disclosing CSR expenditure, with a corporate office in the state of Uttar Pradesh. The paper is significant since it utilized a consensus-building technique i.e. NGT to get a holistic perspective on outcomes of the focus areas, utilizing educational and CSR experts, and implementing NGOs. The results of the NGT will enable firms to decide future initiatives most appropriate to desired outcomes.

Index Terms: CSR, Education, Nominal Group Technique

Design and Development of Educational Computer Games for Young Children

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Abstract

In this paper, an automated system for Assessing the Working Memory of Children and cognitive control in the Age Group of 3-6 years is designed. The study has designed 24 games which are applied to the control groups i.e., village and city children. A comprehensive analysis of the data was then performed to classify the participants based on their results. A total of 45 students participated in the study. The paper concludes by comparing the data obtained from two groups and checks if there is any significant difference between them. Furthermore, it studies if a child's social-economic growth is hampered by their economic circumstances and identifies other factors that influence learning, such as the student's gender.

Keywords: working memory, educational games, early learning

Mediating Role of Consciousness in the Relationship between Resilience and Happiness among Healthcare Professionals

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Abstract

Happiness is an emotional state characterized by feelings of joy, satisfaction, contentment, and fulfilment. Resilience is the process and outcome of successfully adapting to difficult or challenging life experiences. Consciousness describes our awareness of internal and external stimuli. The present correlational study aimed to understand the relationship between resilience and happiness and how consciousness mediates this link. The sample included 320 healthcare professionals who were assessed with the Oxford Happiness Scale, The Brief Resilience Scale, and a self-constructed consciousness scale. The data was analysed with SPSS 20, and regression analysis was done. The results revealed significant positive relationship between resilience and happiness and consciousness partially mediating the link. Thus, revealing the importance of being conscious in order to attain happiness through resilience.

Keywords: Consciousness, Resilience, Happiness, Healthcare Professionals, Mediational Analysis

ORAL PRESENTATIONS
SESSION 6
INFORMATION AND COMMUNICATION SYSTEMS

Clustering-Based Heuristics for Euclidean Leaf-Constrained Minimum Spanning Tree Generation

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Abstract

Given a graph G (V, E) having vertices as points in the two-dimensional Euclidean space and edge-weights representing the Euclidean distances between those vertices, the Euclidean Leaf-Constrained Minimum Spanning Tree (LCMST) problem searches for a minimum cost spanning tree that has at least a specified number of leaf vertices L, $2 \leq L \leq |V| - 1$. The problem is NP-hard and finds applications in facilities location, circuit, network design, and other domains also. The Euclidean LCMST (e-LCMST) problem arises when the domain is restricted to the Euclidean space. A well-known greedy spanning tree constructionbased heuristic for the problem takes O(|V|4) time to compute lowcost LCMST but is restricted in its applicability to only small-sized instances. A recent less greedy heuristic for the e-LCMST problem obtains superior performance in O(|V|3) time. This paper proposes four clustering-based heuristics that obtain good solutions for the e-LCMST problem in O(|V|3) time. In the course of several experiments on standard and large complete graph instances, the proposed heuristics are shown to outperform the existing heuristics for the problem.

Keywords: Leaf-constrained, heuristic, spanning tree, Euclidean, NP-hard, clustering

A Study to Assess Efficacy of Adrenaline Based Intuitive Hormonal Therapy in Critical Medical Conditions using Electro-Photonic Imaging

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Abstract

Homo sapiens, the trinity of body, mind, and spirit is a physiological, psychological and spiritual being. Pursuing golden mean path of "Better Worldliness" through Sigma Six Q, V and I way of life, can evolve a Superhuman species i.e., homo spiritualis. Achieving homeostasis and maintaining control at the physical and mental plane is the first step in this direction. In human body, this balancing depends on autonomic nervous system, where sympathoadrenal and parasympathetic systems play a counter regulatory role to each other.

The neurotransmitters involved are adrenalin on sympathetic side, responsible for fight and flight mechanism and acetylcholine on parasympathetic side for rest and digest. The root cause of diseases is thought to be imbalances in this mechanism. The present study examines the effect of Adrenalin as novel hormonal therapy for its potential use in critical medical conditions to improve coping capability and replace steroids and its side effects. Revered Huzur Prof. PREM SARAN SATSANGI SAHAB propounded the Spiritually inspired Hormonal therapy using Adrenaline for the first time on 2nd July 2022 in HIS Discourse. The short term and long-term efficacy of Adrenalin as hormonal therapy is undertaken from July2022-April 2023. A total of 37 cases, with variety of critical illnesses, who after trying different treatments, resorted to emergency medical Arz and were Graciously advised hormonal therapy using adrenalin, were included in this study and followed up for 3 months. Their symptomatology, investigations along with dynamic measurements of fingerscan capture by Electro Photonic Imaging, using GDV (Gas Discharge Visualization Camera) is being studied. Dramatic symptomatic relief, with immediate effect in most critical patients, in all age groups is observed (90.9%). Physiological parameters like stress and body balance show improvement in 85 % cases ($p=.04363$, $p=.03216$ respectively).

Brain Tumor Detection and Segmentation System using Deep Learning Approach

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Abstract

Brain tumours are one of the significant causes of cancer-related death all around the world. The standard method of detecting a brain tumour is through MRI scans, which are carried out by expert neurosurgeons. The process is time consuming and require the expertise of the doctor. But due to the growing population and an increasing number of cancer cases, there is a need for an automatic brain tumour detection and segmentation system. When this system is assisted by deep learning tools and image processing, it results in faster and more accurate predictions. There are various approaches for automatically detecting brain tumours and for segmenting the affected area. In the proposed work, we present an end-to-end approach to building a trustworthy brain tumour detection and segmentation system in a stepwise manner and also present a comparison of time and space parameters of different state-of-the-art artificial neural network architectures to provide options for different scenarios. In our work we achieved a test accuracy of 99.67%.

Keywords: Brain tumour, deep neural network, Tumour detection, Tumour segmentation, Magnetic resonance imaging

Improved Laser Welding Process of Battery Manufacturing through Image Processing

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Abstract

The need for batteries in the mobile sector has grown over time, and electronics businesses have been struggling to create batteries more quickly and cut down on the time required to fulfil orders. The ultimate objective is to expedite the procedure while maximizing the productivity by properly utilizing both man and machine. Initially, the checking of the open circuit voltage (OCV) and the internal resistance (IR) data of the cell is done; then the laser welding process on the cell and the protection circuit module (PCM) is being carried out, the end-product battery is obtained. Once all the tapping processes on the battery edges and battery function testing is done; the final quality inspection is carried out after obtaining the finished battery pack. In our proposed process, to ensure that the PCM does not miss out or shift on the fixture during operation, the laser welding of the cell with PCM is carried out through image processing; so that it can be processed further, and the finished product can be sent directly to the next machine. In this work, redevelopment of the current laser welding design is done to incorporate an inspection system to find PCMs that are missing, shifting, or not being fed properly through the robot. This inspection system uses a charged coupled devices (CCD) image sensor that has been trained with images of perfect parts to distinguish between them and the faulty ones. With the aim of reducing waste, this research was conducted as a case study in the electronic mobile industry.

