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Criteria-II- Teaching Learning and Evaluation

Key Indicator	2.2	Catering to Student Diversity
Metric	2.2.2	Research Paper Published by Students

RESEARCH PUBLICATIONS

ACADEMIC YEAR
2023-2024

2.2.1 RESEARCH PAPER PUBLISHED BY STUDENTS

S.No	Department	No. of students published the papers
1	Department of Biotechnology Engineering	1
2	Department of Civil Engineering	4
3	Department of Electronics and Communication Engineering	10
4	Department of Electrical and Electronics Engineering	1
5	Department of Mechanical Engineering	5
6	Department of Computer Science Engineering	1
7	Department of Computer Science and Application	5
8	Department of Physics	1
9	Department of English	5
TOTAL		33

DEPARTMENT OF BIOTECHNOLOGY

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	Rabitha.R	Adsorbent potential of the leaf powder of <i>Artocarpus heterophyllus</i> lam (jackfruit) in efficiently removing hexavalent chromium from landfill leachate	Global NEST Journal
	Sivasree.B		
	Nivedha.B		
	Sanjay Stalin.J		



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Adsorbent potential of the leaf powder of *Artocarpus heterophyllus* lam (jackfruit) in efficiently removing hexavalent chromium from landfill leachate

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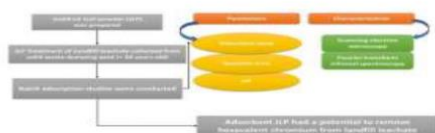
#Equally contributed as first author.

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Graphical abstract



Abstract

Chromium (VI), a ubiquitous toxin, has been associated with several human cancer types as well as immunologic, cardiovascular, developmental, neurological, and endocrine disorders. The present study investigated the selective adsorption capacity and chromium (VI) removal ability of jackfruit leaf powder (JLP, *Artocarpus heterophyllus* Lam.) in landfill leachate collected from eastern region of southern India. The efficiency of prepared JLP in removing chromium (VI) from landfill leachate was examined using a number of variables such as adsorbent dose, pH, and reaction time by employing the batch adsorption process. The maximum chromium removal efficiency was observed by increasing the adsorbent dose, pH, and adsorption reaction time, while the optimal dose of JLP, pH, and adsorption reaction time were found to be 0.5 g/L, pH 8, and 120 min, respectively. Batch adsorption process under optimal conditions showed adsorption capacity value of 0.19 mg/g and the chromium (VI) removal efficiency of 95%. The data were examined using kinetic and equilibrium models. The experimental data and the Freundlich isotherm and pseudo-second order kinetics models were well-matched. The SEM and

FT-IR of fresh and recovered JLP revealed similar surface morphology and functional characteristics, representing the active site present in the adsorbent (JLP) showing no significant change. We performed experiments on chromium (VI) recovery from the adsorbent that resulted in the higher recovery % of chromium (VI) with 0.5 M HCl (90%). The results suggest that JLP may be employed as a cost-effective bio-adsorbent for the removal of chromium (VI) from contaminated soil and water resources.

Keywords: Jackfruit leaf powder; bio-adsorbent, batch adsorption, chromium (VI) removal, isotherm, Kinetics models

1. Introduction

Globally, the landfilling process is used to dispose up to 95% of the municipal solid waste (MSW) (Kurniawan *et al.*, 2006). Landfill method is considered one of the most cost-effective methods for disposing MSW and industrial solid waste (Detho *et al.*, 2021). The dispersion of pollutants from landfill leachate could cause deterioration of soil, surface water, and groundwater (Sangeetha *et al.*, 2023; Deng and Englehardt, 2006). Leachate contains a large amount of inorganic and organic compounds such as heavy metals, sulphate, chlorides, and refractory compounds (Sangeetha *et al.*, 2023). The leachate concentration varies depending on numerous factors such as precipitation, age of landfill, and type of waste and composition (Mahtab *et al.*, 2021). The landfill leachate age is classified into three major categories: young (less than 5-year-old), intermediate (between 5 and 10 year-old), and old or mature (more than 10 year-old) (Deng *et al.*, 2021; Li *et al.*, 2022; Lu *et al.*, 2023; Sangeetha *et al.*, 2023). The precipitated liquid comes in contact with dumped wastes; it leaches the hazardous chemicals, heavy metals, toxic constituents, and some emerging contaminants like pharmaceuticals and personal care

Sangeetha A., Rabitha R., Sivasree B., Nivedha B., Stanlin J.S., Arun C., Shanmugam K. and Balakumar P. (2023), Adsorbent potential of the leaf powder of *artocarpus heterophyllus* lam (jackfruit) in efficiently removing hexavalent chromium from landfill leachate, *Global NEST Journal*, 25(9), 88-96.

