International Conference of Advance Research and Innovation (ICARI-2024) 28th January 2024







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International Journal of Advance Research and Innovation (Google Scholar)

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Message from ICARI Desk

Dear Colleagues

When the goals are big and universal, when the scope touched the national and international boundaries, when the mind aspires for the unlimited, a Voice becomes the imperative need to pierce the ears. It gives me immense pleasure that ICARI-2024 has been graced with the presence of DR.R. MURUGESWARAN Deputy Director (MPs) National Medicinal Plants Board, Ministry of AYUSH, Govt. of India, encouraged, motivated and energized us with great enthusiasm.

We got an overwhelming and very enthusiastic response from students, researchers and faculty and experts from reputed organizations. I thank to all authors for sharing knowledge and wisdom. Papers from more than seven countries were received and the book of Abstract with ISBN was prepared and distributed as conference proceedings. Papers from respective authors were presented in .ppt form, from India and abroad.

I am highly thankful to Rd. Rambir Singh (Scientist G, DST) Dr. Rajeev Sharma (Scientist F, DST). Prof. RS Misra (DTU) was honoured with lifetime achievement award. Prof. S Maji, Prof. BB Arora, Prof. RC Singh, Prof. Nand Kumar. Prof. Ranganath MS, were our Keynote Speakers and Guest of Honors and grace the occasion on 28th January 2024 with their experience, skill and knowledge.

Faculties from DTU, Dr. Akhilesh Arora, Prof. R Srivastva, Prof. SG Warker, Dr. Krovvidi Srinivas, N Yuvraj, Dr. Sanjay, PV Ram Kumar, Ms.Parinita Sinha and students of DTU add the value in the successful complication of the event. Researchers, academicians, Scientists, Engineers, Technocrats from premier institutes and universities gathered on this grand event to exchange ideas and innovations from all corners of India and abroad.

I believe that ICARI-2024 will prove to be very beneficial, enriching and fruitful and also open new fronts and vistas for future research and innovation.

Team ICARI-2024



10th International Conference of Advance Research and Innovation (ICARI-2024)

On 28th January 2024 (Sunday)

Venue

Delhi State Centre, Institution of Engineers (India), (Engineers Bhawan), 2, Bahadur Shah Zafar Marg, New Delhi-110002, India



Working Hours: 9:00AM-5.00PM

<u>Aim</u>

International Conference of Advance Research and Innovation (ICARI-2024) is a premier international conference which aims at current challenges in science and technological advancements with research updates and innovations which are shaping the future of mankind. This conference welcomes all scientists, engineers, technocrats and researchers from all walks of society to share their knowledge and wisdom for exploring solutions to current and future challenges. This platform provides an international forum for researchers to exchange ideas in recent advances on various aspects of theories, analysis, experimentation and computational methods in science, technology and management etc.

Area of Interest

It is a **multi-disciplinary conference**, which includes all areas of Science and Technology. Innovative original research papers on topics covered under the following broad areas (but not limited to). It is a multi-disciplinary conference, which includes all areas of Science and Technology. Innovative original research papers on topics covered under following broad areas (but not limited to).

Mechanical Engineering, Energy Engineering (Renewable and Non-Renewable Energy), Industrial Engineering, Production Engineering, Product Design, Industrial Design, Interaction Design, Visual Design, Automotive Engineering, Marine Engineering, Automation Engineering, Applied Sciences, Architecture And Building Materials, Bio-Mechanical Technology, Chemical And Material Engineering, Bio-Medical Engineering, Fluid Mechanics, Thermal Engineering, Environmental And Civil Engineering, Computer Science & Software, Electrical System, Instrumentation And Electronics Engineering, Mechatronics, Information Technology, Electronics And Communication Technology, Metallurgical Science, Economic Policies And Issues, Total Quality Management, Optimization Techniques, Management, etc. Authors may submit manuscript by E-mail address, as **doc file** attachments to:

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Visa Letter

Letter of invitation can be provided (if necessary) on request, for VISA processing.

Registration Desk

All participants must register before attending the conference. The appropriate registration fee includes conference kit, tea break and lunch break. Registration fee is nonrefundable. Registration fee is accepted through– Draft/Cash/ NEFT –

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-International Journal of Research and Innovation (www.ijari.org)

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At ICARI-2024, you will meet with representatives from industry, leading scientists, research professors, research scholars from all walks of science and technologies.

Guidelines for abstract

Selection of papers presentation will be based on a detailed abstract of up to 300 words and a maximum of five key words. Abstracts will be reviewed and only those abstracts approved by the reviewers will be selected. A soft copy of the abstract in Microsoft Word for Windows should reach the conference. The electronic copy should be mailed to - bsc5871@gmail.com

Paper Presentation in Absentia

Those who cannot come to Delhi but wish to present paper is also encouraged to send their abstract. Papers presented in absentia are eligible for publication in conference proceedings.

For authors who are not able to visit Delhi, due to some unavoidable reasons can present the paper in online mode.

Important Dates

Submission of Abstract	5 January 2024
Paper Acceptance	7 January 2024
Notification	
Last Date for full paper	10 January 2024

➢ ICARI 2024 will be held at Institution of Engineers (India), Delhi State Centre, (Engineers Bhawan), 2 Bahadur Shah Zafar Marg, New Delhi-110002, India. It is situated in central Delhi.

Which is 4 km away from New Delhi railway station, 5 km away from Nizzamuddin railway station (or Sarai Kaley Khan ISBT), 8 km away from Kashmiri Gate ISBT, 9 Km from Anand Vihar ISBT. It will be half km from Pragati Madan Metro station (subway) and 25 km from IG International Airport. Gate No-6, Sation ITO, Metro Voilet Line.

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Advanced Review on the Impacts of Plastic Pollution on Marine Environment and Ecosystems

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Abstract: Plastics are synthesized using organic polymers and according to the modern world and demands, plastics have been become into replacements for various apparatus such as the packing materials, electronic applications, water bottles and covering materials. In generally plastics are lighter than metal and clay materials and the handling is considerably convenient. Therefore, the usages of different types of plastics have been readily increased with. The accumulation and improper wastage have been become into a severe environmental issue because the plastics are naturally non-degradable materials the difficulties in the finding of proper discarding system especially in the domestic level. When considering the discarding of plastics, the land filling is the widely practicing method in most of countries/ regions and the direct disposal or improper disposal would be much harmful regarding the each and every part of the earth. The locations of landfills nearby the oceans or flowing streams are dangerous because of the leaching of some toxic chemical compounds from such landfills as results of the interaction between water and waste plastics such as heavy metals and organic pollutants and also the floating of plastic debris in different sizes such as nano plastics, micro plastics, meso plastics and macro plastics on the ocean would be some severe impacts on the marine ecosystems and livings because the tendency of the releasing of different toxic chemical compounds such as polystyrene into sea water during the slow degradation processes. Also, the floating plastic debris creates some habitations for various colonizing microorganisms and ultimately the migrations of such colonies would be an impact of the equilibriums of such eco systems. The sorption of some other pollutant's presence in marine environment such as some persistence organic pollutants by the floating plastics is recognized as a threat for colonizing microorganisms. The proper dumping, reusing, recovering, recycling and the awareness of proper wasting of plastics are the common recommendations regarding the marine pollution consequence.

Keywords: Plastics, Micro plastics, Meso plastics, Micro plastics, Marine pollution, Eco pollution.

ICARI-AS-24-01-02

Career Women's View of Single Parenthood in Lagos State, Nigeria: Factors and Trend

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Abstract: Single female adults with dependent child(ren) make up the majority of lone-parent families, with one person who can make money for the family. The purpose of this study was to assess the factors and trends of career women's view of single parenthood in Lagos state, Nigeria. A descriptive case study was conducted among 25 learners aged 30 years and above with at least a child. Data were collected with a questionnaire and analyzed using frequency counts, percentages and mean scores. The results showed that single career women's perceptions of the trend in single parenthood are based on their beliefs that the factors contributing to single parenthood among career

women are age of women, choice/personal preference, family background, economic benefits, and family benefits. The study recommended that the marriage institutions be strengthened encourage stable family patterns through the provision of social welfare services such as preventive strategies on pertinent information about family life and counseling to adolescent girl children on the need for achieving good family life.

Keywords: Single parenthood, women, career factor.

ICARI-AS-24-01-03

Fundamental and Advanced Characterization of Sri Lankan Feldspar for Advanced Industrial Uses

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Abstract: Feldspar is a group of minerals that mainly consist with aluminosilicates with some trace elements such as Ca, Na and K and also feldspar is one of most abundant minerals in the earth crust. Usually the minerals which are belonging to the group of feldspar have been investigated as strong abrasive materials, raw materials for both ceramic and glass industries and gem stones. In the existing research, there were expected to investigate some common and distinctive properties of feldspar that available in Owala-Kaikawala area in Sri Lanka and disclosing of their applicability and development of further advanced industrial applications. The collected representative feldspar samples were analyzed using X-ray fluorescence (XRF) spectrometer, optical microscope and Scanning Electron Microscope (SEM). As the major outcomes of the existing analysis, there were observed ~50% of K, ~40% of Ca with trace amounts of Fe and Zn. According to the analysis of the microstructures of feldspar, it seems that colorless, white and pinkish white grains with the shapes of tabular and prismatic crystals. In the comparison of elemental compositions of such feldspar, it is possible to conclude that the presence of both alkaline feldspar (orthoclase) and plagioclase feldspar (oligoclase) because of the presence of K and Ca. Also, this feldspar could be further developed as the refractory materials for heat transferring processes, catalysts for some chemical processes and ion exchanging materials in the water treatment applications because of the higher Ca content.

Keywords: Feldspar, XRF analysis, Microscopic analysis, Water treatment uses.

ICARI-AS-20-01-04

Artificial Intelligence: A Way to Promote Innovation

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Abstract: The theme of artificial intelligence is how to use it to make computers useful in solving problems concerning health We interpret the data that is obtained by the diagnosis of various diseases, such as various types of cancer, diabetes, etc. the largest scientific goal of information construction—the theory of processing intelligence. It is the science and engineering of manufacturing. intelligent machines, especially an intelligent computer. This work presents artificial intelligence (AI). Study how to make computers that have some characteristics of the human mind. AI systems are now routinely used in the economy, medicine, and the military. They also have broad data that has the potential to solve many problems in clinical trials. This article provides an overview of AI and its innovations. It's one of the cutting-edge technologies shaping the future of pharmacy. It includes various advanced systems such as mathematics, machining performance, cloud computing, and algorithm

design have accelerated the development of methods that can be used to analyze, interpret, and make predictions using these data sources. We can learn something about how to get machines to solve problems by observing other people. There are two main areas where there has been sporadic research growth: genomics and digital medicine. This article examines the introduction, definition, history, applications, and innovation in pharmacy.

Keywords: Artificial intelligence, Clinical studies Challenges, innovations, complications of diseases.

ICARI-AS-24-01-05

Leveraging secondary brand association and co- branding

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Abstract This particular research paper is based on Oreo and its secondary brand association. One potentially effective technique for organizations to establish brand equity for their products and services is to genuinely relate their brands to other people, places, and things. Consumers' attitudes regarding the company's brands may shift as a result of their association with these other entities. The brand resonance model is examined and utilized to assist understand how these secondary associations might transform brand knowledge. Theoretical insights are developed, and practical difficulties are recognized and discussed to aid in brand strategy and measurement.

Keywords: Co-branding, marketing, Oreo, secondary brand.

ICARI-AS-20-01-06

Influence of Organizational Policy and Employees Retention in Telecommunications Industry, Lagos State

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Abstract: The study investigated the influence of organizational policy on employee retention in the telecommunications industry in Lagos State. The study adopted the descriptive survey research design. The sample size of 71 human resources practitioners were selected through convenience and purposive sampling techniques because they were subject experts who were easily accessible to provide in-depth and detailed information about the phenomenon of the variables of the study. The questionnaire items were validated for face and content validity. After the pilot study, the Cronbach Alpha Co-efficient r-value of = 0.81 showed internal consistency and high reliability. The effect of organizational policy on employee retention was significant and the implementation of organizational policy influenced employee retention in the telecommunications industry, Lagos State. The study revealed a strong positive significant relationship between the two variables at (r = 0.609, p = 0.00). The multiple correlation coefficients (R) of the independent variable with employee retention implied 67% association between the variables and the regression ANOVA produced (F (3, 68) = 28.10, P < 0.05). The existence of organizational culture and policy in the telecommunications industry, Lagos State was significant as reflected in the organizational structure, availability of HR Handbook and Policy, the practice of the tradition and culture of innovation, and employee engagement and service delivery. There was a strong positive correlation between organizational policy and employee retention in the telecommunications industry, Lagos State. The study recommended that organizations should institutionalize capacity development programmes to align with the National Policy for the Promotion of Indigenous Content in the Nigerian Telecommunications Sector to ensure capacity building of Nigerians, minimum Expatriate Quota and the implementation of the succession plan in the industry. Given the importance of the telecommunications industry to the vision of transforming the country to a digital economy and

the need to have qualified and stable manpower to drive the industry, a dedicated national university for the telecommunications industry in Nigeria is pivotal to manpower development and sustainable employee retention in the industry.

Keywords: Organizational Policy, Employee Retention, Workplace Longevity, Workforce Management, Telecommunications Industry.