Keywords: Laser welding process, charged coupled device, mobile battery packaging, protection circuit module, image processing, PLC programming, scrap reduction

Optical Character Recognition of Text in Textured and Newspaper Images

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Abstract

Most of the work reported in the literature for Optical Character recognition (OCR) assumes the background to be clean or white and works for one or two fonts. Real documents can range from simple plain backgrounds to complex uneven illuminated backgrounds. OCR of such documents is further complicated due to text written in a variety of fonts and sizes. In this paper, an OCR system is proposed for extraction and OCR of text for Newspaper layouts and textured backgrounds. The proposed system has been tested on a variety of images taken from different newspapers, old books and synthetic images on textured backgrounds. It works on several unknown fonts even in the presence of complicated backgrounds although the database consists of only four fonts. The recognition accuracies obtained are 98-100% in most cases. Thus, the proposed approach for Telugu OCR performs well for extracted text images from a larger variety of sources than the previous attempts which were more restrictive and domain specific.

Keywords: Histogram; Wavelet transform; Edge Direction Feature; Jeffrey Divergence Distance Measure; Telugu OCR

POSTER PRESENTATIONS

Nature's Sounds to Deep Listening

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Abstract

There is growing evidence to suggest that merely listening to nature can have not only psychological benefits but enhanced cognitive function, thus listening to natural sounds has been linked to improved attention, concentration and mathematical ability. Studies conducted on children in Dayalbagh have shown very positive results.

Keywords: Nature, Cognitive Capability, Experiments

Human Vices versus Spiritual Consciousness

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Abstract

Human beings are trapped into many vices which govern their emotions and actions. These vices have so strong gravity that it is easier for the individuals to encapsulate them and to behave accordingly. However for better worldliness these vices are barriers which create hindrances for the ultimate growth of human beings. Therefore from Wrath to Bliss, the virtue of Spiritual Consciousness plays a very pivotal role. Spiritual Consciousness usually arises from deep seated inner- connectedness with divine supreme - Being. In view of this construct the present research paper investigates the relation of attachment, greediness and anger with spiritual consciousness. Correlational design has been used on the sample of 100 individuals. Findings of the present result show that correlation of Anger, Greediness and Attachment with Spiritual Consciousness are significantly negative. Therefore it can be concluded that increment in Spiritual Consciousness leads to decrements in human vices. If attachment, greediness and anger are kept at minimum level and under control, higher levels of Spiritual Consciousness can certainly be achieved.

The impact of Conscious Leadership on the workforce in a Hybrid Work paradigm

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Abstract

Post pandemic the effectiveness of conscious leadership is more than ever essentially required in an organization for keeping the workforce engaged as the work arrangement model like Hybrid model is being adapted. Systems approach of management is implemented to address the effectiveness of conscious leadership and adaption of hybrid model to understand the output that defines the workforce alignment and engagement with the set objectives. Paper stresses the importance of conscious leadership that brings in empathy, aspects of nurturing and empowering the teams, adapting the transformative process of implementation and sharing the objective feedback with team members. Aspects of autonomy, ownership of tasks, leading cross functional teams, providing transparency in displaying future road map and bringing upon process related to engagement is discussed in the paper. Framework with Input factors related to Hybrid work model, process that highlights the characteristics of conscious leadership and output related to workforce's alignment to organization's values are presented.

Keywords: Conscious, Leadership, Hybrid, Engagement, Recognition, Management

Performance and Sustainability of SHGs for Social System

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Abstract

Self Help Groups (SHG), especially those formed by women are emerging as an important social innovation to help the poor in recent years. It is beyond doubt that SHGs have the capability to enable women to come forward and make them self-dependent and self-employed. Also if sustainable they can act as a platform to address women-related issues and social problems. They can play an important role in the empowerment of women thus contributing solutions to the growth and development of society. These women SHGs can handle various social and emotional issues the society is facing these days and can help build a healthy, sound social system. The first national conference of women in November 1981 advocated the need for developing women entrepreneurs for the overall development of the country. SHGs formulation, performance and sustainability would be mandatory to reach such a goal.

Keywords: Self Help Group, Self-Employed, Performance, Sustainability

Construction of Being - Values Scale

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Abstract

Maslow (1908- 1970) the father of the humanist movement focused on the potential of people to become all that they can be. In his famous 'self- actualization theory', Maslow has proposed the five-stage model, explaining that there are lower four levels of deficiency needs (D-needs), while the top level is known as growth needs or being needs (B-needs), and everyone has to satisfy hierarchy of needs, ranging from basic physiological requirements to love, security, esteem, and self-actualization. Further, Maslow also gave the concept of peak experiences and Being - Values. Maslow defined peak experiences as "the most joyous, happiest, most blissful moments" in life wherein, one reports feeling detached from others and experiences a sense of calmness and rightness. Along with peak experiences, Maslow has also stated the presence of another construct called 'Being -Values' to be found in individuals with high self-actualization. The literature on 'Being – Values' is relatively small. Literature provides the understanding of this concept with detailed review of peak experiences and how individuals report of these b-cognition values in their experiences. Maslow has qualitatively stated the likelihood of presence of these values in peak experiences but not many studies have been conducted on this area nor has any questionnaire been developed for 'Being - Values'. With this perspective, the researchers constructed and prepared a scale that could measure the 'Being -Values' quantitatively, independent of peak experiences; which has only been subjectively mentioned in the literature as of now. Reliability and Validity were measured to make it an objective psychological scale of quantitatively measuring "Being -Values'.

Key words: Self- actualization, 'Being -Values', needs, scale construction

Religious Chanting- A Step Towards Higher Consciousness

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Abstract

Chanting has been a common practice in almost all religious philosophies, which signifies the great importance of this practice in increasing the level of consciousness, in acquiring deep attention concentration during meditation and finally achieving blissful state. Holy names are of two kinds – Dhunyatmaka and Varnatmaka. Names whose sound reverberates automatically in the Akasha of Spiritual Centres of every human being are Dhunyatmaka Names. So, with regular varnatmak chanting, one learns to mould mind to hear internally the dhunyatmak sound resounding at the higher planes of Consciousness.

Keywords: Chanting; Dhunyatmak; Varnatmak; Consciousness

Sigma Six Q: Women Empowerment through Self Defence

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Abstract

Dayalbagh has always believed in women empowerment, and it can be seen in various domains like agriculture, medical, education etc. In April 2022 Most Revered Gracious Huzur Prof. Prem Saran Satsangi, Chairman, Advisory Committee on Education (ACE) Dayalbagh Educational Institute guided to make Dayalbagh Rapid Action Force (RAF) team to provide self-defense training for women empowerment. Women's empowerment through self-defense is an important issue that seeks to provide women with the knowledge and skills to defend themselves along with the physical, mental, spiritual development. It is an important issue, as women are often vulnerable to violence and harassment, and self-defense can help them feel more confident and secure in their daily lives, as well as develop important life skills such as assertiveness and decision-making. Women plays a major part in the world and make our existence possible only men cannot make the world. World has realized their value and equality is provided to all its citizens irrespective of caste, creed, sex, and colour in India. World is paying attention for advancement and empowerment of women which include community empowerment, political empowerment, organizational empowerment, psychological empowerment, physical empowerment, mental empowerment, and all-round development. Government and NGOs are playing crucial roles in upliftment [1]. This research paper shares the case study on self-empowerment of women through Rapid Action Force (RAF) training provided in Dayalbagh. Using data and evidence, the paper will examine the benefits of self-defense training, and the most effective strategies for empowering women to defend themselves. Through this research, we hope to contribute to the broader conversation on women's empowerment and safety.

Keywords: Women Empowerment, self-defense, India, Dayalbagh Rapid Action Force (RAF), Dayalbagh, Sigma Six Q

Community Support System: A Case Study of Dayalbagh Community

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Abstract

The objective of the study was to gain insight into community support services provided to Dayalbagh Community members. It is believed that an individual can be conceived alone, but survival is impossible. The individual would require a community to exist and survive. Community is the only environment in which a child's inherent abilities can develop. The community assists individuals in numerous ways by providing opportunities for holistic growth. The researcher discovered that members of this society receive food at nominal costs, engage in games and sports, engage in agricultural activities, engage in non-demonization practices, participate in initiatives to have a clean and fresh environment, and receive free health checkups and treatment. In addition, they receive placement and career services. By providing health, educational, informational, recreational, and vocational support for their students, the Dayalbagh community strives for the students' well-being and holistic development.

Keywords: Community support system, Dayalbagh community

Digital Solutions to Ensure Inclusive and Equitable Quality Based Education System

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Abstract

Increased complexities of the modern world present new challenges and additional load on the education system. The changes must be identified and introduced strategically. Digital solutions provide the required agility to ensure inclusive and equitable quality education and promote lifelong learning opportunities in line with sustainable Development Goals established by the United Nations. Digital classrooms, libraries, and continuous feedback will benefit the institution if gathered and communicated to decision-makers at the right time systematically. The optimized effort could be diverted to research and development projects. Implementing a simple technique of launching automated daily polls to staff and student bodies with instant dashboard displays to the Advisory committee would save time, effort, and energy.

Digital storage will help gather productive data, classroom lectures, and e-books, resulting in the smooth management of a complex education system. The generated data could be used for analysis, generating different patterns and key performance indicators related to teaching effectiveness and positive student responses ensures an easy, economical, and efficient way to operate effectively by preventing the possibility of making a biased decision.

Keywords: Sustainable, Decision making, Digital, Continuous Feedback, Education System

Elements of Healing: An Exploration of The Relationship between the Periodic Table and Homoeopathy

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Abstract

Knowing about the elements in the Periodic Table can help people learn more about how to treat illness using homoeopathic medicine. Dr. Jan Scholten's significant contribution to the field of homoeopathy involved the application of the theme or constitution of various elements from the Periodic Table, leading to a better understanding and development of this area. According to Jan Scholten all elements in each row of Periodic Table characterized by single common theme. This article highlights the unique features of various elements that are present in different series and columns of the Periodic Table. It provides a concise overview of the distinctive properties of elements and how they vary, based on their location in the table.

Keywords: Homoeopathy, Periodic Table, Element, Remedy

An AI-based-Multi Platform Audio-Visual Feedback Application for Yoga

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Abstract

Several scientific papers show that the practice of yoga particularly has been beneficial for the overall well-being of people during COVID-19 lockdown. However, an improper posture in the absence of a trainer, and irregular regime can do more harm than benefit. We have developed an AI based-Multi Platform Audio-Visual Feedback Application for Yoga- Gam-i Yog. The application can run on any device with an in-built camera. It takes in the video feed of the user performing the asana as the input and responds with feedback to improve posture and safety warnings to the user. The landmarks are extracted through the Mediapipe or PoseNet library and then the pose is classified using our novel implementation of decision trees. The implementation of the Decision Trees is about 384x faster in training and 72x faster in running as compared to existing methods. We gauge the accuracy of the pose through a k-means clustering algorithm and provide insightful feedback and safety alarms in case of improper posture. Our solution promotes the Government of India's vision of Swasth Bharat and Digital India, to educate the people on the practice of yoga and thus provide a tool to keep your body and mind fit.

Transcriptome Profiling and Identification of Candidate Genes Involved in Diosgenin Biosynthesis in Tribulus terrestris L.

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Abstract

NGS sequencing has revolutionized the identification of candidate genes, pathways, and their regulation in both model and non-model species. Tribulus terrestris L. is an important annual medicinal herb with various medicinal properties. However, the biosynthetic pathway of its major bioactive compound, diosgenin, is not well understood. To address this, the whole transcriptome of T. terrestris was analyzed using the Illumina HiSeq 2000 sequencing platform, resulting in 7.9 GB data and 148,871 unigenes. About 50% of the unigenes were annotated using functional databases such as Gene Ontology and KEGG-KAAS pathways. Most unigenes related to diosgenin biosynthesis were up-regulated in the root, fruit, and leaf, except for the SQE gene in the root. Selected genes were validated by qRT-PCR, showing high homology with other plants such as Quercus suber, Theobroma cacao, Vitis vinifera, Juglans regia, and Citrus sinensis, Sesamum indicum, Handroanthus impetiginosus, Erythranthe guttata, and Oleaeuropae var. sylvestris. Additionally, 21,026 unigenes of transcription factors and 15,551 unigenes of SSR were assembled. This research provides insights into the diosgenin biosynthetic pathway and lays the foundation for future molecular research on metabolic engineering to increase diosgenin content.

Keywords: Tribulus terrestris, Transcriptome analysis, Diosgenin biosynthesis, Homology, SSRs

Monetary Evaluation of Health Risk Due to Respirable Suspended Particulate Matter

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Abstract

The study highlights the economic loss caused by health effect due to ambient air pollution in Agra city. The results show that the seasonal mean concentrations of PM_{10} is highest in post monsoon (253.05 µg/m^3) followed by winter (220.36 µg/m^3), summer (209.99 µg/m^3), and monsoon (85.03 µg/m^3). Critical health risk of air pollution measured by Exceedance Factor which is more than 2.0 during the study period and more than 2.5 in post monsoon. The population weighted mean of PM_{10} is 0.35µg/m^3 in 2022. Health risk assessment performed using AirQ+v.2.1.1 model developed by World Health Organization show estimated attributable proportion of incidence of chronic bronchitis in adults 87.58%; post neonatal infant mortality, all Cause 52.26% and prevalence of bronchitis in children 76.56%. The monetary cost burden due to air pollution related health risk performed by value of statistical life is Rs. 7912.81 per person and the estimated total economic loss of health risk due to air pollution is $137 billion annually in 2022. Economic cost burden of health endpoints in Agra city has increasing trend.

Sophisticated Automatic Question Generation System based on Transformer Technology

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Abstract

In the field of education, generating new questions is a time-consuming and costly process. To alleviate this issue, Automatic Question Generation methods have been developed. These techniques typically require complex architectures and significant computational resources, along with a deep understanding of the subject. In this study, we present an end-to-end AQG system that utilizes the Text-to-Text Transfer Transformer, a recently introduced transformer. We fine-tune the pre-trained T5 model for our downstream task of question generation and achieves 16.60 of score on BLEU and 49.67 on METEOR metrics which is far better than baseline scores. Our system performs well on previously unseen data, producing grammatically correct and well-formed questions. These questions can be used by both students and teachers, with students being able to evaluate their understanding and teachers quickly reinforcing key concepts as needed.