ICARI-AS-24-01-07

ICARI-AS-24-01-08

Therapeutic Painting and Sexual Violence Expressed by Students in Selected Secondary Schools in Bundibugyo District in Uganda

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Abstract: Sexual violence has often caused distress to many people and a lot has been written proposing solutions to this vice. Restoring hope among people who have been affected by sexual violence in Secondary schools in Bundibugyo District requires concerted effort and adopting ways that help to relieve the affected people of stress resulting from their experience with sexual violence. The current study focused on how therapeutic painting can be utilized to describe in detail lived experiences relating to ever increasing sexual violence in secondary schools in Bundibugyo district. Despite the various forms of violence that affect secondary school students, sexual violence seems to be a vice that greatly affect school children and young children are always shy to verbally express how they are affected. This study therefore, was aimed to investigate the relationship between Visual art therapy and sexual violence expressed by students in selected Secondary Schools in Bundibugyo District. The following objective guided the study: To examine the statistical relationship between therapeutic Painting and sexual violence expressed by students in selected Secondary Schools in Bundibugyo District. 400 S2 students participated in this study, these included; Semuriki High School-Izahura-163, Bukonjo Seed School-17, Bundikahungu Seed school-75, St Mary's Simbya Secondary School-145.

Keywords: Violence, Sexual Violence, Therapy, Therapeutic, Painting.

Mythological Interpretation of Shivaji Sawant's Mrutyunjay: A Study

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Abstract: Mythology has always piqued the intense curiosity and intrigue of literature. Indian literature is no different. Numerous literary works have continued to be inspired by the Vedas, Puranas, and Upanishads. The writers of all times have retold Indian myths to fit the present context as a result of the prominence and popularity of Indian mythology. When ancient myths are transformed into the vernacular of modern media and technology these mythological tales, when interpreted as reflections, help the English-speaking, globalized class to find their place thus resolving the identity conflict. Ancient mythological novels can be analyzed using cultural symbolism. As a result, a legitimate explanation for the rebirth of Indian myths in Indian fiction written in English can be found in the fear over Indian identity in the globalized era. In the era of capitalist development, myth becomes a product that may be consumed. They reveal historical and social reality that has been altered by its psychological value when it is closely examined. These legendary novels exemplify the connection between the literature and history,

which they metaphorically reflect, when interpreted as tales or mystical stories. They are the channel for the literature's deeper tensions and anxieties, which are exposed through Ideological Psyche. **Keywords:** Mythological, Shivaji, Mrutyunjay.

ICARI-AS-24-01-09

A Predictive Evaluation of the relationship between Operation Workforce Prerequisites Sustainable development

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Abstract: For instance, poor education leads to a high unemployment rate in isolated rural regions. Students from various areas get education but not educational chances, which is the biggest difficulty that regional youth confront today. Most rural employees have just one way to improve their lives or income, and that is via education, but they lack the necessary knowledge, skills, and ability to do so due to a lack of educational options. A pleasant learning environment empowers all students to be economically productive, to create sustainable development, to contribute to free and stable societies, and to increase individual wealth. Unqualified education is a trap for all students. You never know what people will pay for it in the future. It's preferable to be alphabetical rather than allegedly talented and jobless. In India, poor schooling results in poor learning outcomes.

Supply chain management is the administration of the flow of goods and services, and it includes all procedures that turn raw materials into completed products. The use of knowledge, statistical methodologies, and machine learning technologies to forecast future events based on previous data is known as predictive analytics. The major purpose of this article is to examine current human resources, forecast future needs and availability, and take measures to ensure that the supply of people and skills meets demand.

Keywords: Quality Education, Predictive evaluating, operation work force, Skill manpower, Linear regression.

ICARI-AS-24-01-10

Issues and Prospects in the Use of Artificial Intelligence in Human Resource Management

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Abstract: The gap between the promise and reality of artificial intelligence inhuman resource management and propose ways forward. We highlight four problems with using data science approaches to human resource tasks: the complexity of HR phenomena, the restrictions imposed by tiny datasets, accountability problems related to fairness and other ethical and regulatory constraints, and 4) the possibility of unfavorable employee responses to management choices using data-based algorithms. This study suggests practical solutions to these issues, focus in

go three over lapping concepts-cause and effect, randomization and trials, and employee input-that might be both economically efficient and socially suitable for employing data science in employee management.

Keywords: Quality Education, Predictive evaluating, operation work force, Skill manpower, Linear regression.

ICARI-AS-24-01-11

Employee engagement practices during the COVID19 lockdown: Human Resource Management Challenges and a Roadmap

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Abstract: Due to the lockdown in the present business environment amid the COVID-19 epidemic, employee engagement has become one of the most significant concerns for human resource managers and practitioners in enterprises. In light of the recent coronavirus pandemic, this essay will analyse the many ways in which businesses kept their staffs active. In order to keep their employees motivated during these trying times, businesses are always coming up with new and interesting methods to do so. This is an exploratory study based on the literature found in academic journals, internet media outlets, and the World Health Organization. Organizations are developing a wide variety of ways to get people involved in the midst of the pandemic. These include: online family engagement practises; virtual learning and development; online team building activities; webinars with industry experts; online conducting weekly alignment sessions; online conducting team meetups over video conference for lunch; online conducting short online game sessions; virtual challenges and competitions; online courses; online appreciation sessions; online communications exercises; and live sessions for news. Employers and employees alike may reap several benefits from instituting regular engagement activities into the work-from-home schedule. Staff members that participate in such events help their companies grow and develop. Despite the spread of the deadly COVID-19 virus, the company's employees have remained committed to their jobs.

Keywords: Employee, Covid 19, Human Resource, management.

ICARI-AS-24-01-12

Economic Strategies for Sustainable Development: Finding a Balance Between Social Justice, Environmental Protection, and Growth

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Abstract: This study examines how economic policies might be integrated to balance social justice, environmental protection, and economic growth in order to achieve sustainable development. It includes effective case studies from diverse regions and looks at the opportunities and difficulties of integrating sustainability goals into economic policies. The report offers suggestions to policymakers on how to create and carry out economic policies that support growth, social justice, environmental preservation, and sustainable development.

Keywords: social equity, environmental protection, growth, interlinkages, economic policies, and sustainable development.

ICARI-AS-24-01-13

Organizational Innovation's Impact on Overall Quality Management

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Abstract: The competitive priority is greatly impacted by Total Quality Management (TQM) strategies in terms of cost, quality, time, and innovation. The speed at which technology is changing presents issues for many firms in the competitive market. More creativity and innovation in product lines, management techniques, and manufacturing methods have been advocated by management theorists and practitioners alike. On the one hand, TQM, or total quality management, has long been a prominent management technique. Globally, TQM is becoming widely recognized as a competitive advantage, and few businesses can afford to ignore it. A large aspect of TQM is continual process improvement. Continual improvement drives an organization to be both analytical and creativity.

Thus, this paper's goal is to discover and extract the characteristics of TQM and innovation. Four TQM dimensions and two innovation dimensions have been identified in the first section of the study. The four TQM dimensions are leadership, employee relations, customer focus, and continuous improvement, while the two innovation dimensions are process and product innovation. Furthermore, this study examined the causal relationships between these parameters using the DEMATEL Method.

Keywords: Total quality management, Innovation, DEMATEL method, Continual improvement

ICARI-AS-24-01-14

Participation of Indian Manufacturing Sector in Global Value Chain

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Abstract: This paper is an attempt to estimate the level of participation of Indian manufacturing sector in the global value chain. This is an attempt to reframe the Balassa Bela index to segregate the different industries according to level of participation in GVC. The Balassa Bela index was applied for traditional trade statistics. Trade statistics in particular are collected in gross terms and records several times the value of intermediate inputs traded along the value chain. As a consequence, the country of the final producer appears as capturing most of the value of goods and services traded, while the role of countries providing inputs upstream is overlooked. Bilateral trade statistics and output measures at the national level makes it difficult to visualise the "chain" or the production network. In this process WTO and OECD input output table data set TiVA provides value added based trade statistics. This paper attempts to measure relative comparative advantage in terms of value addition in exports of different manufacturing sector. This provides an idea of level and nature of participation in value chain in these sectors.

Keywords: Global Value Chain, Balassa Bela index, Manufacturing, Tiva.

ICARI-AS-24-01-15 Empirical Investigation of Export-Led Growth Hypothesis: With Reference to the Indian Agriculture Sector

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Abstract: The study would try to understand the causality between exports of the agriculture sector and its gross domestic output using the data from 1961 to 2021 by incorporating methods of the autoregressive distributed lag model and the Granger causality test. The purpose of the study is to understand how export-led growth contributes to the specific sector or how sectoral growth contributes to exports. The results of the unit-root test reveal that the series of agricultural output and agricultural exports are integrated into order one. The results of the Granger causality test reveal a unidirectional relation between agricultural output and agricultural exports. It indicates that agricultural output Granger causes agricultural exports and thus, provides no evidence of export-led growth in the Indian agricultural sector. The results of the autoregressive distributed lag-bound testing approach reveal the direct and long-run stable relationship between agricultural export and agricultural output. The study suggests a stronger policy to strengthen agricultural output which can enhance agricultural output and hence, the position of agricultural output in the international market.

Keywords: Agricultural Exports, Agricultural Growth, ARDL, export-led growth.

ICARI-AS-24-01-16

Economic problems and solutions of eunuchs in literature

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Abstract: In Hindi fiction literature, especially among the novelists, there are many such writers like Mahendra Bhishma, Girja Bharti, Pradeep Saurabh, Chitra Mudgal etc. who are currently working for the welfare of these marginalized groups like LGBT. But he is using his pen. Kinnar Katha written by Mahendra Bhishma is a novel, in which the author has drawn our attention to many aspects of the Kinnar community. Mahendra Bhishma not only wrote many novels like Kinnar Katha, Main Payal but also made various genres a part of his creative art. Be it a story, a story collection or a feature film (stories) like Terah Karvatein, Ek Unsent Letter, Kya Kah Kah, Teesra Kambal, Lal Dora etc. (story collection) Jai Hind ki Sena. Produced short films on two stories and a feature film on the novel Kinnar Katha. Mahendra Bhishma was also honored with many awards. Which are as follows – Munshi Premchand-Katha Samman, Vidyanivaas Mid Award, Mahakavi Awadhesh Sahitya Samman etc. Apart from being a novelist, Mahendra Bhishma, who was a first-class officer in the Lucknow bench of the Honorable High Court of Allahabad, expresses sensitive and thought-provoking thoughts in his foreword like this, after all, God do injustice

to them. Hindi do we keep them away from ourselves and in social society. Keeping them marginalized, out of the box. The lens of obscenity in our thinking towards them. Hesitate in taking a walk with a eunuch or making him sit in our drawing room and having a snack with him. Thoughts on this. To connect them with the mainstream of the society, respect them completely. According to them, they have to be provided employment as per their wish. Like us, they too are the children of their father, born from their mother's womb, they are not asking for much. We should be considered human beings and not eunuchs.

Keywords: Economics, eunuchs, Hindi, Society.

ICARI-AS-24-01-17 Sailing through Myth and Engineering: Maritime Insights from the Ramayana

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Abstract: This research investigates the nexus of myth and maritime engineering in the Ramayana, uncovering insights into ancient Indian seafaring. Through an in-depth analysis of watercraft descriptions, Setu Bandha (the bridge to Lanka), and Hanuman's extraordinary journey, the study illuminates the sophisticated maritime technology embedded in the epic. In tandem, contemporary novels such as Amish's Ramayana Trilogy, Chitra Banerjee's -The Forest of Enchantments, and Devdutt Pattanaik's Sita offer modern interpretations, enriching the discourse. Comparative analyses with historical shipbuilding practices reveal potential technological insights, forging connections between ancient and contemporary maritime knowledge. The study navigates scholarly debates, considering alternative interpretations within cultural and historical contexts. Culminating in a comprehensive conclusion, it synthesizes key findings, discusses implications for understanding ancient marine engineering, and proposes avenues for future research. This work contributes to a nuanced understanding of the intersection between myth, memory, and maritime technology in the Ramayana and its relevance to the present.

Keywords: Myth, Ramayana, Maritime technology, memory.

ICARI-AS-24-01-18

Unraveling the Connection: A Methodical Investigation into Drivers of **Sustainable Investments**

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Abstract: Purpose: Sustainable investments (SI) refers to pursuing financial gains while enhancing environmental, social and governance (ESG) value. The purpose of this study is: first, to systematically review articles on SI; second, to identify and classify types for investors in SI third, to map out linkages between types of investors in SI and drivers for SI and fourth to provide future research directions to regarding adoption of ESG in investment decisions. In this study, a total of 81 articles (2014-2023) were selected using PRISMA protocol from web of science database. These articles were then analyzed using VOS viewer software. The systematic review revealed that the number of published research articles on sustainable investments has exponentially grown in the last 8 years. The United States is the main contributor, followed by United Kingdom and China, and most of these countries are cooperating among themselves. Using citation analysis, the study identified the most influential journals, authors, and documents in the underlying research field. A total of three themes based emerged from the network analysis that was conducted on the selected set of research papers. The study identified a total of 12 investor motivations and 9 drivers of SI. A mapping exercise was conducted by author to assess the interlinkages between investor motivations and drivers in SI to provide a more comprehensive outlook.

Policymakers can draw inferences from this study and further explore the various barriers, mitigation strategies and opportunities associated with the successful implementation sustainability practices which can further help

corporations and investors to embrace ESG into their investment decisions. Theoretical Implication: From a theoretical standpoint, our paper may assist academicians and scholars in exploring elements related to various corporate governance theories, such as agency theory, stakeholder theory and modern portfolio theory. Future researchers and scholars can conduct a comparative study of developed and developing economies regarding the integration sustainability practices like ESG in investor decisions in order to get a comprehensive outlook. **Keywords:** Sustainable investments, ESG, Biblioshiny 2.0, VOS viewer, citation analysis, thematic mapping

ICARI-AS-24-01-19

Maritime Travel and Dyslexia: Understanding Challenges and Strategies for Success

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Abstract: Dyslexia, a neurological condition affecting language processing, can present unique challenges in various aspects of life. This research paper explores the intersection of dyslexia and maritime traveling, delving into the difficulties individuals with dyslexia may encounter in this context. The paper aims to shed light on the specific challenges faced by individuals with dyslexia in maritime environments, as well as proposing strategies and accommodations to enhance their success and safety during sea journeys.

Keywords: Dyslexia, Maritime Travel, Enablers, Strategies, Accommodations.

ICARI-DI-24-01-01

Design and Development of a Drowsiness Alert System while Driving

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Abstract: Drowsiness while driving is very dangerous and it is very difficult to recognize the state of the driver. As a result, if the driver neglecting the focus while driving diminishes the driver response time, a very short frame of time is to respond within that driver have to respond otherwise misfortune of life and property can happen, by taking into consideration a forward step has been made to concur the life on the road. We will monitor the drivers' focus on the road with the spectacle glass mounted with the infrared module and Arduino on the eye to monitoring the eyelid of eyes and transmitting the signals to the receiver end, and receiver end will process the signal with the microcontroller and gives the alert signal according to data programmed in the microcontroller. Its prototype is developed and it is working successfully which keeps the driver awake. This device will prevent the sleepless condition of the driver the prevent accidents.

Keywords: IR Sensor, Drowsy, Infrared module, Driver, Driver monitoring Device, Microcontroller.

Emulating Nostalgia in Modern Video Games A Framework for Game Developers

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Abstract: Nostalgia is a powerful and timeless emotion that transcends generations, capable of transporting individuals to cherished moments of their past. In the realm of video games, nostalgia plays a pivotal role, evoking fond memories and connections with gaming experiences of yesteryears. This research paper embarks on a comprehensive journey to quantify the demand for nostalgia in video games, assess how existing some game developers evoke nostalgia in video games. It delves into the techniques employed by game developers to effectively evoke nostalgia and presents a structured framework to guide game developers in integrating nostalgia into modern video games.

Keywords: Nostalgia, Gaming, Nostalgia in Video Games, Video Game Psychology, Childhood, Emotions in Video games, Game Developers, Identity.

ICARI-DI-24-01-03

Analyzing the Relationship between Sustainable Public Transportation and Delhi's Urban Environment: A Comprehensive Overview

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Abstract: This review article examines the relationship between public transportation and sustainability in the context of Delhi, India. It provides an overview of the current state of public transportation in Delhi, including its strengths and weaknesses. The impact of public transportation on sustainability is also explored, including its potential to reduce greenhouse gas emissions and improve air quality. The review highlights the importance of a three-dimensional strategy that considers the environment, society, and economy. Societal factors, such as pollution and congestion, are the main focus of this study, and the role of public transportation in promoting social welfare is emphasized. Overall, the review emphasizes the crucial role that public transportation can play in promoting sustainability in rapidly growing cities like Delhi.

Keywords: Sustainable Public Transportation, Environment, economy.

Emotional Expression Through the Ages

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Abstract: This paper aims to explore and establish a gap and a contrast between the two age groups (above and below 30) in emotional expressiveness and mental health awareness. In this paper, our aim is to fill the gap by conducting a survey of two age groups: those under or equal to the age of 30 (the younger generation), and those above 30 (the older generation), asking them various questions to gauge their emotional expressiveness and awareness of mental health issues. Two types of surveys were conducted: a sit-in interview and an online multiple choice questions (MCQ) style survey. The data was gathered from a sample of Ninety adults from Delhi, India, by conducting two tests, MCQ type Survey and personal interviews afterwards. The results established and Validated that the younger generation is more expressive about its Emotions and less stigmatic about mental health problems compared to the older generation.

Keywords: emotional cohesion, expressiveness, mental health, anxiety, emotions, happiness, Gen Z, Boomers

ICARI-DI-24-01-05

A Review of Elderly Care in India: Challenges, Solutions, and a Comparative Analysis with Japan

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Abstract: by the nation's swiftly aging population. The study unfolds through a three-fold exploration, commencing with a thorough analysis of the challenges faced by the elderly in India. It progresses to offer a strategic roadmap for establishing and managing elderly care homes, addressing the evolving needs of this demographic. The comparative analysis with Japan provides a global perspective, highlighting diverse approaches in cultural, demographic, and policy contexts. The challenges in elderly care are rooted in the shifting dynamics of family structures and the increasing life expectancy of the aging population. Social isolation, healthcare access disparities, and safety concerns emerge as focal points, necessitating holistic solutions. The rise of professional elderly care homes becomes pivotal, catering to the unique healthcare needs of the elderly and ensuring a secure and supportive environment.

The strategic roadmap outlined in this research paper provides a comprehensive guide for establishing successful elderly care homes in India. Market research, feasibility studies, and a well-defined business plan serve as foundational elements. Legal compliance, optimal location selection, and meticulous staffing considerations are emphasized. Financial planning, safety and security measures, and a commitment to quality of life services contribute to the viability and sustainability of elderly care homes. Healthcare infrastructure, government programs, and policy differences further underscore the distinctive approaches to elderly care. This research paper serves as a valuable resource for individuals and organizations seeking to address the growing need for elderly care in India. By unraveling challenges, proposing strategic solutions, and providing a comparative lens with Japan, the study contributes to a nuanced understanding of elderly care in different societal contexts. The evolving landscape of elderly care requires a commitment to adaptability and improvement, ensuring the well-being and dignity of the aging population.

Keywords: Elderly care aging, population.

ICARI-DI-24-01-06

Exploring and Developing Alternatives for Visual Narrative Design in Children's Literature

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Abstract: This study aims to investigate and create alternatives to visual narrative in children's books. The study aims to investigate the potential of alternative approaches, such as interactive digital media, augmented reality, and unconventional art styles, in enhancing the visual narrative experience for young readers. By examining the benefits, challenges, and implications of these alternatives, the research provides insights for authors, illustrators, and publishers in creating innovative and engaging visual narrative approaches and explores technical and practical considerations associated with these approaches. The study throws light on the importance of visual narrative in children's books, particularly in terms of promoting imagination and creativity, improving understanding, and supporting cognitive and emotional development. The research offers practical implications and recommendations for creators in adopting these alternative approaches and pushing the boundaries of visual storytelling in children's literature.

Keywords: Visual Narrative, Children's Literature, Illustrations, Storytelling, Interactive Digital Media, Augmented Reality (AR), Virtual Reality (VR), Cognitive Development, Emotional Development.

ICARI-DI-24-01-07

A Comprehensive Analysis of Key Factors in User Experience Design

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Abstract: Designing for the user experience (UX) is essential for the success of digital goods and services. Designers must consider a variety of elements that influence customer pleasure, engagement, and overall product success while creating extraordinary user experiences. Through the evaluation of case studies, this review article tries to completely assess key variables in UX design. Users can acquire useful insights into the effective implementation of UX design concepts and their impact on user happiness by looking at real-world examples. The findings show that ease of use, accessibility, aesthetics, responsiveness, and navigation are the primary factors that lead to a positive user experience in product and service design.

Keywords: User experience (UX) design, digital and physical product development, easy to use, user engagement, Product and service design

Factors Influencing the Sustainable Performance of Urban Passenger Transport Systems: A Comprehensive Review

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Abstract: The sustainability of urban passenger transport systems has become a critical concern due to the challenges posed by rapid urbanization, population growth, and environmental degradation. This review article aims to provide a comprehensive analysis of the various factors influencing the sustainable performance of urban passenger transport systems. By examining a wide range of research studies and practices from different geographical contexts, this review identifies key factors that contribute to the sustainability of urban transport, including technological advancements, policy interventions, social and behavioural aspects, and infrastructure development. The findings of this review will help policymakers, urban planners, and transport authorities in developing effective strategies to enhance the sustainability of urban passenger transport systems.

Keywords: Urban passenger, transport system, environment, urbanization.

ICARI-DI-24-01-09

Coloring the Healing Journey: The Impact of Color Psychology in Pediatrics Hospital Management

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Abstract: The comprehensive study on the "Impact of Color Psychology in Hospital Management: A Case Study in Paediatrics Hospitals" explores the profound influence of color choices on paediatrics hospital management, with a focus on their effects on patients, staff, and families. The research findings reveal that color psychology plays a pivotal role in creating healing environments tailored to the unique needs of children. Warm and vibrant colors, such as yellows and reds, are shown to uplift the mood of young patients in play areas, while softer pastels like blues and greens can soothe and potentially aid in pain perception in recovery rooms. Color psychology extends to staff perceptions, where a well-designed hospital with carefully chosen colors can boost morale, enhance job satisfaction, and foster better communication and teamwork among healthcare professionals. For families, the study highlights the role of colors in alleviating stress and anxiety, advocating for comfortable and relaxing spaces in waiting areas and family rooms.

These findings have critical implications for hospital management, including potential improvements in patient outcomes, staff satisfaction, and family experiences. The study underscores the need for future research on cultural variations, long-term effects, multi-sensory design, cost-effective solutions, and patient and family involvement in hospital design. Incorporating these insights can lead to more compassionate, supportive, and effective healthcare environments for pediatric patients and their families. In essence, this study illuminates the transformative power of color in pediatrics healthcare settings. It emphasizes that color choices are not merely aesthetic decisions but strategic tools that can profoundly impact the emotional well-being and experiences of all stakeholders in the hospital environment. The careful selection of colors contributes to a healing environment that supports the unique needs of children, fosters staff satisfaction, and eases the burden on families during challenging times. Ultimately, the study highlights the profound connection between color psychology and hospital management, paving the way for more compassionate and effective healthcare environments for pediatric patients.

Keywords: Color Psychology, Pediatrics Hospital Management, Healing Environments, User Experience.

Understanding the Interplay of Flexibility, Control, and Sensitivity towards Green Constraints in Product Design: A Review

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Abstract: This review article explores the interplay of flexibility, control, and sensitivity in the early stages of product lifecycle design, with a specific focus on incorporating green constraints. The objective is to enhance the efficiency and effectiveness of product development while minimizing environmental impact. By analyzing research, methodologies, and case studies, this article highlights the importance of considering green constraints from the outset of product design and provides insights into leveraging flexibility, control, and sensitivity for sustainable outcomes. Modular designs, flexible platforms, and configurable options enable upgrades, repairs, and reuse, extending product lifecycles and reducing waste. By monitoring and managing environmental performance, designers can minimize impacts and promote ethical sourcing and manufacturing through effective supply chain management. Sensitivity analysis helps designers understand how variations and uncertainties impact product performance and environmental footprint. By assessing the sensitivity of design parameters and conducting life cycle evaluations, designers can identify critical elements and optimize design solutions to minimize environmental footprints. However, challenges persist in integrating environmental constraints, managing trade-offs, and ensuring data availability and quality. Overcoming these obstacles requires interdisciplinary collaboration, standardized data collection, and advanced simulation and modeling technologies.

Keywords: Flexibility, control, sensitivity analysis, product lifecycle design, green constraints, design parameters, sustainable product design.

ICARI-DI-24-01-11

Color Psychology and Consumer Behavior: Understanding the Impact of Demographics and Nationalities on Branding and Marketing Strategies

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Abstract: This study investigates the influence of color psychology on consumer behavior, focusing on diverse demographics, such as age, gender, nationality, geographic region, and industry. Extensive research has indicated that colors play a substantial role in shaping consumers' purchasing decisions and emotional reactions. Moreover, the strategic use of specific colors can impact consumer perception, brand recognition, and overall sales. Therefore, comprehending the variations in color preferences and associations across demographics and nationalities becomes paramount in developing effective branding and marketing strategies that effectively resonate with target audiences. The study explores the impact of color psychology on consumer behavior by investigating color preferences among participants based on their location and occupation using an ANOVA analysis. The null hypothesis assumes no significant difference, while the alternative hypothesis proposes a difference in preferences. The significance level is set at 0.05. The ANOVA results indicate a strong evidence of significant differences in color preferences among groups (F-value = 75.511, p-value < 0.0001). The sum of squares calculations supports this finding. Consequently, it is concluded that location and occupation influence individuals' color preferences significantly. These insights offer valuable guidance to businesses and marketers, enabling them to strategically select colors that resonate with their target audiences, improve brand recognition, and elicit positive consumer responses. Moreover, this research contributes to the understanding of color psychology's role in shaping consumer decisions, making it pertinent in branding and marketing strategies.

Keywords: Color Psychology, Consumer Behavior, Branding, Marketing Strategies, Demographics, Nationalities.

Integration of Colours to Enhance Smart Cities of India With Cultural Significance

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Abstract: In this study, we explore the significance of color s in various cities of India and their impact on the cultural, architectural, and tourism aspects. Each city has its own unique color association and significance, contributing to the visual appeal and symbolism of these vibrant destinations. Jodhpur, known as the Blue City, showcases the predominant use of blue paint on its houses, creating a striking contrast against the desert landscape and offering a unique visual identity. Jaipur, the Pink City, earned its name when it was painted pink to welcome a royal visit, symbolizing hospitality and warmth. Udaipur, the White City, uses white marble in its architecture, signifying purity and peace. Amritsar, the Golden City, boasts the iconic Golden Temple covered in gold leaf, representing divinity and prosperity. Jaisalmer, also known as the Golden City, features golden sandstone architecture that blends harmoniously with the desert surroundings. Kolkata, the City of Joy, is characterized by its vibrant culture, with the annual Durga Puja festival showcasing colorful decorations and artistic displays.

Agra, the City of Love, is home to the Taj Mahal, renowned for its ivory-white marble that symbolizes purity and beauty. Other cities like Jhansi, Ahmedabad, Srinagar, Pondicherry, Bundi, Rishikesh, Pushkar, Varanasi, Thiruvananthapuram, Aizawl, Mumbai, Guwahati, Chennai, Mysore, and Chandigarh also have their unique colors and cultural significance, adding to the diverse tapestry of India. The colors not only define the identity of these cities but also create memorable experiences for visitors and residents alike, making them vibrant and captivating destinations. In conclusion, the use of colors in Indian cities reflects their cultural, historical, and spiritual elements, adding to the overall ambiance, cultural identity, and tourism appeal. These colors not only enhance the visual charm but also symbolize the rich heritage and traditions of each city, making them truly unique and captivating places to explore.