Keywords: Automatic Question Generation; T5-model; Transformer Model; Natural Language Processing; Neural Network

Biosensors: A Smart Approach Towards Clinical Diagnostics and Healthier Environment

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Abstract

Air Pollution poses an enormous threat to human health and the environment. Aerosols play a vital role and affect human health and climate. The biological components of aerosols are known as bioaerosols which include microorganisms (like; bacteria, viruses, fungi, etc.), pollens, biofilms, etc. They infect humans, plants, and animals and are estimated to be responsible for more than 15 million deaths worldwide each year. The present pandemic situation due to SARS-COVID and the production of biological warfare agents has posed threats to the safety and security of human beings. However, detection of biological components in ambient air is a difficult challenge as the methods are cumbersome and time taking. Hence, the development of fast and accurate methods of detection and identification systems for biological components in the environment is of paramount importance in the current scenario of the infection and spread of pathogens. Nanomaterials have a great impact when used in biosensing applications because of their unique properties at nanoscale. Thin metal oxide based thin films of ZnO may have great potential. ZnO based thin film has been prepared and characterized to see the biosensing properties to fabricate the biosensors for monitoring and measurements of bioaerosols in the environment. ZnO thin films has been prepared using sol-gel method and characterization of thin films were done by various techniques using FE SEM, UV-VIS and XRD. ZnO electrode has also been prepared to see the biosensing application.

Keywords: ambient environment, bioaerosols, biosensors, nanomaterial

A Study of the Recommendations of NEP2020 and its Alignment with the DEI Education Policy

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Abstract

The Cabinet adopted a new National Education Policy on 29 July 2020, with the goal of making many reforms to the present Indian education system. By concentrating on multi-disciplinarity, versatility, emphasis on capability development, and quality research, the NEP promises to lead to holistic development of students. Dayalbagh Educational Institute is a model Deemed to be University that believes in excellence with social relevance, imparting values-based and quality education, with the objective of reaching the last, the least, the lowest and the lost; contributing to nation and community by empowering weaker sections, women and children; building the economy through research and frugal innovation anchored in the principle of achieving more with less The Dayalbagh Educational Institute's Vision is ambitious, clearly defined and backed by over a hundred years of experience of imparting quality education. The study aims at aligning the recommendations of NEP2020 with the existing DEI Education Policy.

Keywords: National Education policy, values and quality education

Co-Curricular Activities at DEI: A Precursor to Better Worldliness

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Abstract

Co-curricular activities are being devised for the development of students into complete humans in DEI, Dayalbagh for achieving better worldliness. Co-curricular activities are the activities which supplement and complement the curricular activities. These activities are related to art, language, culture and sports. They are responsible for the development of various skills and values in the students. Dayalbagh is innovatively integrating these activities as a compulsory component of the curriculum in order to initiate and catalyze the all- round development of the students.

Keywords: Co-curricular activities, better worldliness, allround development, Dayalbagh, Dayalbagh Educational Institute, education

Fifth (5th) Industrial Revolution and "Conscious Reform in Socio-Economic-Education System" Volume-1: Dayalbagh Educational Institute (DEI) role as Dayalbagh Industrial Institute (DII) and Modern Model Industries (MMI): A framework for the effective participation

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Abstract

The present paper is concentrating about the need of conscious reform, in 'Socio-Economic-Education System' for the 'better worldliness' by taking a immediate step towards the 5th Industrial Revolution, which supports a shift of focus from economic value to societal value. For a positive enforcement of any revolution in any progressive economy like India there is a need to identify the health of the economy, where micro and small enterprises (MSE's) are its backbone. So we have tried to 'conscious' about the actual status of the 'Tree' of the 'Socio-Economic System' named 'Micro and Small Enterprises' which has the equal importance/ value as a 'Tree' has in the 'Ecological System' and can only be flourished under the aura of 'conscious wisdom' instead of 'commercial wisdom'.

Keywords: Fifth Industrial Revolution, MSE's, Conscious wisdom, commercial wisdom, Socio-economic-education-system

Improving Exam Day Management: An Intelligent System for Room and Seat Allocation during Exams

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Abstract
Proper allocation and management of examination rooms and creation of relevant documentation is crucial for the effective conduct of examinations in educational institutions. However, with the increasing number of students, subjects and departments, the task of managing exam seating arrangements becomes quite complex. This paper describes a novel system that automates the existing manual process of examination room allotment and seating arrangements at the Faculty of Engineering, D.E.I. The objective of the proposed system is to produce a conflict-free, customizable student/exam-room allocation that caters to the controlled co-education model of the Faculty of Engineering, D.E.I. The system provides users with a simple, intuitive web-based interface to submit relevant information like exam date sheets, exam room/hall data and student course registration information, and generates requisite reports such as Seating Plan, Attendance List, Seating List, and individual room seating (Matrix) Plan for each examination session.

Keywords: Examination, Automation, Seating, Room allocation, Reporting, controlled co-education

Effects of PM_{10}, and PM_1 during the festive season of Diwali; A study in an urban area of Agra, India

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Abstract

Diwali is a Hindu holiday celebrated every autumn in India, known locally as the Festival of Lights. Setting off fireworks on this day will cause air and noise pollution, which will have a negative impact on human health. Particulate matter monitoring for a 24-hour period at Dayalbagh Educational Institute college campus, Agra, India over Diwali 2021. PM_1 and PM_{10} concentrations were studied for a seven-day period in November 2021. The average concentration of PM_{10} and PM_1 during Diwali month was recorded as 202.596±51.616, and 345.71±61.374 $\mu g/m^3$ respectively. In addition, the relative humidity, wind speed, and Temperature during that month were determined in this month with 62.866±11.38 %, 0.385±0.385m/sec, and 24.263±2.83˚C. Despite the cracker ban, the presence of such a high concentration of particulate matter in the ambient air during Diwali calls for immediate action to better implement policies to ensure healthier public health. The present study suggests that reducing fireworks during Diwali could reduce pollution levels and lead to potential health benefits.

Keywords: Firecrackers, PM_1, PM_{10}, Diwali, NAAQ

Indoor and Outdoor $PM_{2.5}$ bound trace metals at a residential site of Agra

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Abstract

Fine particulate matter ($PM_{2.5}$) and associated chemical species especially trace metals are released during indoor cooking which have immediate effect on human health and cause several cardio-vascular disorders. In the present study, $PM_{2.5}$ particles and certain trace metals (Al, Fe, K, Na, Ca, Mg and Zn) were identified for assay based on their impact on human health both in indoor and outdoor environment. 24-hour $PM_{2.5}$ aerosol samples were collected from an urban residential area in Agra simultaneously, for a period of six months using Envirotech APM 821 sampler operated at a flow rate of 3 lpm; both indoors and outdoors. Studies have reported that a major fraction of indoor pollution originates outdoors. Therefore, to assess the ambient air, I/O ratios and infiltration factors have been estimated and results show that some of the elements were infiltered from outdoor environment, indoors.