Keywords: Colors, Smart City, Cultural Significance, Psychological Impact, Aesthetics, Designers, Architect, User Experience.

Taxonomy of Products we play with toys, sports equipment and reconfigurable products

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Abstract: A product taxonomy is a structure for organizing all available products so that customers can find what they want in as few clicks as possible. In general, it works like a product hierarchy that organizes products into categories. Then use tags to group the products in each category. Attributes (such as color and size) are then applied to products in each category.

As a result, customers can easily navigate through all levels to find exactly what they are looking for. Multiple independent taxonomies can also be overlaid on the same data for different views. For example, in a music database, you can find products by genre or record label. When the right product appears in search, the likelihood of a purchase increases exponentially. Taxonomies organize everything behind the scenes to make this possible. **Keywords:** Taxonomy, product design, customer.

Sustainable Sneaker Revolution: Intersection of 3D Printing Augmented Reality and Contemporary Streetwear

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Abstract: At the core of this transformation lies the unique concept of 3D printed shoes enhanced by AR customization—a novel approach that could reshape contemporary and street fashion. this study of exploration and innovation, we'll understand the complex, yet interesting interplay between 3D printing and Augmented Reality, developing a future where fashion transcends mere garments and becomes an immersive experience for everyone. Through customization, sustainability, and cutting-edge aesthetics, this literature review paper envisions a world where 3D printed shoes can emerge as the trailblazers in the contemporary and street fashion scenes, challenging norms and offering a fascinating glimpse of what we can achieve in the near future. This technology can help express themselves like never before, thanks to the huge customization potentials. Beyond providing a tailored fit using the AR technology, these shoes hold the potential to mitigate the environmental concerns often associated with traditional manufacturing methods.

Keywords: 3D Printing, Augmented Reality (AR), Customization, Street Fashion, Sustainability.

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Impact of 3D Printing on Industry: A Comprehensive Analysis

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Abstract: In the ever-evolving landscape of technology, the advent of 3D printing has ushered in a transformative era for various industries, presenting unprecedented opportunities for innovation and efficiency. This research paper is a deep dive into the multifaceted effects of 3D printing, exploring its impact on manufacturing processes, supply chain management, product design, and the overarching economic dynamics. Through a comprehensive examination, combining existing literature, real-world case studies, and empirical evidence, we aim to unveil the nuanced and far-reaching influence of 3D printing across diverse sectors. It's not merely about machines producing objects; it's about reshaping the fundamental paradigms of how things are made, disrupting traditional manufacturing, redefining supply chain structures, influencing the creative realms of design, and ultimately leaving an indelible mark on the economic fabric of industries. Welcome to the 3D-printed revolution—a journey into the heart of innovation that is shaping the future of industry.

Keywords: 3D printing, rapid prototyping, supply chain management, design freedom, lightweight structures, economic implications, innovation.

Understanding the Impact of Artificial Intelligence in Professional and Personal life

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Abstract The rapid evolution of technology may lead to a gap in professional and personal life balance, the use of AI in decision-making processes can sometimes result in ethical dilemmas. As society becomes increasingly interconnected, the integration of the latest technologies has revolutionized the way we work and live. This paper presents a qualitative study that aims to identify the influence of technology on human resources as well as their impact on productivity, employment dynamics, work-life balance, and the overall fabric of our personal lives.. The participants in the study are people who hold key positions in private and public organizations. This review paper delves into the multifaceted influence of cutting-edge technologies on contemporary work environments and personal lifestyles.

As AI technologies become increasingly integrated into various facets of our daily existence. It underscores the importance of ongoing research, user-centric design, and proactive measures to address challenges, ensuring that the integration of RCTs contributes positively to both professional and personal spheres in an increasingly connected world.

Keywords: Artificial intelligence, professional life, personal life, human behavior, changing technology, automation.

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Women and Consumer Behavior in the Cosmetics Industry: Analyzing the Impact of Intersectionality

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Abstract: Increasing awareness of beauty products, rising personal grooming premium, changing consumption patterns, and improved purchasing power of women are forecasted to boost the Indian cosmetic industry by 25% to \$20n billion by 2025. Personal care sector is an integral part of the nation's economy with its huge potential. The personal care industry is one of the largest consumer sectors in the country. The purchasing power and disposable incomes of the Indian consumer have considerably increased and it has created a niche for leading organizations in this segment in the last decade, resulting in phenomenal growth in this sector Through this paper, the authors attempt to analyze and understand how psychological, social, and economic factors have influenced the consumer behavior of women, in terms of cosmetic products, and contributed to this boost.

Approaching the topic from an intersectional perspective, the study analyzes the role heteronormative beauty norms have played in establishing a culture that rewards 'femininity', and its consequent impact on the psychology and cosmetic buying behavior of women. Approaching the topic from an intersectional perspective, the study analyzes the role heteronormative beauty norms have played in establishing a culture that rewards 'femininity', and its consequent impact on the psychology and cosmetic buying behavior of women. Our research serves the purpose of interpreting how the intersection of color, caste, race, religion, and other social characteristics creates variability in the cosmetic purchase behavior of women, intersectionality, cosmetic industry, gender-based pricing, consumption patterns.

ICARI-DI-24-01-18

Enhancing Remote Work Communication and Serendipitous Interactions Through Mixed Reality Solutions: A Case Study

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Abstract: In traditional office settings, employees benefit from immediate, in-person assistance for problemsolving. In contrast, remote workers often face delays and increased self-reliance when seeking help, resulting in productivity bottlenecks and suboptimal solutions. This study aims to (1) quantify the differences in response times and effectiveness of problem-solving between in-office and remote work scenarios, (2) identify the specific hurdles remote workers face when seeking assistance, and (3) explore potential strategies to enhance remote work communication and reduce the lag in addressing issues. The research design encompasses a comparative analysis between in-office and remote work environments to gauge the speed and efficacy of assistance-seeking behavior. It involves examining the distinct challenges remote workers encounter, such as reliance on asynchronous communication and scheduling constraints for help-seeking calls. The findings illuminate notable disparities in the time and efficiency of assistance-seeking methods between in-office and remote work, with remote workers often experiencing delays in problem resolution. Factors such as asynchronous communication and scheduling constraints were identified as primary contributors to these disparities. The insights gained from this comparative analysis shed light on the need for solutions that can bridge the gap between in-office and remote work scenarios, enabling more efficient and effective communication and assistance-seeking for remote workers.

Keywords: Quality of interaction, collaboration, Help seeking, Tech usability, remote work, virtual engagement.

ICARI-DI-24-01-19

A Comprehensive Study and Survey of Foot Ergonomics in Athletic Shoe Development

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Abstract: Over time, there have been remarkable advancements in the development of athletic footwear for sports, with the primary goals being protection and performance enhancement. A crucial aspect in this evolution is the interplay between human anatomy, biomechanics, and design in athletic shoe construction. This paper conducts a thorough scientific investigation into the ergonomics of the foot, and how it applies to the design of athletic shoes. Through a comprehensive analysis of existing literature, it presents a deeper understanding of foot variations, the effects of footwear selection on personal needs, and the connection between age and foot characteristics.

This study explores new techniques for measuring foot ergonomics in amateur athletes in the Delhi National Capital Region (NCR), specifically using the Wet Foot Test. Through thorough statistical analysis, the results show a clear relationship between age and foot measurements, highlighting the need to consider individual foot traits in the design of athletic shoes. These findings emphasize the critical role of customized footwear that prioritizes comfort, reduces the chances of injury, and improves athletic performance. The study also suggests the potential advantages of personalized shoe design and advancements in computer-aided design and production methods, which could have significant implications for the sports shoe industry. In this comprehensive review, we explore the significant relationship between foot ergonomics and athletic shoe design through a thorough analysis of empirical evidence. We emphasize the critical role of structure and considering age-related differences in designing sports footwear. With the inclusion of the Wet Foot Test in our research, we offer valuable methodological insights for evaluating foot ergonomics among athletes. Our findings also highlight the need for individualized solutions in athletic footwear, particularly for amateur athletes. As we advocate for further advancements in design techniques to cater to diverse foot characteristics, we foresee an elevated sports shoe market for amateur athletes. **Keywords:** Foot Ergonomics, Athletic Shoe Design, Biomechanics, Wet Foot Test.

The Evolution of Design Education: A Historical Analysis

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Abstract: This research paper aims to provide a comprehensive historical analysis of the evolution of design education. It explores the origins, key milestones, influential movements, and paradigm shifts in design education over the years. The study aims to understand the historical evolution of design education and identify key milestones and influencers in the field and to understand the current state of design education and its alignment with technological advancements and industry demands. Present paper traces the development of design education from its early beginnings to its current state, highlighting the factors and individuals that have shaped its evolution. It helps educators and institutions anticipate trends, stay ahead of industry demands, and adapt their programs to meet the evolving needs of design professionals. Design education history can also be instrumental in preserving cultural heritage and identity. It allows societies to maintain connections to their unique design traditions and adapt them for contemporary contexts.

Keywords: Quality Education, design thinking, conventional design.

ICARI-DI-24-01-21

A Comprehensive Analysis of Factors Influencing Automobile Design: Insights from Industry Experts on User Experience Design in New Product Development

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Abstract: This research paper is dedicated to a focused examination of the fundamental factors that shape the design of new automobiles. Aimed at providing crucial insights for designers in the automotive industry, the study narrows its scope to identify key considerations across various aspects of user experience design. Through extensive surveys and discussions with 15 industry experts, the paper elucidates the critical factors influencing the design of automotive interiors and exteriors, human-machine interfaces, safety features, connectivity, and other essential elements. By delving into these core considerations, this research serves as a comprehensive guide for designers engaged in the intricate process of crafting user-centric automobile designs.

Keywords: Automobile Design, Industry Experts, Product Development.

A comparative study of Quantitative and Qualitative methods and the use of mixed methodologies of analysis in UX Research

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Abstract: In the newly defined field of User Experience Research, Qualitative & Quantitative Methods of research were regarded as the only two options of research. However, as User Experience study is complex in nature, this binary choice often resulted in stunted outcomes either based on statistical importance or based on lost context. Consequently, the past few decades have seen the emergence of mixed methods of research as an imperative methodology to explore and study complex topics, yet the proper incorporation of qualitative and quantitative data remains vague and needs expansion. In this paper, we pursue a comparative study of the two research methods, along with a study on the concept of mixed methodologies and their scope in UX Research.

Keywords: Experience Design, User Experience Research, Data Analytics, Quantitative and Qualitative Research, Mixed Methodology.

ICARI-DI-24-01-23

Evaluating the Environmental Impact of a Bicycle: A Life Cycle Assessment with a New Green Product Design Framework

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Abstract: This study aims to evaluate the environmental impact of bicycle production in Bangladesh using a proposed novel green product design (GPD) framework. Bicycles are considered to be environmentally sustainable and fuel-efficient, and their increasing use can help reduce traffic congestion and carbon dioxide emissions. The study employs the ISO 14044 guideline and considers the entire life cycle of the bicycle, with life cycle inventory data obtained from a previously published article. The proposed GDP framework is based on the life cycle assessment method and is validated by comparing the results with the previously published study. The study finds that manufacturing causes the maximum environmental burden, and the proposed GDP framework performs similarly to the method used in the referenced article. This research contributes to the understanding of the environmental impact of bicycles and provides a novel GPD framework for evaluating the environmental sustainability of other products.

Keywords: Life cycle assessment, Bicycle, Green Product Design, Framework, Environmental impact.

Design for Impact: A Framework for Green Product Design

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Abstract: This research aims to develop a comprehensive framework for green product design, emphasizing a single-figured Life Cycle Assessment (LCA) with a specific focus on carbon emissions. In response to the escalating environmental crisis, the purpose is to equip designers and engineers with a structured approach to integrate sustainability into the early stages of product development, fostering the creation of eco-friendly and sustainable products. The research methodology centers around the utilization of a single-figured LCA, focusing on carbon emissions as a key environmental indicator. This approach involves a detailed exploration of sustainable product design principles, the significance of carbon emissions in the product life cycle, and the development of a practical framework for integration into the design process. The design and methodology are geared towards providing a clear and accessible pathway for incorporating environmental considerations from the inception of product ideation. Findings: The findings of this research culminate in a robust green product design framework. Early-stage integration of sustainability, material selection based on LCA data, eco-friendly manufacturing processes, and considerations for end-of-life management are integral components. Through a case study application, the framework's efficacy is illustrated, showcasing its potential to guide designers in creating products with significantly reduced carbon footprints. The originality of this research lies in its focused integration of a singlefigured LCA, particularly emphasizing carbon emissions, into a practical and applicable green product design framework. The proposed framework not only contributes to the existing body of knowledge on sustainable design but also holds tangible value for industries seeking innovative solutions to align their products with environmental stewardship. By prioritizing simplicity and practicality, this research aims to inspire and facilitate the widespread adoption of sustainable practices, thereby fostering a more resilient and ecologically conscious industrial landscape. Keywords: Green product design, Sustainability in design, Environmental impact assessment, Sustainable product development, Eco-friendly design framework,

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Advanced Review on the Impacts of Plastic Incineration on Atmosphere and Human Health

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Abstract: Plastic is a production of organic polymers and currently most of plastics have been identified as the pollutants as the results of accumulation because of the resistance for the natural degradation, production in large scale, lack of proper disposal systems and the variations in sizes. Basically, the environmental impacts of plastics can be considered as direct impacts and indirect impacts. The incineration is a common practice in the discarding of plastic wastes with other litters. But currently there were identified as few of significant environmental impacts fate of the incineration regarding the atmospheric content and human health. In the case of maintaining of land filling sites and direct disposal of plastics, there were confirmed the generations of some pollutants such as the smaller debris (nano and micro debris) due to the wind which cause some diseases as results of the respiration such as hormone disorders, cancers, gene toxicity, cardiovascular diseases and some diseases in skin. In generally, the incineration of plastics generates acetones, phosgene, toluene, hydrochloric acid and vinyl chloride during the

incineration of some plastics such as polyvinylchloride. Also, there can be emphasized a few of dieses reported with those toxic compounds such as the irritation of eyes, cancers, some uneven symptoms are brain functions, impacts on nervous systems, issues with the functions of liver, asthma and issues with immune system. Therefore, the improper incineration must be mitigated and it can be recommended some other similar thermal treatment options in plastic waste management such as the pyrolysis and gasification. In addition, that the recycling and reusing options will be recommended forever as the simple and cost-effective methods to reduce the plastic pollution. **Keywords:** Plastics, Nano plastics, Micro plastics, Meso plastics, Macro plastics, Incineration, Health impacts.