Keywords: Indoor air quality, indoor to outdoor ratio, particulate matter ($PM_{2.5}$) and trace metals

Heavy Metals, Sources, and Health Risk Assessment of PM_1 in Urban and Sub-Urban site at Agra

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Abstract

PM1 is the respirable proportion of ambient particulate matter with an aerodynamic disuperscript

ameter less ≤1µm (PM_1) were analysed at urban and sub-urban site in Agra from December 2021 to November 2022. The samples were collected for period of 24h at both the sites simultaneously, Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES) was used to extract the samples for metal analysis. The highest concentration of PM_1 calculated during winter (74.2±4.8 µg/m^3) during post-monsoon (68.3±3.8 µg/m^3), Monsoon (65.0±2.8 µg/m^3) and least in summer (22.1±3.4 µg/m^3). All the season showed 1-4 times higher concentration of PM_1 than WHO and NAAQs standard (15 and 60 µg/m^3). The elemental analysis of PM_1 bound crustal metals depicted high Ca>Na>Mg>Fe>K and Al>Zn >Ba>Pb>Cr=Cu>=V=Ag trace elements at Dayalbagh (Sub-urban site). Absence of K was observed at Dayalbagh which indicates no biomass and coal burning activities. Among the 5 heavy metals Ni, Pb and Co were witnessed at Sikandra (Urban site) clearly indicating high loads of industrial and raw coal combustion activities. The results of the study could be extended to source identification to come up with effective measures for abatement of PM pollution.

Keywords: Particulate Matter, Respirable Particulate Matter, Environmental Regulation

Study on the Effect of Vehicular Pollution on the Ambient Concentrations of Particulate Matter and Carbon Dioxide in Agra City

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Abstract

The main source of particulate matter is combustion-related emissions. One of the main contributors of particulate matter emission is thought to be on-road transportation. The estimation for this fluctuation is crucial for policymaking since the association between on-road transportation and particulate matter concentration fluctuates with time and space. The purpose of this to monitor air quality parameter inside and outside the moving vehicle on the road of Agra city and how automobile pollution affected the levels of carbon dioxide and particulate matter in the air in Agra, India. This study aims to assess the levels of air pollution among various commuting vehicles. The quantities of particulate matter (PM2.5, PM10) and Carbon dioxide (CO^2) in the air are measured as a commuter inside the vehicles as auto, bus, mayuri and bike by using portable air quality monitoring instrument. The measurements were made at various hours of the day and in various traffic patterns. Vehicles are the main source of pollution in these areas. The areas with the highest traffic density in the city are Dayalbagh to Naulakha via Mahatma Gandhi Road and via Bijli ghar is a medium traffic density route. We considered both the route for our study. According to the study, the levels of air pollution inside of mayuri were the greatest, followed by those inside of auto and buses. Peak traffic times and places with a lot of traffic congestion saw the greatest levels of PM2.5 and PM10 which is not under the acceptable limit. Additionally, increased level of CO^2 found particularly in buses. According to the research, people who commute by Mayuri or cycle may be highly exposed to higher amounts of air pollution from the surrounding atmosphere. The study emphasises the significance of tracking air pollution levels in all modes of transportation and putting emissions-reduction plans in place to lessen the negative consequences of air pollution on both human health and the ecosystem.

Keywords: Vehicular Emission, Particulate Matter, Carbon dioxide, Road traffic

Pavement Blocks from Plastic Waste

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Abstract

Plastic waste is increasing, polluting land and water. As it is non-biodegradable, we cannot degrade it into soil. To dispose of it, we can reuse or recycle it into products like construction materials, roads mixed with plastic, or bottles. This paper is about introducing plastic as a binding medium with silica sand particles to reinforce the blocks by heating a mix of plastic and sand in designed machine, in a proportion of 1:4 by weight, then, moulding the mix in desired shape and to test the concerned properties like hardness, compressive stress and water absorption.

Keywords: Plastic waste, reinforce, binding medium, Proportion of 1:4, compressive stress, pavement block

Numerical Feasibility Analysis of Selection of Thermal Storage Design & Material for 24x7 Operations

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Abstract

Energy is the need of time due to limited resources all over the world and there are two ways for this. First is to develop the energy at a particular cost and other is to conserve the energy by some means. The research is going on all over the world and the scientists are working majorly on storage of energy. Here we are discussing about especially on thermal storage which have multiple applications in all over the world such as in preserving food, for preparing food, for room heating, for usage in industry and even in automobile industry nowadays.

The storage can be majorly classified in two types i.e. using chemical batteries to store energy from electricity and other is by using solar thermal storage system to collect the energy from the sun. Various techniques are in the developing phase also which claims to increase the efficiency of thermal storage or energy storage multiple times. Here we are proposing the technique which will work on solar energy available at free of cost and able to work 24 hours in a day and all the seven days of the week. This means that continuous energy of solar energy can run the solar thermal storage for a long time. A system which will work at free of cost and having no running and maintenance cost and it will provide most of the basic daily energy requirement to a great extent. This paper deals with the calculation and analysis of pre design feasibility of solar thermal storage only in terms of size and material. This analysis is sufficient to check the feasibility of the proposed solar thermal storage in terms of design and material.

Effects of Electrolyte pH in $LaFeO_3$ Thin Films for Efficient Photoelectrochemical Water Splitting

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Abstract

Global energy demand is estimated to be doubled by 2050 due to population expansion and rapid industrialization leading an urge to shift away from conventional energy sources. This is also necessary for climate change mitigation, sustainable energy production and for a cleaner & greener environment. There is a need for an environment-friendly method for hydrogen production such as solar water splitting to produce green hydrogen. Thus, an intensive search for a novel semiconductor material is been carried out all over the world. Perovskite like metal oxides (ABO_3) have high activity/ durability and excellent compositional and structural flexibility, superior sunlight absorption capability and precise control of band gaps and band edges. Among them, Lanthanum Iron Oxide ($LaFeO_3$) is an attractive candidate for the desired application because of its stability, environmental friendliness and the relatively high earth abundance of the constituent elements. To further maximize its efficiency, we have tried to study the effect of pH on photocurrent density of $LaFeO_3$ in the proposed system. The optimized pH range was chosen for further electrochemical characterizations. Result in detail would be discussed.

Keywords: Photoelectrochemical water splitting, hydrogen generation, nanomaterials, perovskites, electrolyte pH optimization

Synthesis and Characterization of High-Efficient Green Adsorbent Material for Amino Acid Removal from their Aqueous Solutions

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Abstract

Global energy demand is estimated to be doubled by 2050 due to population expansion and rapid industrialization leading an urge to shift away from conventional energy sources. This is also necessary for climate change mitigation, sustainable energy production and for a cleaner & greener environment. There is a need for an environment-friendly method for hydrogen production such as solar water splitting to produce green hydrogen. Thus, an intensive search for a novel semiconductor material is been carried out all over the world. Perovskite like metal oxides (ABO3) have high activity/ durability and excellent compositional and structural flexibility, superior sunlight absorption capability and precise control of band gaps and band edges. Among them, Lanthanum Iron Oxide (LaFeO3) is an attractive candidate for the desired application because of its stability, environmental friendliness and the relatively high earth abundance of the constituent elements. To further maximize its efficiency, we have tried to study the effect of pH on photocurrent density of LaFeO3 in the proposed system. The optimized pH range was chosen for further electrochemical characterizations. Result in detail would be discussed.

Keywords: Activated Rice husk ash, Adsorption, Characterization, Amino acids

Analysis and Design of Long and Narrow Solar Charging Station for Electric Vehicles: An Initiative to Achieve Green Highway

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Abstract

In today's time, the problem of a petrol diesel and CNG is a lot. The demand for fossil fuel grows day by day. India is depend upon gulf countries Electric vehicles (EVs) are becoming more prevalent in modern society. The resource of coal is limited. This problem is overcome by renewable energy resource. The Indian government has announced plans to create an electric expressway between the national capital Delhi and Mumbai in an effort to address the growing issue of rising pollution. This paper deals with solar charging station are deployment on highway. Long and Narrow solar panel design and deployment on highway Using MATLAB Code and Simulink model.

Keywords: Normal and rectangular design, long and narrow design, calculation

Keratin waste Utilization to form Bio based Plastics towards Better Worldliness: Some Preliminary Outcomes

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Abstract

Although there is no doubt that plastic has extensively contributed in the advancement of human civilization but its negative impact on the environment and living beings is inarguable. Management of plastic waste is a global concern and to deal with the same, many plastic alternates are being researched for. In the current study, efforts have been made to explore the potential of human hair waste to be utilized as the raw material for the preparation of bioplastic film.

Seismic Activity and its Analysis of Buildings on Hilly Slopes

Arushi, Apoorvi Rajput, Kajal Solanky, Surbhi Agarwal, Rachna Avasthi, Krishma Yadav
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Abstract

Due to irregularities in height and design, structures positioned on sloping ground are much more susceptible to earthquakes than those on flat ground. Understanding the dynamic properties of hill buildings and researching the impacts of sloping ground on the seismic force at various slope angles are the primary goals of this analysis. The study of the paper is influenced by the building's geometry, the force operating on it, and the loading that is put on it. When compared to seismic response on flat ground, the seismic response on sloped ground is very distinct. Because the structure is built with various column heights on sloping ground, structures there sustain more damage during earthquakes. This study investigates how construction structures behave on the sloped ground while taking different slope angles into account. (10°, 20°, 30°). For the study, a G+8-story structure is used. According to IS code 1893(part 1) 2002, the structure is situated in seismic zone IV of India, with a variety of loading conditions and forces. STADD Pro software was used to analyze and create the models with a fixed base system. The axial force, bending moments, and the horizontal reaction of the results are contrasted.

Keywords: Seismic; earthquake; building; vibrations, dynamic analysis, response spectrum

Issues and Advancement in Microgrids: Topology, Operation, Control, Protection and Energy Management System

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Abstract

A microgrid is a small power distribution system with distributed generators, energy storage, grid, and regulated loads that can result in an energy system that is self-sufficient. When a fault strikes the main grid, a microgrid is considered as an equivalent generator that can effortlessly detach and run independently from the utility grid. Control, protection, and infrastructure requirements are important technical and operational issues that come with the design, installation, and operation of such systems. This paper conducts a review to identify the problems and the advancement done in the topology, operation, control, protection and Energy Management System area of the microgrid.

Keywords: microgrid, control, protection, topology, energy management system

Implementation of Logic Gates Using Neural Network for Neuromorphic Computing

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Abstract

Neuromorphic computing offers promising avenues for designing highly energy-efficient computing systems. This makes them well-suited for applications that require high performance computing while minimising power consumption, such as edge devices, IoT devices, and autonomous systems. In this work, we propose a technique for neuron FPGA implementation using Verilog HDL. We have used single layer and multi-layer perceptrons to implement the logic gates by using Unit Step and ReLU activation functions. The hardware implementation of the proposed design was created and tested on a Nexys 4 DDR FPGA board, realised by using Verilog HDL with Xilinx Vivado Design Suite, and simulated for different input values. The proposed neural based AND logic gate, XOR logic gate, and other gates emulate similar behaviour as actual gates. The proposed design could play an important role in future neuromorphic VLSI system design.

Keywords: Neuromorphic Hardware, Neuron, FPGA, VLSI Design, Xilinx Vivado, Verilog HDL

Multiple Chatbot Implementation for Thoughtful Responses (MITR): A Comparative Study

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Abstract

Chatbots, are specially designed softwares, build to enhance communication between the customers and the service. Many technologies like natural language processing, deep learning, machine intelligence etc. are used to enhance the functionality of the chat systems Transformers based model and large language model are another innovative step in making efficient chat systems, for introducing better understandability while having conversation with humans.

GPT3 and Blender Bot, are pretrained model trained on huge amount of data. These are considered as large language and state-of-the-art models, based on transformer model. These are appreciated a lot in the market for their performance, but at the same time, people are pointing out many lags and inconsistencies in these models when considered, for the commercially usable chatbots which leads to their comparison with each other.

Here in our work, we have analyzed their performance through an open survey. The approach is to provide a collaborative environment for people to experiment with the chatbots build using these tools, at one place. In addition to these we are also providing a TensorFlow based chatbot with customizability feature and new interesting tweaks, for enhancing the performance of the traditionally designed chatbot.

Our task focuses on a careful analytical study, and experimentation with the new AI techniques used to create chatbots, on same platform, so that we can quickly take a quick glimpse of different, AI based chatbots by looking at their pros and cons after their careful and considerate analysis through audience pole and survey.

Keywords: Chatbots, AI-based chat systems, natural language processing, deep learning, transformer- based model, GPT3, Blender Bot, state-of-the art, large language model

Video Haze Removal

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Abstract

Video dehazing is a significant challenge in various computer vision applications, such as surveillance, driving, and other outdoor scene analysis. Haze reduces the visibility of distant objects, degrades image quality, and affects the performance of subsequent computer vision algorithms. This paper presents a comprehensive study on video dehazing by application of the Dark Channel Prior Algorithm

This algorithm is a powerful prior that exploits the inherent statistical properties of haze-free images. By assuming the presence of a local dark channel, the DCP method estimates the global atmospheric light and the transmission, enabling the restoration of hazy scenes. While the DCP approach has been extensively studied for single-image dehazing, its application to video sequences poses unique challenges due to temporal coherence and real-time processing requirements.

Keywords: temporal coherence, Dark channel prior

Quantum Tic-Tac-Toe with Chance and Strategy Balancing

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Abstract

We propose a quantum version of the game of TicTac-Toe, which utilizes the concepts of quantum mechanics like superposition, entanglement, and collapse to achieve a balance between chance and strategy. The need for developing such a game arises from the fact that the classical Tic-Tac-Toe is purely strategic and can easily be mastered with minimal effort, leaving no sense of intrigue for the players. We present a quantum version of Tic-Toe-Toe, design the game rules and develop a simulator. We also analyze the gameplay and devise heuristics for computer gameplay. The proposed Quantum Tic-Tac-Toe is more interesting because of the uncertainty involved. The simulator could be used as a tool for teaching concepts of quantum mechanics.