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Operational strategy for grid integration of electric vehicle

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Abstract: The evolution of the decentralized generators in the form of renewable energy resources, RES and electric vehicles, EV have brought about a dramatic change to the power distribution system. Being a sustainable alternative, the distributed generation is majorly provided for energy support by renewable sources. These renewable sources are attractive alternatives keeping in mind the rapid depletion of fossil fuels. These are more desirable and sustainable also because they provide reduction of carbon footprints. With their ready availability, they are the answer to the global energy demand which increases each day. Furthermore, the strategic location of RES makes the transition from traditional grids to smart grids paradoxically an easier yet challenging task. The sporadic availability of renewable sources allows for interconnection at both the transmission as well as distribution levels of the grid. However, the integration of electric vehicle is restricted to distribution side only. The major challenges faced are in terms of the intermittent nature, the increased usage and future endeavors of mass plug-in EV's. Research towards addressing these challenges is ongoing and there is a need to develop viable interconnection strategies which are able to provide grid support for sustainable overall operations. A novel control strategy named central frequency control has been developed in conjunction with an intelligent battery management system which provides energy priority between grid and EV charging and discharging ensuring energy to the consumers at all times.

Keywords: Renewable Energy Resources, Distributed Generation, Electric Vehicle, Frequency Controller

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Laser forming technique- an advanced sheet metal forming process

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Abstract: Lasers are widely utilized in the production of essential parts for consumer electronics, aircraft systems and vehicles, biomedical instrumentation, autos, and shipbuilding applications due to their capacity for precise focusing and ease in managing the heat source. Metals, nonmetals, composites, and ceramics can all be processed using lasers in a variety of methods, including heat treatment, cutting, shaping, engraving, marking, joining, cladding, sintering, scribing, drilling, etc. An essential shaping technique that can be used to create both macro and micro-sized pieces is sheet bending. Lasers can be used to bend 2D metal sheets into complex 3D objects in a process called laser forming. Laser forming bends metal sheets by locally heating the sheets to generate plastic strains and is an established metal bending technology in the shipbuilding industry. To achieve the desired bend angle in the work sheet, mechanical punches, and dies are used in the traditional method of sheet bending. The method is cost-effective and frequently used for component mass production. However, the capital cost of the necessary equipment is typically very considerable. Additionally, changing or adjusting tooling takes a lot of time. Its use in the precision manufacture of sheet metal components is further affected by the spring-back effect and the challenge of creating complicated shapes. Some of these restrictions can be bypassed by using lasers to bend metal sheets.

Keywords: Laser forming, metal forming, spring-back effect, mass production.

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Analysis of Efficient Engine Oil for IC Engine using Nanoparticles: Review

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Abstract: In an internal combustion engine, engine oil is essential for minimizing wear and friction on mating elements that are in relative motion with one another. Engine oil made by base oil or crude oil, viscosity improvers and additives. Additives also plays very important role in the engine oil. Various carbon base nanoparticle such as graphene, carbon Nano tube, metal nanoparticle (Al, Cu, Mo). These nanoparticles added into the engine oil and experiment done on wear and friction testing instruments. Like four-ball tester, linear tribometer and pin-on-disc. It has been found that after the adding of these nanoparticles into the engine oil, the characteristics of the original commercial engine oil changed like viscosity, thermal conductivity, oxidation stability of the engine oil and lubrication behaviour of the engine oil improves, friction and wear of the metal surface reduced significantly. **Keywords:** Engine oil, wear and friction, nanoparticles, lubrication, viscosity improvers.

ICARI- ME-24-01-03

Utilizing the COPRAS as A Multi-Criteria Decision-Making to Choose the Most Suitable Electric Vehicle Option in India

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Abstract: The adoption of electric vehicles (EVs) plays a significant role in alleviating the emissions of greenhouse gases, thereby addressing the concerns such as global warming and increase in air pollutants. As a result, electric vehicles aid in confronting issues related to environment and public health. Numerous countries are switching to this new age of electric mobility, thus actively advancing and contributing to the pursuit of sustainable development. Due to fast-paced evolution and broadening range of the electric vehicles in the consumer market, the process of selecting the optimal alternative among the various available electric vehicles is quite tedious.

This work explores the domain of electric vehicles within the Indian market, utilizing the COPRAS approach as a multi-criterion decision-making tool (MCDM) to choose and rank the most appropriate option for customers among the available electric vehicle options in India. The entropy method is used to obtain the weights associated with the criteria used in the analysis. For this study, seven electric vehicles present in the Indian market have been selected as alternatives. This research adds value by giving a definitive preference hierarchy, considering an extensive range of selection criteria and evaluating the optimal choice among the electric vehicles currently available.

Keywords: Multi-Criteria Decision-Making, COPRAS, electric Vehicle.

A Predictive Evaluation of the relationship between Operation Workforce Prerequisites Sustainable development

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Abstract: The requirement of finished surface is the top most priority in the manufacturing area. Among the various finishing processes like AFM, MAF, viscoelastic magnetic abrasive finishing (VMAF) is the latest emerging process for internal gears finishing. A carbonyl and abrasive particle is applied over the workpiece's surface and regulated using the permanent magnet. In this research, magnetic flux density (MFD), magnetic field strength (MFS), current density (CD), and magnetic energy (ME) are studied over the surface of internal gear made up of different materials, steel, brass and aluminium and observed machining behaviour is discussed. The observation concluded that steel's internal gear has the edge over the other two materials in MFD. Brass has the edge over the other two materials the other two materials.

Keywords: Viscoelastic Magnetic Abrasive finishing, Magnetic Flux density, Current Density, Magnetic Energy.

ICARI- ME-24-01-05

Unlocking Advanced Coating Technique: The HVOF

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Abstract: High Velocity Oxygen Fuel (HVOF) stands as a cutting-edge thermal spray coating process with widespread industrial applications. The current study investigates the foundational principles of HVOF, in which the explanation of methodology that involves the supersonic combustion of fuel and oxygen to propel molten particles onto a substrate. Thermally sprayed HVOF coating finds versatile applications across several domains, serving various purposes, including: enhancing resistance to corrosion and wear, providing protection against electromagnetic and electrostatic interference, shielding against radio frequency interference, facilitating metal buildup for structural reinforcement and offering cosmetic improvements to surfaces. Different kinds of characterization techniques, such as SEM, EDS, XRD, microhardness, and friction wear-testers, were used to investigate the coating's microstructure, phase, wear, and corrosion resistance. On the other hand, due to its reduced hardness dispersion, the HVOF coating demonstrates a higher stability of its friction coefficient. Coating methods have been increasingly important in recent times, due to the constantly rising cost of materials and the corresponding growth in requirements for materials. the paper tries to resonate with a diverse audience, ranging from industry professionals seeking cutting-edge solutions to students and researchers intrigued by advancements in materials engineering. Ultimately, the present study serves as an educational tool, bridging the gap between the technical intricacies of HVOF and its practical implications.

Keywords: High Velocity Oxygen Fuel, Bonding mechanism, Porosity, Microstructure, Wear.

An analysis of solutions for how AR/VR tools can be integrated into work environments to promote collaboration, accessibility and inclusivity for employees

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Abstract: In today's world, technology is an integral part of the workplace, and organizations are increasingly incorporating augmented reality (AR) and virtual reality (VR) tools to improve the user experience. By utilizing AR/VR technology to adjust and customize workspaces, provide employees with resources, and increase communication and collaboration, employers can create an inclusive and accessible work environment for all of their employees, regardless of their abilities. This technology can be especially beneficial for workers with disabilities, who may otherwise face barriers to accessing the same opportunities as everyone else. In this paper, we will explore how AR/VR tools can be integrated into work environments to promote collaboration, accessibility and inclusivity for employees with disabilities. By integrating AR/VR tools into the workplace, employees with disabilities with visual, auditory, and tactile feedback, help improve communication between colleagues, and enable employees with disabilities to transition into remote and hybrid work environments. As the workplace continues to evolve, employees should consider the power of AR/VR tools to create more accessible and inclusive work environments for employees with disabilities.

Keywords: augmented reality, virtual reality, work environments, technology.

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Numerical Study of Heat Transfer Characteristics in Convergent-Divergent Microchannel Channel Heat Sink

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Abstract: A three-dimensional numerical simulation has been carried out to investigate the cooling capability of a convergent-divergent microchannel heat sink. To investigate the effect of nanoparticle size and concentration on hydrothermal performance, hybrid nanofluid was employed as a coolant with varying nanofluid concentrations. We further investigated the thermal potential of the heat sink by inserting porous media into the flow domain of the channel in a composite fashion and explore the effect of porous material thickness and position on heat transfer rate. This investigation reveals that using nanofluid as a coolant has augmented the heat transfer maximum by 18 %. Moreover, the porous media enhanced the heat transfer rate very significantly with a maximum augmentation of 5.35 times. Finally, the practical utility of the convergent-divergent microchannel heat sink is optimized in terms of heat transfer efficiency and Figure of Merits. As a result, the optimum hydrothermal performance of this present study is achieved at a lower volume flow rate, higher volume fraction of nanofluid, and a lower porosity level with a partial porous channel.

Keywords: Heat sink, Heat Transfer, Microchannel, Nanofluids, Porous media.

Characterization studies of TIG Welded aluminium joint

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Abstract: The characterization studies of TIG welded Aluminium AA5083 alloys have been carried in the present work to understand the grain size, strength and hardness. TIG welding of aluminum is tough and challengeable process because of its inherent properties. AA 5083 being rich in manganese content, it is able to manage its grain structure, leading to a stronger alloy. However, the alloy loses the originality when TIG welded and results into decrease in tensile strength and hardness apart from variation in the grain structure. The present work explores the effect of TIG welding on AA5083 with different filler wires to characterize the joint in terms of strength, hardness and grain structure.

Keywords: Tungsten inert gas welding, aluminium alloys joints, Filler wire.

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Investigation of role of Smart Meters in reactive power management and mitigating the power factor issues

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Abstract: In last few decades various schemes have been launched by Govt. of India for improving the health of Distribution sector like of APDP, APDRP, RAPDRP, IPDS, Uday etc. but still distribution sector has to go a long way for providing secure, reliable and quality power supply to each household in India. Keeping these things in mind Ministry of Power, Govt. of India rolled out an ambitious scheme for Distribution sector named as Revamped Distribution Sector Scheme (RDSS) which is a result based and performance linked scheme for overall revamping of the distribution sector in India. RDSS aims at reducing the AT&C losses of each DISCOM in the range of 12-15 % and also to make the DISCOMs economically viable by reducing ACS-ARR gap to zero. Major thrust area of this RDSS scheme is implementation of AMI. AMI stands for Advanced Metering Infrastructure. DISCOMs has been continuously facing various issues like of poor billing as well as collection efficiency, not able to get the real time data from existing meters, real time energy auditing and accounting. As more no. of consumers now a days becoming Prosumer (Producer + Consumer) so prosumers will have to go for net metering in large number. For tackling all these issues AMI is a single solution. Smart meter is one of the components that will help Discoms to reduce losses but it can also play an important role in reactive power management, proper billing for reactive power and further mitigating the power issues.

Keywords: Smart Meter, AT&C losses, reactive power management, power factor corrections, tariff.

An Examination of a Single-Pass Heat Exchanger's Parametric Design Using Coding

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Abstract: The main objective of this real-life example is to help readers who may have just a basic understanding of engineering concepts and a limited amount of expertise with the exchange of heat equipment. The procedure of creating a structure, a thermal transfer area, as well as pressure decreases whereas determining whether the inferred variables satisfy every need is referred to as Thermo-Hydraulic Structure originality. Analyzing many design variables is necessary for the hydrocracker unit heat exchanger, commonly known as the compact thermal exchanger. The design phases and assumptions are covered in this research as well. Borlando C++ program is used for parametric research evaluations. The intricate connections between fluid mechanics and heat transfer are also shown in this case study, drawing from a variety of scholarly research papers and industry recognized design data book. The design seeks to produce a high rate of heat transfer rather than a large pressure drop. The coding is essential to the design of densely packed heat exchangers and represents a significant improvement over previous design.

Keywords: Hydrocracker unit heat exchanger; Design data book; Thermo-Hydraulic Structure; Coding; Forced convection.

ICARI-ME-24-01-11

Numerical Investigation and Optimization of Micromixer Model with Meta-Heuristic Algorithm

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Abstract: To enhance the mixing performance of the micromixer with twist and ben, we conduct multi-objective Moth Flame Optimization (MFO). Numerical analysis of fluid flow and mixing in the micromixer is performed using the 3D Navier-Stokes equation. The objective function for optimizing the mixing performance (φ) and pressure drop (Δ P) of the micromixer. Parameter studies are performed to examine the impact of the twist and bend on the objective function. The objective function is approximated through the use of surrogate modelling and the creation of response surface functions. The optimal configuration of the passive micromixer is obtained by MFO algorithm through the surrogate modelling, considering variations in the Reynolds number (Re). This approach has not been explored in prior studies. The results obtain shows that the mixing performance of the micromixer has significantly increased after optimization. The optimized micromixer shows an increase in mixing efficiency of 27.64%, 30.75%, 32.08%, and 33.91% when compared to the reference design for Reynolds numbers (Re) of 0.1, 1, 10, and 100, respectively.