Keywords: Quantum Game theory, Classical Tic-Tac-Toe, Quantum Tic-Tac-Toe, Teaching Metaphor

Enhancing Object Detection Accuracy with YOLOv8 on the Augmented Dataset

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Abstract

Object detection is a crucial task in computer vision, with applications in various domains such as surveillance, robotics, and autonomous driving. The You Only Look Once (YOLO) algorithm is one of the most popular object detection algorithms, with YOLOv8 being the latest and increasingly favored for computer vision applications. In this study, we aim to improve the accuracy of vehicle detection by customizing and optimizing the dataset using a two-step approach. This study aims to improve the accuracy of vehicle detection using the You Only Look Once (YOLO) algorithm by customizing and optimizing the dataset through a two-step approach. By augmenting the number of training images and applying data augmentation principles, we achieved a 23% increase in mean average precision (mAP) at 0.5 intersection over union (IoU) compared to the initial dataset. Our results demonstrate the potential of customizing datasets and applying data augmentation techniques to improve the accuracy of vehicle detection, particularly for small and distant vehicles. Our work contributes to the ongoing efforts to improve object detection algorithms for safer and more efficient transportation systems.

Keywords: Object Detection, Deep neural network, Yolov8, Custom dataset, data augmentation

Maker-Breaker Triangle Game

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Abstract

The Maker-Breaker triangle game, introduced by Chvátal and Erdős (1978), is a two-player mathematical combinatorial game that involves creating and restricting the formation of triangles on a complete graph. For n,q ∈ N, the (n,q)-triangle game is played by two players- Maker and Breaker, on a complete graph Kn , where n is the number of nodes and q is the number of moves for Breaker in each chance. Alternately, Maker chooses one vertex/edge and thereafter Breaker chooses q vertices/edges. The objective of the Maker is to complete a triangle consisting of his/her choices whereas the Breaker needs to stop the same. The Maker wins the game if he claims all the edges/nodes of a triangle otherwise the breaker wins. The game requires strategic thinking and mathematical skills, as players must analyze the graph and anticipate their opponent's moves in order to respond effectively.

In this paper, we present a Maker-Breaker triangle game simulator in the form of a web-based application. The simulator generates randomized game scenarios with provision for increasing the level of challenge and excitement for the players by varying q. The simulator facilitates two-person game play as well as one person game play with computer playing the Breaker and the person as the Maker. It is well-known that the choice of q results in three possible outcomes with theoretical bounds on q. Maker wins for smaller q's, Breaker for larger q's and a region of uncertainty in between. The experience with the simulator is envisaged to provide intuition for further improving the theoretical bounds on winning ranges of q for Maker and Breaker. It can also facilitate generalizing the game for any graph rather than complete graphs.

Keywords: Breaker, Triangle Game, Complete Graphs, Edges, Nodes, Strategy, Game Theory, Algorithm

Bokashi-An Emerging Technique of Bioremediation for Better Environment

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Abstract

India is a country of vast diversity where reside people of different caste, color, culture and religion. People worship their almighty and perform various offerings to please them. In this ever-lasting race of development and evolution to become better from what we were yesterday, we have been practicing things which have now taken a toll on the environment. One such practice includes disposal of floral waste, old or broken idols and immersion of dead bodies and even bone immersion after death directly into the flowing waters. This has led to severe contamination in the water bodies, affecting health and conditions of microbial flora residing there. This review concludes the work done in the field of bioremediation and with the special focus on one of the techniques known as bokashi. Remediation of waste water using bokashi has been done for the past several years. This technique is convenient because it is composed of easily available raw material (such as rice bran, domestic waste from kitchen, manure, molasses, etc.) which is usually otherwise discarded. Along with these is a consortium of effective microorganisms which also includes indigenous microorganisms which speed up the process of bioremediation. Various other aspects related to bioremediation are being discovered and researchers are constantly working in this field to find out ways to tackle the problem of waste water.

Keywords: Bokashi, Bioremediation, Consortium, Indigenous, Remediation

Study on the Effect of Abiotic Elicitors on the Piperine Production in Piper longum L.

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Abstract

As the population is increasing, the needs of humans are also increasing and people are moving towards natural resources from the world of artificial resources. In the same way, all the people are shifting from synthetic medicine to natural medicine for the treatment of many diseases. Plants are used as good source of traditional medicines, as well as natural medicines by the use of their natural bioactive compounds. These natural bioactive compounds (secondary metabolites) are found in various parts of plants and are used for their therapeutic properties. Elicitation is a method that involves the external addition of elicitors (biotic and abiotic) to the growth medium. This causes the stress response to be triggered and, as a result, the production of secondary metabolites is increased. In this study, production of piperine in Piper longum L. (male) plant was enhanced by using abiotic elicitors because, in male plant, accumulation of piperine is low as compared to female plant. Among all the treatments provided, the plants treated with 30mM CaCl2 (T2) and 5 µM Sulfosalicylic acid (T4) were able to accumulate the highest amount of piperine in the roots of male plant of P. longum.

Keywords: Piperine, Abiotic elicitors, Secondary Metabolites, Calcium Chloride, Sulfosalicylic acid

A Hierarchical Approach using Deep Neural Networks for Severity Identification of Brinjal Plant Disease

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Abstract

The limitation of natural resources and changes in climate due to global warming has severely affected agricultural productivity. Rampant use of pesticides and fertilizers has increased the productivity but it significantly reduces the natural quality of crops, thereby adversely effecting human health. As an alternative precision farming is also in use, it helps in increasing the quality and quantity of crops. However, a lot of technical support is required in terms of sensors and machine learning algorithms for automation. With the wide acceptability of machine learning in various domains, researchers are now stepping towards the agricultural domain. The integration of deep learning techniques with agricultural practices can be considered as an elementary step towards precision farming. The limited availability of image-based plants datasets can be considered as a bottleneck in this direction. This study proposes a new dataset for brinjal leaves disease detection. Moreover, it presents an integrated approach which works at two levels: at a lower level, deep neural networks help in determining disease-specific severity in leaves. Since leaves may have more than one disease, an inference system has been designed at upper level to identify the overall severity of infection using disease-specific severities. And thus, the proposed hierarchical approach helps in identifying role of disease-specific severities towards the overall severity of infected leaves. The presented approach has also been deployed on a mobile platform to demonstrate its applicability in real-time scenarios.

Keywords: Brinjal plant disease dataset, deep neural networks, inference system, deployment of deep networks

Comparison of Growth and Physiological Parameters of Tomato under Hydroponics and Soil Cultivation inside Polyhouse

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Abstract

Polyhouse cultivation is steadily becoming popular in India these days. The advantages of protected cultivation inside polyhouse are numerous. Another technology, hydroponics, is also slowly getting the interest of growers these days. There are many benefits of hydroponics over soil cultivation thus it can sustainably support a high yield of tomato to achieve UN SDGs. To evaluate the basis of higher yield under HC, we conducted a comparative study of various growth parameters in hydroponics and soil grown of San Marzano 3 heirloom variety of tomato inside polyhouse. Plant height, leaf area, chlorophyll contents were higher in HC when compared to SC. In contrast, the leaf number was reduced in HC. Moreover, the flowering initiation time and the number of flowers were also reduced in HC system.

Keywords: Polyhouse, tomato, hydroponics, yield, growth parameters, protected -cultivation

Measurements of photosynthetic parameters of Plectranthus amboinicus (Lour) Spreng exposed with variable light conditions by using Infra-Red Gas Analyzer

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Abstract

In this article, we analyze the photosynthetic parameters with natural and shade light conditions of Plectranthus amboinicus (Lour) Spreng, with the help of portable Infra-Red Gas Analyzer (IRGA). A large data set was collected over a period of 8 hours. The set was used to analyze the comparison between various photosynthesis parameters like- assimilation rate, transpiration rate, leaf temperature, stomatal conductance and intracellular CO_2 (Ci), total conductance of CO_2, Total conductance to water vapor, the Saturation vapor pressure at leaf temperature, Fluorometer light source photodiode count.