Keywords: Optimization; Passive Micromixer; Moth Flame Optimization; ANN.

A literature review on Characterization of Dissimilar Joints

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Abstract: Friction Stir Welding (FSW) stands out as an advanced solid-state welding method in which a nonconsumable tool with a rotating pin and shoulder creates frictional heat to soften materials without melting. This tool stirs and forges materials together along the joint line, distinguishing it from conventional welding. Unlike traditional methods, FSW minimizes the Heat-Affected Zone (HAZ), leading to joints with high strength and fewer defects. Extensively utilized in the aerospace and automotive sectors, FSW excels at joining materials such as aluminium, Steel and titanium, offering benefits like reduced distortion and improved structural integrity. Consequently, it is the preferred technique for applications demanding precision, strength, and reliability. Whereas TIG welding excels in dissimilar joint applications, joining different metals with precision. The process, using a non-consumable tungsten electrode and inert gas, ensures a clean, high-quality weld. Its versatility makes it ideal for dissimilar metal combinations, providing strength and durability in industries like aerospace and automotive manufacturing.

Keywords: Tungsten Inert Gas Welding, Friction Stir Welding, Dissimilar Joints, Heat-Affected Zone, Non-consumable Tungsten Electrode.

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A review on experimental analysis on influence of process parameters of GTAW in a butt welded SDSS (2205)

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Abstract: Whenever welding procedures are executed, under the influence of heat the grains of material which are close to the weld pool may experience vibration or let's say disturbance of particles and that results in changes in the size of the grains which may eventually alter properties of the material. In this study, the Taguchi method was used to optimize and build relationships between the input parameters and depth of penetration for GTAW of 202 grade stainless steel plates. A mathematical model is also developed to correlate the process parameters like welding current (I), welding speed (V), and shielding gas flow rate (Q) to depth of penetration. The developed model then compares with the result: it is supposed to be found that the deviation falls within the limit of 90% confidence level. Additionally, the results obtained also by implementing various testing processes like Micro hardness and Microstructure testing, Magnetic barkhausen noise test etc. and Wire EDM is used in order to cut out the material in desired dimension without forming heat affected zone (HAZ).

Keywords: Depth of penetration, Process parameter, Taguchi method, Micro hardness and Microstructure testing, Magnetic noise test.

A literature review on Fabrication of FDM based 3D Printer

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Abstract: Additive Manufacturing (AM) technologies, especially Fused Deposition Modeling (FDM), have witnessed widespread adoption in various industries due to their flexibility and cost-effectiveness. This abstract presents the design and fabrication process of a customized FDM-based 3D printer tailored for prototyping applications in the field of mechanical engineering. Key components of the printer, such as the extrusion system, are engineered to accommodate a wide range of thermoplastic filaments. A high-precision extruder with variable nozzle sizes facilitates the printing of intricate details. The motion system utilizes precise stepper motors, lead screws, and linear guides to ensure accurate and repeatable layer deposition.

Keywords: 3D printing, FDM, rapid prototyping, rapid tooling.

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Challenges and Framework for Measurement and Implementation of Design-Oriented Strategies

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Abstract: The economic value of strategic design and design management has become increasingly pivotal in the competitive landscape of businesses. This research paper delves into the challenges faced by businesses in quantifying the value of design-oriented activities and explores how design principles can be harnessed to elevate the development and execution of business strategies. By addressing these issues, organizations can bridge the gap between design and business strategy, ultimately unlocking the untapped potential for innovation and competitive differentiation.

This paper seeks to address these issues by exploring the challenges of measuring the monetary impact of designoriented activities in a business context. Through empirical research, it investigates the existing barriers and the factors that affect the quantification of design value and examines the role of design thinking as an approach to enhancing the formulation and execution of business strategies. In addition, this paper defines a practical flow for the implementation of design principles in strategic decision-making, offering guidance to businesses looking to leverage design for competitive advantage. This framework considers both the qualitative and quantitative aspects of design, providing a comprehensive view of design's contribution to the organization's financial success.

Keywords: Design Management, Business Strategy, Business Management, Innovation Strategy, Design Thinking.

A review over manufacturing, machinability and material optimization of aluminium metal matrix composite

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Abstract: The Aluminum Metal Matrix composite is extensively utilized in diverse applications within the automobile and aerospace sectors. Its intricate mechanical properties make both manufacturing and machining challenging. Commonly employed manufacturing techniques, such as squeeze casting and centrifugal casting, yield promising results. The discussion encompasses various machining processes, including both conventional and non-conventional methods. Among the methods explored, squeeze casting is found to be particularly suitable for complex shapes. Regarding machining, laser machining exhibits a high material removal rate, abrasive jet machining provides a superior surface finish, and tools with Chemical Vapour Deposition diamond coating demonstrate improved material removal rates compared to standard tools.

Keywords: Composite, silicon, aluminium, graphite, Optimisation, casting, metal matrix.

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Parameter Optimization of Cold Metal Transfer Process Using Response Surface Methodology for Super Duplex Stainless Steel 2507

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Abstract: Weld bead quality plays a vital role in determining weld strength and hardness. The purpose of this manuscript is to study the effect of process parameters (Welding current, Speed and Gas flow rate) on output parameters Microhardness and Penetration of samples fabricated by the Cold Metal Transfer (CMT) process of Super Duplex Stainless Steel 2507 (SDSS 2507) using Response Surface Methodology (RSM). Analysis of variance (ANOVA) was adopted to identify the model's accuracy. The optimal input parameters were predicted to be 169.18 A of current, 7.18 mm/s of welding speed, and 23.38 l/min of shielding gas flow rate and output parameters were to be 276.57 HV0.5 of Microhardness and 2.44 mm weld bead penetration. The welding current was found to be the most significant factor. The welding speed and gas flow rate followed it. Using a CMT-based arc welding method, this research has promising implications for manufacturing stainless-steel weld products.

Keywords: Cold Metal Transfer; Super Duplex Stainless Steel 2507; Optimization; Response Surface Methodology; ANOVA.

Effect of inlet swirl on Straight annular diffuser

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Abstract: Diffusers are useful in many internal flow applications where the flow needs to be slowed down with minimal losses. CFD investigations were conducted to determine the effect of swirling flow at the inlet on the straight annular diffuser with area ratio 2. Analysis was carried out with inlet swirl angle ranging between swirl angles of 0° to 25° to determine the performance as well as flow profile of an annular diffuser. The turbulence model k- ε was used for the present analysis. Further sub-model of k- ε such as standard, RNG and realizable were analyzed in the pre-study, however RNG, k- ε turbulence model had shown much better results and were in accordance with the experimental results. The effect of swirling inlet flow was found to be strong function of flow regime and diffuser performance. Recovery is up to certain diffuser passage after which the marginal increase goes on decreasing. After 12° inlet swirl, the pressure recovery decreases after certain diffuser passage and decrease is sharp for 25° inlet swirl.

Keywords: Annular diffuser, pressure coefficient, swirl.

ICARI-ME-24-01-19 Numerical Analysis of Microfluidic T-Mixer and The Impacts of Different Working Fluids on Mixing Performance

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Abstract: This study analyses the mixing efficiency of T-micromixers with various working fluids flowing inside mixing channels using simulation work. The conservation equations are solved by the CFD Tool. Water- and water-soluble dye, as well as water and ethanol, were used as the working fluids. For T-micromixers, the simulations were performed at different Reynolds numbers (i.e. 30, 106, 200, 300, 400, and 500). The variations in concentration dispersion and mixing index for both working fluids inside the microchannel were quantified. The mixing index and pressure drop value are mostly determined by the Reynolds number. By increasing the Reynolds number, one can attain a greater mixing index and pressure drop. As the distance from the junction grows in the direction of the outlet, the mixing index value increases for both working fluids inside the microchannel. Because two streams mix more quickly when the diffusion coefficient is high, the results showed that T-micromixers with high diffusion coefficient values work better when it comes to mixing. The T-micromixer with water and ethanol as a working fluid has a higher pressure drop than the one with water and water-soluble dye as a working fluid inside the mixing channel. In real practice, a lab-on-a-chip system is unaffected by a drop-in pressure. The pressure drop shows the overall amount of energy used by the apparatus. Thus, the microchannel's design is crucial and is influenced by its working fluid.

Keywords: Micro mixing, mixing index, Numerical simulation, Micromixer, Pressure drop.

Numerical Investigation for The Enhancement of Heat Transmission in Phase Change Material Heat Exchanger Using Fins

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Abstract: The purpose of this work is to emphasize the design of a phase change material (PCM) heat exchanger for the storage of solar energy for hot water generation. The purpose is to investigate a 2D model of PCM heat exchanger of shell and tube type having PCM in shell region and water is flowing in tubes operating under realistic environmental conditions. Thus, a Computational Fluid Dynamics (CFD) numerical simulation with enthalpy porosity approach is used to predict the temperature evolution and liquid proportion of PCM in the storage heat exchanger. To enhance the heat transmission into the PCM, fins are incorporated on the outer surface of the tubes. This research aims to compare two models of PCM heat exchanger with or without fins in terms of temperature evolution and liquid proportion of PCM. Effects, advantages and limits of using fins to enhance heat transmission are investigated using a range of numerical observations and a number of thermal performance indicators for the system. Assumptions, numerical modelling equations, temperature evolution profiles, and PCM melting proportion are all shown and discussed in this study. It was discovered that incorporating fins on the tubes reduces the time necessary for complete melting of PCM inside the PCM heat exchanger. The results also reveal that the geometry selected is critical in accurately representing phase change processes and system thermal performance. Other suggestions and many geometric enhancements for future research are also discussed based on the design and investigations conducted.

Keywords: CFD simulation, PCM, Heat Transmission, Melting, Liquid Proportion.

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Developments in the design of the Return Guide Vane of the Multistage Centrifugal Pumps

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Abstract: The Return guide vane is one of the critical parts of multistage centrifugal pumps. Compliance with the technical specifications is a vital responsibility for the guide vane. It is equally important to produce a technologically correct guide vane. The manufacturing process of such parts is time-consuming. Guide vanes of three different structures are studied, and the design procedures for these structures are developed to enhance the hydraulic design accuracy and efficiency of the return guide vanes of the multistage centrifugal pumps.

CREO parametric software is used to develop the hydraulic design systems of the guide vanes. The coordinates of the vanes are obtained using the error triangle technique, their profiles are built using Bezier curves, and subsequently, the curves of the flow areas along the flow path are determined. This technique is capable of creating both two and three-dimensional hydraulic models.

Keywords: Return guide vane, Multistage Centrifugal Pump, Creo Parametric.

Tool wear analysis during turning with dual supply of LN2 using optimization approach

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Abstract: Green and clean machining are supported by liquid nitrogen. User's problematic health issues are solved. In the presented research work, LN2 is supplied directly at rake face and in another machining condition, LN2 is supplied at rake and flank face simultaneously. The DoE of performance of experiments is in accordance with Taguchi S/N ratio L18. Flank wear length, crater wear width, cutting force and temperature at the interface of cutting insert & workpiece at LN2supply at rake & flank face simultaneously declined by 23-38%, 20-30%, 32-48% and 34-46% respectively as compared to LN2 supply at rake face only. ANOVA give the highest effect of contribution in the percentage to LN2 supply at rake & flank face simultaneously as 76.06%, 77.67%, 77.13% and 87.42% next in decreasing order followed by speed, feed and depth of cut. SEM images depict flank wear length and crater wear width in both machining conditions. Tool wear is low during turning LN2 supply at rake and flank face. Optimized values of each response are confirmed by performing experiments at the calculated levels of control factors. It has been found that values are in close agreement of the predicted range of values.

Keywords: Liquid nitrogen, cryogenic turning, flank face, rake face, optimization, ANOVA.

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Influence of Angle Projection in Robotic Nozzle during Painting Operation

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Abstract: Painting a car body is one of the costlier and more complex processes as compared to other production processes. In this research project work the different angles of nozzle of robotic manipulator were analyzed during painting section almost one year. The aim was to minimize the wastage of painting especially at the corner surface of car body between the mud guard positions of wheels. Different angles at 0° , 15° , 30° , 45° and 90° were checked during painting It was found that at angle of 45° the wastage of paint was minimum and cost of Rs 22.24 lakhs were saved per annum. The reduction in the wastage of Stone Guard Coating was performed in the plant of an automobile manufacturing car company. It was found that an optimum angle of robot nozzles was 45° and was wastage of paint was reduced to 90 grams per vehicle. The purpose of this project is to reduce the wastage rate of the paint shop department of an automobile car manufacturing company.

Keywords: Painting, Nozzle, robotic, automobile.

Effect of Dimensional Change in Paddle Shift Switch of Steering Wheel for 6 Automatic Transmission Gear Mechanism of Car

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Abstract: The transmission system is one of the most basic and important parts of a vehicle. It transfers power from the engine to the wheels. Transmission simply refers to the gearbox, which uses gears and gear trains to provide speed and torque. In this research paper problem related to paddle shift switch of steering wheel of a car was investigated and solved to minimize losses of time and money. The size of coupler was noticed to be inappropriate. Due to under size the coupler got disconnected with jerks during running of vehicle. The size of sleeve was changed and it was found that total cost savings of 29.14%. Pareto Analysis was used for identifying the problem and finding out the better size of sleeve. Increase the efficiency of assembling process and eliminate the material wastage due to repair process with total cost saving of 29.142%. The defects and rework on a product always increases the cost of product and quality of product.