The result indicates that measurements of photosynthetic parameters under natural conditions is higher and favorable for the maximum photosynthetic rates in comparison of shade conditions as in the absence of light, stomata tend to close to reduce water loss through transpiration. This results in a lower stomatal conductance to water vapor in shade conditions. And intercellular CO_2 is high in photoperiod as we know in light plants need carbon dioxide in large amount to perform photosynthesis. Leaf temperature for gas exchange showed that in photoperiod gases exchange from leaves is higher. Photodiode count (Pc) of a fluorometer when exposed to natural light, the photodiode count will typically be high, as chlorophyll fluorescence will be induced by the natural light source.

Keywords: Photosynthesis, Infra-Red Gas Analyzer (IRGA), Natural, Shade, Light intensities

Analysis of Photosynthetic Parameters of Curcuma Longa L. Exposed with Variable Light Conditions by using Infra-Red Gas Analyzer

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Abstract

Curcuma longa commonly known as turmeric is a perennial plant belonging to the family Zingiberaceae. Turmeric is a popular spice used in cooking, particularly in Indian cuisine. It is also used in traditional medicine for its anti-inflammatory and antioxidant properties.

Photosynthesis is a vital physiological process in plants that converts light energy into chemical energy. Understanding the photosynthetic response of plants to different light intensities is crucial for optimizing their growth and productivity. This study aimed to analyze the photosynthetic parameters of Curcuma longa L. exposed with variable light intensities. The analysis is done using Infra-Red Gas Analyzer (IRGA). One set of three separate pots are kept under natural photoperiod of 8 hours of 157.62µmol m^{-2} s^{-1} PPFD light intensity and second set of three plants was kept in shade for 8 hours of photoperiod of 2.03µmol m^{-2} s^{-1} PPFD light intensity. Parameters such as Stomatal conductance to water vapor (mol m^{-2} s^{-1}), Total conductance to CO_2 (mol m^{-2} s^{-1}) and Total conductance to water vapor (mol m^{-2} s^{-1}) show high number of variations when compared under deferent light intensities. In general, stomatal conductance tends to increase in response to light, which triggers photosynthesis and water uptake by the roots. In sunlight, the total conductance to CO_2 tends to increase due to the increase in stomatal conductance and the increase in the activity of enzymes involved in photosynthesis within the mesophyll cells. This allows for greater uptake of CO_2 from the atmosphere, which is important for plant growth and carbon fixation. However, the decrease in total conductance to CO_2 in shaded conditions is generally less than the decrease in stomatal conductance to water vapor. This is because CO_2 is less soluble in water than water vapor, and hence, its transport through the leaf is less affected by changes in stomatal conductance.

Keywords: Curcurma longa, Photosynthesis, Light conditions, Infra-Red Gas Analyzer (IRGA)

वेदों में पर्यावरण चिंतन

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सार

हमारे चारों ओर वायुमंडल, जलमंडल, स्थलमंडल विविध प्रकार के जीव- जंतु एवं वनस्पतियाँ हैं, इसे ही पर्यावरण के संघटक तत्त्व के रूप में जाना जाता है। पर्यावरण की सुरक्षा में ही मानव जीवन सुरक्षित है, अन्यथा अपार समस्याओं का सामना करना पड़ सकता है। यदि पर्यावरण पर सूक्ष्म चिंतन किया जाए तो वह द्विविध होता है- अंतः पर्यावरण प्रदूषण और वाह्य पर्यावरण प्रदूषण।

हमारे मनीषियों ने सहस्रों वर्ष पूर्व मानव जीवन के कल्याणार्थ पर्यावरण का महत्त्व और उसकी रक्षा प्रकृति से सान्निध्य, संवेदनशीलता, रोगों के उपचार तथा स्वास्थ्य संबंधी अनेक लाभदायक तत्त्व निकाले थे। जब हमारा मन कलुषित विचारधाराओं से भरा हुआ होता है, तब हम कहते हैं कि हमारा अंतः पर्यावरण प्रदूषित हो गया और जब वायु, जल, पृथ्वी, वनस्पति, ध्वनि आदि प्रदूषित हो जाता है तब वहीं पर्यावरण के प्रदूषण को स्वीकार किया जाता है। ध्यातव्य है कि वाह्य पर्यावरण तभी प्रदूषित होता है जब हमारा आंतरिक पर्यावरण अर्थात् मन विकृत होता है। यदि मन में प्रदूषण न हो तो किसी भी प्रकार का वाह्य प्रदूषण नहीं होगा।

औद्योगीकरण एवं भूमंडलीकरण से पूर्व मानव सहजतापूर्वक पर्यावरण के साथ समन्वय से रहता था, पीपल और तुलसी आदि पेड़- पौधों की पूजा करता था। वेदकालीन समाज में न केवल पर्यावरण के सभी पहलुओं पर सूक्ष्म दृष्टि थी वरन् उसकी सुरक्षा और महत्त्व को भी स्पष्ट किया गया था। उन्होंने प्रत्यक्ष एवं परोक्ष रूप में पर्यावरण की रक्षा की और समाज का ध्यान भी इस ओर आकर्षित किया। पर्यावरण की रक्षा पूजा का एक अविभाज्य अंग था।

A Comprehensive Study of Image Dataset Expansion Techniques for Improving Deep Learning Model Performance

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Abstract

This research paper presents a comprehensive study of image dataset expansion techniques for improving deep learning model performance. It investigates various techniques, including patch-based sampling, conditional GANs, cross-domain data generation, AugMix, and more. The correlation between these techniques and dataset expansion, as well as their impact on dataset size, diversity, and quality, is analyzed. The effects of these techniques on model performance, such as accuracy, robustness, and generalization, are also examined. The study provides insights into the strengths, limitations, and practical considerations of these techniques. The findings contribute to enhancing deep learning models by addressing data limitations through image dataset expansion.

Keywords: Deep learning, image dataset expansion, model performance, dataset diversit

Adrenaline & its Role in Promoting Evolutionary Consciousness for Sustainable Humanity

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Abstract

In our body are located a set of glands at the top of both kidneys. They are Adrenal glands and produce hormones responsible for regulating our immune system, blood pressure & metabolism. They also control hormones which initiate the flight or fight response in our behavior as a response to dangerous or stressful situations in life. These glands release a hormone called Epinephrine which causes the blood vessels to dilate, enabling them to carry more oxygen and nutrients. Blood vessels run throughout the body & are supposed to deliver more nutrients to skeletal muscles, and vessels leading to the brain induce greater brain function, creating higher levels of alertness and awareness. It also causes vascular constriction in the veins, thereby slowing the return of blood to the heart. With the dually impacting role - the nutrient-filled blood stays within target areas longer, thereby prolonging activity. Given that there are such critical functions as well as capabilities present in our own body which ensure we perform at our most efficient & consistent output in varied types of situations, it becomes an interesting area of research to explore & determine if there are viable options to utilize, augment & leverage the functions of adrenal gland in an optimal but controlled manner.