Keywords: Steering Wheel, Gear Mechanism, Automatic Transmission, material wastage.

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Comparative study on mechanical properties of CMT and MIG-Pulse welded 2099-T86 aluminium alloy sheet

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Abstract: The excellent strength, toughness, corrosion resistance, and high strength-to-weight ratio of the AA2099-T86 alloy make it suitable for the aerospace and marine industries. The present paper aims to find the mechanical properties of CMT-welded AA2099-T86 alloy sheets and compare them with the MIG-Pulse welding process. The UTS and elongation values are measured for both CMT and MIG-Pulse welded joints. It is revealed that mechanical properties are better in the CMT-welded sample as compared with the MIG-Pulse-welded sample. Welding speed, contact tip-to-workpiece distance, and current were used as welding process parameters. Fractured samples were examined by FESEM analysis, and dimple morphology was observed in large-size microvoids in MIG-Pulse welded samples, which will deteriorate the mechanical properties. The maximum ultimate tensile strength and elongation of the CMT welded sample are 260 MPa and 15%, which is significantly greater than the MIG-Pulse welded sample (235 MPa and 14.8%) due to low heat. A 10.61% increase in weld joint efficiency was observed in CMT as compared with MIG-Pulse welded samples.

Keywords: Cold metal transfer (CMT); Ultimate tensile strength (UTS), Metal inert gas (MIG).

Investigation on the effect of ultrasonic vibration on the joint quality of CMT welded AA2099-T86 alloy

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Abstract: Industries in today's world benefit from ultrasonic vibration to get improved material flow rates and improve grain growth when they are combined with welding This paper focuses on the effect of ultrasonic vibration on the joint quality of CMT welded AA2099-T86 alloy. Welding of 2099-T86 is carried out by using ER4047 filler wire of 1.2 mm diameter. Ultrasonic vibration-assisted cold metal transfer welding (UCMT) is accomplished to fabricate butt joints of similar thickness and microstructural and mechanical behaviors are studied. Current, travel speed and CTWD are chosen as variable process parameters while gas flow rate, ultrasonic frequency, and amplitude of vibrations are made constant i.e. 16 liters/min, 20 kHz, and 60 µm respectively. A field emission scanning electron microscope (FESEM) is used for microstructural analysis of the welded joint. Results discovered that microhardness and ultimate tensile strength are improved by applying ultrasonic vibrations. UCMT also results in refined grain structure and less porous structure compared with CMT welded samples.

Keywords: Ultrasonic vibration, cold metal, transfer welding, contact tip-to-workpiece distance, field emission scanning electron microscope.

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Friction Stir Additive Manufacturing on aluminum composites materials

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Abstract: Reviewing the application of Friction Stir Additive Manufacturing in the realm of aluminum composite materials is the main focus of this paper. Additive manufacturing, known for its distinctive layer-by-layer fabrication process, has been labeled by numerous individuals as the most recent innovation in the manufacturing sector. Owing to its broad range of processes, system technology, materials and applications, Additive Manufacturing has been associated with terms like 3D printing, Rapid Prototyping, free-form fabrication, Additive Layer Manufacturing, and similar expressions. Friction stir additive manufacturing (FSAM) is a recently created technology that employs the friction stir welding (FSW) principle to join metal alloys additively while they are in a solid state. Aluminum poses significant challenges in conventional melt-based additive manufacturing (AM) processes due to its low evaporation temperature and high reactivity with oxygen. Nevertheless, the use of friction stir additive manufacturing (FSAM), operating as a solid-state technology, is anticipated to eliminate the melting-solidification issues throughout the entire manufacturing process and ultimately address these challenges. The objective of this study is to illuminate the operational principles and prior research endeavors conducted by different authors employing FSAM as a fabrication process.

Keywords: Friction stir additive manufacturing, Metal additive manufacturing, Friction stir welding, Mechanical & Microstructure properties, 3D Printing.

Autonomous Horizons: Navigating the Future of Self-Driving Cars

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Abstract: Future of self-driving cars is promising, with potential benefits such as accident prevention, safer transport, and a revolution in transportation. The paper explores recent advancements in autonomous electric vehicles (AEVs), covering subsystems like energy storage, chargers, motors, and brakes. It introduces a unique embedded controller design for a green energy-powered, collision-protected, and GSM-guided vehicle. Utilizing GPS and image processing, it ensures safe navigation with obstacle avoidance. Additionally, the study presents a mini self-driving car using IOT and AI for advanced capabilities. Emphasizing artificial intelligence and machine learning, the paper envisions self-driving cars as pivotal for accident prevention and revolutionizing transportation, providing a comprehensive overview of the transformative potential of autonomous technology. Self-driving cars hold the promise of a safer, more sustainable, and economically efficient future for transportation. With the potential to significantly reduce accidents, lower pollution levels through shared services, and offer economic advantages to users, autonomous vehicles represent a transformative force.

Keywords: Autonomous electric vehicles, Embedded controller design, Self-Driving Vehicles, Artificial Intelligence, Machine Learning.

ICARI- ME-24-01-29

Hyperloop Paradigm: A Glimpse into the Future of High-Speed, Sustainable Transportation

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Abstract: A series of diverse studies comprehensively explore the Hyperloop, a revolutionary high-speed ground transportation system. These investigations cover essential aspects, including system objectives, design, capacity, passenger flow dynamics, capsule optimization, and unique scientific phenomena like molecule diffusion. The research delves into infrastructure challenges, aerodynamic performance, adaptability in the levitation system, and a systematic review identifying key issues in Hyperloop development, collectively highlighting the multifaceted nature of this transformative technology in reshaping high-speed ground transportation. Studies assess the broader implications of Hyperloop implementation, evaluating operational, financial, social, and environmental aspects. Noteworthy contributions include innovative Hyperloop designs and comprehensive literature reviews, offering insights into current components and EU stakeholders. Together, these studies provide a holistic understanding of the Hyperloop's potential, challenges, and future directions, emphasizing its transformative role in revolutionizing the landscape of high-speed ground transportation.

Keywords: Hyperloop, High-speed ground transportation, System analysis, Aerodynamics performance.

Driving Towards Sustainability: A Comprehensive Review of Electric Vehicles

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Abstract: This research explores advanced strategies for optimizing electric powertrains, transit networks, and fast charging systems to enhance sustainability in electromobility. The focus includes minimizing energy consumption in powertrains through sophisticated design and control strategies, validated in a small family vehicle case study. A novel design methodology for battery electric light vehicle powertrains is introduced, demonstrating efficiency in navigating design complexities. The study extends to efficient transit network design for battery electric buses, tested in Guadalajara for superior results over current bus services. Additionally, analysis is done on how quick charging affects Li-ion battery deterioration, revealing insights into mitigating effects and identifying cost-effective solutions for various battery technologies. Overall, this comprehensive investigation contributes crucial insights for advancing sustainable electric mobility.

Keywords: Electric powertrain optimization, sustainability, transit network efficiency, fast charging, Li- ion Battery degradation.

ICARI-ME-24-01-31

AI Across Domains: Transformative Applications from Beauty Contests to Healthcare and Sports: Review

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Abstract: This collection of papers spans a diverse range of artificial intelligence (AI) applications, showcasing innovative approaches and advancements in various fields. The studies address concerns about fairness in beauty contests through an AI-based facial attractiveness assessment model, propose a supervised AI approach for analyzing children's computational thinking, and explore benchmarking for Spiking Neural Networks (SNNs) with a focus on AI applications. Additionally, there is a focus on the evolution of Industry 4.0, the growing role of AI in medical research, the use of AI in pharmaceutical imaging processes, and the application of AI in cattle identification for animal health management. The papers also delve into concrete surface crack detection using AI, defect detection in the semiconductor industry, and an intelligent model for crack detection in sensitive structures. Furthermore, the articles highlight the potential of AI in medical and plastic surgery education, dental speech pattern analysis, and the exploration of an AI text-to-picture system. The studies contribute valuable insights into the intersection of AI and diverse domains, emphasizing advancements, challenges, and the potential for transformative impacts on various industries and research domains.

Keywords: Industry 4.0, Artificial Intelligence (AI), Spiking Neural Networks.

Sustainable Horizons: A Deep Dive into Renewable Energy Research, Grid Integration and Global Transformations

Bhavya Agarwal, Bhavay Nagar, Varsha Pathak

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Abstract: This comprehensive analysis addresses a wide range of topics related to renewable energy research, including the historical development of systems that rely only on renewable energy, integration issues in the grid, optimal dispatching models, and global perspectives. It looks at how using fossil fuels to generate power affects the environment and how renewable energy can be used to desalinate water. The study explores issues related to power quality, suggests an AHP-based method, and talks about the transformation of the Ukrainian energy industry. An extensive synopsis of battery sizing for renewable energy sources is given, with a focus on environmental aspects. Hybrid Renewable Energy Systems (HRES) and Multi-Energy structures are highlighted as the review ends with insights into integrating renewables in residential structures. This provides a thorough overview of recent developments and obstacles in renewable energy research.

Keywords: Sustainable Horizons, Renewable Energy, Grid Integration, Global Transformations.

ICARI- ME-24-01-33

Vedic Cosmology: Exploring Scientific and Spiritual Dimensions

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Abstract: This research paper explores the intricate interplay between science and spirituality, emphasizing the complementary relationship between the two domains. It examines seven key conceptual polarities, such as outerinner and empirical-transcendental, to delineate the nuanced differences. The paper critiques modern science for relying on assumptions, asserting that such an approach falls short in representing the complexity observed in the natural world. In contrast, it highlights Vedic science as an observational discipline free from assumptions, recognizing both efficient and material causes behind natural phenomena. Furthermore, the study advocates for the integration of Vedic scientific concepts into the school curriculum in Nepal, positioning the Vedas as valuable repositories of both spiritual and scientific knowledge. This approach not only aligns with cultural and religious guidance but also promotes critical thinking, inquiry, and wisdom, bridging the gap between traditional wisdom and modern education.

Keywords: Science, Spirituality, Vedic Science, religion.

Crafting Tomorrow: The Art and Science of Nanotechnology

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Abstract: This research paper provides a comprehensive introduction to nanotechnology, an interdisciplinary field at the forefront of scientific and technological advancements. Operating at the nanometer scale, nanotechnology involves the manipulation of materials, devices, and systems, yielding unique properties and functionalities. The paper explores the historical evolution of nanotechnology, its foundational principles, and the transformative potential it holds across various industries, including medicine, electronics, and energy. Emphasizing its multidisciplinary nature, the research paper highlights the collaborative efforts required from experts in Physics, Chemistry, Biology, Medicine, Informatics, and Engineering. The abstract encapsulates the significance of nanotechnology in reshaping scientific paradigms, fostering innovation, and propelling diverse applications that contribute to the global technological landscape.

Keywords: Nanotechnology, material, engineering, innovation.

ICARI- ME-24-01-35

Building Tomorrow: The Imperative Role of 3D Printing in Shaping the Future

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Abstract: This research paper provides a comprehensive exploration of 3D printing's transformative impact on manufacturing, offering a historical overview and detailed analysis of its core aspects. The study evaluates materials used and compares 3D printing advantages to traditional additive manufacturing. Beyond industrial applications, the paper highlights 3D printing's diverse uses in healthcare, education, construction, and emerging fields like electrochemistry and functional optics. The educational sphere's transformation is emphasized, categorizing use cases from technology education to creating learning aids. The paper presents a nuanced understanding of 3D printing's multifaceted implications, showcasing current achievements and promising avenues for future advancements across various domains.

Keywords: 3D Printing, Manufacturing, Education, Healthcare.

Marine Intelligence Unleashed: Navigating Challenges with Advanced Path-Planning for Autonomous Data Harvesting Vehicles

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Abstract: This paper explores advanced path-planning techniques tailored for Autonomous Marine Vehicles (AMVs) engaged in data harvesting and ocean sampling missions, addressing the challenges of wireless communication in the marine domain. The first section provides a comprehensive overview of fundamental models and various algorithms, platforms, and tools for maritime data collection. The research introduces a novel path planning framework for Unmanned Surface Vehicles (USVs), integrating optimization models, meta-heuristic solvers, and Clothoid-based path connectors. Another section presents a path planning method for USVs using a modified artificial fish swarm algorithm, emphasizing safety and non-holonomic constraints. The paper delves into the challenges of Underwater Internet of Things (UIoT), proposing an Inevitable Communication Space (ICS)-based dynamic data collection algorithm for underwater sensor networks. Finally, an uninterrupted collision-free path planning system for multiple USVs in ocean sampling missions is presented, showcasing the efficiency of B-Spline data frames and particle swarm optimization. This research contributes to enhancing autonomous marine vehicle navigation and data harvesting in complex maritime environments.

Keywords: Autonomous Marine Vehicles, maritime data collection, Unmanned Surface Vehicles, Underwater Internet of Things, Inevitable Communication Space.

ICARI- ME-24-01-37

Dive into Connectivity: A Comprehensive Exploration of Cutting-Edge Underwater Wireless Communication Technologies

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Abstract: This paper explores three key underwater wireless communication (UWC) technologies: radiofrequency-UWC for offshore applications, hardware-based Doppler compensation in acoustic communication for small AUVs, and the resurgence of interest in Underwater Optical Wireless Communication (UOWC). The study emphasizes constructive interference in radiofrequency-UWC to overcome seawater conductivity issues. It proposes a hardware solution for agile Doppler compensation in small AUVs and discusses the potential of single-photon receivers in UOWC for enhanced data rates. The paper also addresses the broader context of underwater communication in the Internet-of-Underwater-Things (IoUT) framework, advocating for advancements beyond acoustic communication. Finally, a hybrid opto-acoustic model is introduced for energy-efficient underwater communication, demonstrating substantial power savings. Overall, the paper offers a comprehensive analysis of UWC technologies and their applications.

Keywords: Underwater Wireless Communication, Underwater Optical Wireless Communication, Internet-of-Underwater-Things.

Enhancing Durability and Evaluating the slurry Erosion-Corrosion Resistance of HVOF sprayed WC-10Co-Cr coating in offshore hydraulic machinery applications

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Abstract: In offshore conditions, hydraulic machinery contends with both slurry erosion and corrosion, necessitating robust protective coatings. This study assesses the efficacy of the HVOF-sprayed WC-10Co-4Cr coating, known for its hardness and wear resistance. The research employs advanced techniques like SEM and XRD to analyses the coating's microstructure and phase composition. Slurry erosion resistance is evaluated under simulated offshore conditions using a specialized testing apparatus. Additionally, electrochemical studies, including potentio dynamic polarization and EIS, probe the corrosion resistance of the WC-10Co-4Cr coating in relevant corrosive offshore environments. The results aim to provide comprehensive insights into the coating's performance, contributing significantly to the optimization of protective coatings for offshore hydraulic machinery. This research is pivotal in enhancing durability and longevity in the demanding marine settings faced by offshore hydraulic equipment.

Keywords: Durability, Erosion-Corrosion Resistance, hydraulic machinery.

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Corrosion Mitigation in Saline Environments: Electrochemical behavior of HVOF Coatings WC-Co-Cr on Aluminium Metal Matrix Composite under 3.5% NaCl

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Abstract: This research investigates the corrosion mitigation potential of High-Velocity Oxygen Fuel (HVOF) coatings, specifically WC-Co-Cr, applied onto Aluminium Metal Matrix Composite (AMMC) substrates in a 3.5% NaCl solution. The WC-Co-Cr coatings, comprising tungsten carbide (WC), cobalt (Co), and chromium (Cr), are strategically employed to enhance corrosion resistance in saline environments. Electrochemical studies, including potentio-dynamic polarization and electrochemical impedance spectroscopy, are conducted to analyses the corrosion behavior at the coating-substrate interface. The study aims to elucidate the protective mechanisms, oxide layer formation, and synergistic effects of the coating constituents in mitigating corrosion in the presence of 3.5% NaCl. Complemented by scanning electron microscopy (SEM) for surface morphology analysis, the findings contribute valuable insights into the electrochemical behavior of WC-Co-Cr HVOF coatings on AMMC in saline environments, providing a foundation for effective corrosion mitigation strategies in practical applications.

Keywords: WC-Co-Cr, corrosion mitigation, NaCl solution.

Comparison of fracture toughness of AA5083 obtained in quasi-static loading and dynamic loadings at different strain rates

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Abstract: As we know that fracture toughness is very important parameters as considered during design of mechanical components because it is used to predict crack initiation and propagation during services. In this article, aluminium alloys AA5083 was considered for experiments and three posit bend specimens were prepared for quassistatic and dynamic loading conditions. In dynamic conditions, time of initiations were obtained by fixing strain gauges on specimen and using data acquisition system along with modified Hopkinson pressure bar for three-point bend test. Using this time of initiations at different loading rates and load displacement curves, dynamic fracture toughness was obtained and compared with static fracture toughness and it was found that its values increases with loading rates.

Keywords: Modified Hopkinson pressure bar, fracture toughness, Loading rates, time of initiation.

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Numerical Simulations of Sandwich Panel Subjected to Blast Loading Developed by Explosion

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Abstract: Aluminium foam cores are widely used in the defence and aerospace industries due to their outstanding properties, such as their high strength-to-weight ratio and high energy absorption capacity. The authors made efforts to simulate a free-air blast against the sandwich panels made by putting an aluminium foam core (15 mm thick) between the thin sheets (1 mm thick) of steel. These simulations were performed in Ls-Dyna using the Multi-Material ALE approach by modelling the square sandwich panel, cuboid air domain, and cylindrical TNT. The interaction between the fluid (ALE) and structure (Sandwich panel) has been defined using CONSTRAINED_LAGRANGE_IN_SOLID. Material models used for Air, TNT, aluminium foam core, and steel are Null, High Explosive Burns, crushable Foam, and Plastic Kinematic, respectively. The pressure-time history of the blast wave and the central deformation of the sandwich panel have been verified with the experimental data available in the literature. Then, numerically investigating the influence of stand-off distance on pressure time history and central deformations, it was found that the decrease in central deformation of the sandwich panel increased the stand-off distance of central deflection.

Keywords: Blast Loading, MMALE, Aluminum Foam Core, TNT, Ls-Dyna.

Advancements in Diverse Surface Modification Techniques: Meeting Industry Demands Through Coating Innovations

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Abstract: This paper explores the vital role of diverse surface modification techniques in meeting industry demands. Methods such as Physical Vapor Deposition (PVD) and Chemical Vapor Deposition (CVD) are discussed for thin protective films, while Spray Deposition is highlighted for high-quality composite materials. Ion Beam Mixing and Ion Implantation techniques are examined for modifying material properties, and the TIG Arc Method is introduced for enhancing mechanical, tribological, and corrosion properties through thick surface composite layers. Thermal spray deposition techniques, including combustion spray, plasma spray, and cold spray, are explored for their cost-effective coating of thick layers with various materials. Parameters like hardness, porosity, bond strength, oxide content, and surface roughness are considered for evaluating deposition quality. Electro-deposition is discussed for its ability to deposit thin adherent layers, despite challenges related to parameter optimization and environmental concerns. The paper provides a concise yet comprehensive overview of the advantages and applications of these techniques, offering insights into their suitability for diverse coating requirements.

Keywords: Physical Vapor Deposition, Chemical Vapor Deposition, TIG Arc Method, combustion spray, plasma spray, cold spray.

ICARI- ME-24-01-43

Innovative Solutions for Advanced Materials: Friction Stir Processing in Aluminium-Based Metal Matrix Composites for Superior Surface Engineering

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Abstract: This research endeavours to explore the evolving landscape of aluminium-based metal matrix composites (AMMCs), which have demonstrated superiority over traditional aluminium alloys in advanced engineering applications. AMMCs exhibit remarkable engineering properties, including high hardness, wear resistance, and a favourable strength-to-weight ratio. Various conventional fabrication techniques have been employed over the years, yet challenges persist, such as the development of detrimental phases and difficulties in achieving homogeneous dispersal of nano-reinforcement particles. Addressing these challenges, this study delves into the innovative realm of Friction Stir Processing (FSP), a technique capable of creating surface composites with varying thicknesses, fine-grained microstructures, and improved mechanical properties.

Keywords: Friction stir processing, strength to weight ratio.

A Study on the Dynamic Behaviour of Multi-layered Aluminium Alloys AA2014 and AA5083 due to Loading at High Strain Rates

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Abstract: In this article, the dynamic mechanical responses of multilayered aluminium alloy Alloys AA2014-T6 and AA5083 were investigated at different strain rates using a split Hopkinson pressure bar. The specimens with circular cross sections and different aspects ratios 1, 0.75, and 0.5 were considered during compression experiments at high strain rates. The thin layered soft cotton materials were used as pulse shapers to obtain dynamic equilibrium during experiments. It was seen that the stress-strain behavior of materials under high strain rate loadings were significantly different than that of individual alloys. The stacking of different materials are useful because different layers of materials are being used in aerospace structure to get better mechanical properties. Generally, multilayered stacking used in military armors are subjected to high loading rates during service. Multilayered stacking are also used in compound cylinders and air frame to provide strength in the structures. The true stress-strain diagrams for multilayered aluminum alloys at different loading rates were evaluated and presented.

Keywords: AA 2014, AA5083, split Hopkinson pressure bar, high strain rate, different aspect ratio.

ICARI- ME-24-01-45

Dynamic Simulation of Bio-Dynamic Human Model Coupled with Half Car Model Using Bond Graph

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Abstract: This work uses the bond graph simulation technique to illustrate the dynamics behavior of a 5 DOF half automobile vehicle model combined with a 4 DOF bio-dynamic human model. A range of dynamical responses in both the time and frequency domains have been simulated for the circumstances in which the vehicle is traveling at 40 km/h over sinusoidal bump. Additionally, for a range of vehicle velocities between 10 and 100 km/h, R.M.S. acceleration and displacement responses of the head, upper torso, lower torso, and pelvic (thigh) have been investigated. The paper's findings demonstrate the fascinating behavior of fully loaded automobiles.

Keywords: 9 DOF half Car Model, Bondgraph Modeling, Bio-dynamic Human, Model, Dynamic Simulation.

Advancements in Laser Wire-Based Directed Energy Deposition for Additive Manufacturing and Repair Applications

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Abstract: This study explores the advancements and potential of laser wire-based Directed Energy Deposition (DED) for additive manufacturing and repair applications. The research investigates process optimization, material compatibility, microstructural analysis, and quality assurance techniques in laser wire-based DED. The findings contribute to the understanding of this technology's capabilities, limitations, and its industrial applications. The study is supported by extensive experimental investigations, data analysis, and validation against existing standards and specifications. The outcomes of this study are to enhance the efficiency, quality, and reliability of laser wirebased DED processes.

Keywords: 3D printing, Additive Manufacturing, process optimization, Direct energy deposition.

ICARI- ME-24-01-47

Future Role of 3D/4D printing in the supply chain management of railway industry

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Abstract: The importance of supplying spare parts with reliability and on time. The ever-present high-cost pressure in the railway business. The need for high-quality and cost-efficient parts in a sector with varying regional norms presents a unique set of challenges for additive manufacturing. A possible solution is collaborating with customers and authorities to fast-track the process of achieving more economical use cases.

How additive manufacturing is already modernizing railway fleets. Trains undergo a total overhaul after 16 or 18 years, often including the introduction of new monitors and air conditioning systems that are heavier than their predecessors. 3D printed parts can be up to 50% lighter due to intelligent design, enabling upgrades without significant weight increases. This not only saves costs but also avoids the time-consuming and expensive process of obtaining new approvals. Future fleets of vehicles may rely heavily on the promise of lifetime availability for parts that 3D printing could offer.

Keywords: 3D/4D printing, Additive Manufacturing, supply chain management, product design.

Optimizing the Fashion Start-up Supply Chain: A Comprehensive Analysis and Actionable Insights

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Abstract: This study delves into the problematic dynamics of deliver chain management inside the dynamic style and splendor industry, acknowledging the enterprise's transformative shifts driven by way of globalization, digitalization, and heightened client expectancies. Focusing particularly on demanding situations faced by means of startups on this zone, the take a look at underscores the pivotal role of an optimized deliver chain in making sure their achievement and sustainability. Leveraging superior technology, which includes analytics and synthetic intelligence, the research goals to provide actionable insights via a comprehensive evaluation of income, operational methods, and delivery strategies. The study unfolds key findings illuminating various aspects such as product overall performance, consumer demographics, operational performance, and delivery dynamics. Notably, the studies demanding situations traditional assumptions through revealing a nuanced courting between manufacturing lead time and charges, prompting a reconsideration of value-effectiveness strategies. The implications of higher disorder rates also are mentioned, emphasizing the essential need for strong best control measures.

Strategic guidelines emanating from the take a look at embody targeted enhancements in production techniques, first-class control protocols, provider choice standards, and logistics techniques. These recommendations are tailored to empower startups in the fashion and beauty sector to attain operational efficiencies, cost financial savings, and heightened consumer delight. Despite precious insights, the studies recognizes certain boundaries, inclusive of capability gaps inside the dataset's scope and a confined timeframe. Future studies instructions are recommended to discover the effect of external elements and to comprise customer remarks for a greater holistic information. The take a look at underscores the significance of continuous monitoring and adaptive techniques based totally on real-time facts to foster resilience within the face of industry dynamics.

Keywords: Supply chain management, Fashion and Beauty Industry, Operational Optimization, Supply Chain Sustainability, Technological Integration.

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Apri	I						May	,						June	2					
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
31	1	2	3	4	5	6	28	29	30	1	2	3	4	26	27	28	29	30	31	1
7	8	9	10	11	12	13	5	6	7	8	9	10	11	2	3	4	5	6	7	8
14	15	16	17	18	19	20	12	13	14	15	16	17	18	9	10	11	12	13	14	15
21	22	23	24	25	26	27	19	20	21	22	23	24	25	16	17	18	19	20	21	22
28	29	30	1	2	3	4	26	27	28	29	30	31	1	23	24	25	26	27	28	29
														30	1	2	3	4	5	6
July							Aug	ust						Sept	temł	ber				
SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TVE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
30	1	2	3	4	5	6	28	29	30	31	1	2	3	1	2	3	4	5	6	7
7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14
14	15	16	17	18	19	20	11	12	13	14	15	16	17	15	16	17	18	19	20	21
21	22	23	24	25	26	27	18	19	20	21	22	23	24	22	23	24	25	26	27	28
28	29	30	31	1	2	3	25	26	27	28	29	30	31	29	30	1	2	3	4	5
Octo	ber						Nov	emb	er					Dec	emb	er				
SUN 20	30	TUE 1	9 WED	1HU 3	FRI A	SAT 5	SUN 27	MON 28	TUE 20	WED 30	31	FRI 1	SAT	SUN	2 2	TUE	WED A	THU 5	FRI 6	SAT 7
6	7	י 8	9	10	11	12	3	4	5	6	7	2	9	8	9	10	11	12	13	14
12	14	15	16	17	10	10	10		12	12	14	15	16	15	16	17	19	10	20	21
00	04	10	00	04	05	19	47	10	10	00	04	00	00	10	00	04	05	19	20	21
20	21	22	23	24	25	20	1/	18	19	20	21	22	23	22	23	24	25	20	21	28
21	28	29	30	31	- 1	- 2	24	25	20	21	28	29	30	29	30	31	- 1	- 2	5	4