CIVIL (M.Tech) ENVIRONMENTAL ENGINEERING

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	R.M.Iniyan	A review on Grey water treatment	Journal of Emerging Technologies and innovative research, Volume 11, issue 5 May 2024, ISSN -2349-5162
2023-2024	M.Linkesver	A review on Co- digestion of Feedstock's, Parameters and Pretreatments	International Journal of All Research Education and Scientific Methods, Volume 12, issue 5, May 2024
2023-2024	P.Sudharsan	Treatment of Sewage using Moving Bed Biofilm Reactor	Journal of Emerging Technologies and innovative research, Volume 11, issue 5 May 2024ISSN-2349-5162
2023-2024	S.V.Sobhika	Assessment and mapping of noise pollution using Geographic Information System in a developing city of southern region of India	Disaster Advances (Accepted; Yet to Publish)



A REVIEW ON GREY WATER TREATMENT

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Abstract- The global mishandling of grey wastewater management poses a significant danger to the circular economy, particularly in developing nations. This literature review aims to provide relevant information on the environmental impact and mitigation of surfactants found in greywater, targeting two major challenges: water scarcity and water management. Because there is less water available, recycling greywater has become crucial in today's world. Greywater, however, can only be used for non-potable uses. The term "grey water" refers to waste water that is produced by home equipment, such as washing machines, kitchens, and bathrooms, but does not include any feces. The goal of our project is to investigate the properties of greywater and the efficacy of the adsorption method in eliminating pollutants from it by employing natural adsorbents. Assuring access to clean water and tackling the problems brought on by urbanization, population expansion, and climate change require sustainable water management. Greywater, which comprises everything except toilet waste, makes up 50–80% of the wastewater generated each day in a typical household. It is distinguished by its huge volume and low organic strength. Large urban wastewater treatment facilities built for high-strength operations may find this to be problematic. Therefore, for the proper management of greywater employing distinct treatment options, segregation of greywater at the source is required for decentralized wastewater treatment. Reusing greywater may therefore result in lower transportation costs, improved adaptability and resilience of regional water systems, and fit-for-purpose reuse. Assuring access to clean water and tackling the problems brought on by urbanization, population expansion, and climate change require sustainable water management. For big urban wastewater treatment plants built for high-strength operations, this may be a problem. Greywater must thus be segregated at the source in order to be properly managed utilizing different treatment techniques for decentralized wastewater treatment. Therefore, greywater reuse may result in lower transportation costs, improved durability and adaptability of regional water systems, and fit-for-purpose reuse..

Keywords: Greywater, segregation, decentralization, and sustainable water management

I. INTRODUCTION

Since freshwater resources are rapidly declining, it is imperative that treated wastewater be reused and recycled in order to conserve freshwater. When a substantial amount of treated wastewater is reused, particularly in closed loop systems, water recycling attains zero discharge from domestic sources (kitchen, laundry, and bathroom). Up to 75% of all wastewater, including light and dark grey water is domestic wastewater. Grey water is now consistently and successfully treated, making it a more important resource than garbage. The distinction between grey and black water is obvious in terms of metrics (i.e., quantity and quality); yet, in many nations, domestic water is collected and sent to a centralized wastewater treatment plant via municipal sewage systems. Emphasized the discrepancy between the amount of wastewater generated and the capability for treatment. It can be meritoriously resolved by treating the source and efficiently separating effluent. A few examples of the variables that influence the amount of grey water generated are income, population density, ease of access to water, cultural differences, and frequency of cleaning product use.

Rarely are studies conducted on the identification of novel pollutants from household wastewater. also impacted by the substances that every home uses. Effective and efficient storm water management is necessary to reduce the effects of urban storm water and address related issues. Similar to this, recycling and reusing grey water from homes has several advantages, including lower pollution loads in streams, cost (conveyance and treatment), and a considerable decrease in water bills and infrastructure. Numerous research studies have been conducted to better understand the possibility of on-site wastewater treatment; yet, it still has certain limits because of local area considerations (such as the quality of recovered water, socioeconomic and psychological hurdles).

Many aspects of social and economic barriers remain unchanged, such as people's aversion to reusing grey water, their fixed mindset regarding the risks involved in using treated grey water, cost considerations and the comparison of treated and freshwater, speculative fears regarding the quality of treated water due to ignorance of the treatment process, environmental awareness, and sociodemographic factors.

The consequences of urbanization, population growth, and climate change are making sustainable water use more difficult. Increasing water management's robustness is a major development aim for many nations since it is closely linked to human rights, food security, education, ecological services, and public health. Searching locally for reusable water sources offers two key benefits over the long-distance approach: it can increase the resilience and adaptability of the local water system and save the need to move water over long distances, which could result in significant cost savings. Decentralized water installations acting as independent systems are necessary for the treatment of low wastewater flows in local reuse.

The implementation of decentralized water management units can serve as a supplement to a centralized grid by facilitating the gathering, processing, release, and recycling of wastewater flows in close proximity to the production site, ideally close to the point of consumption. Problems with small-scale installations include pathogens and nutrients having to be removed from a complex



A Review on Co Digestion of Feedstocks, Parameters and Pretreatment

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ABSTRACT

Because of consumerism and the urbanization process, the amount of solid trash produced worldwide is increasing yearly. Researchers have been investigating ways to produce biogas from diverse organic wastes in the last several years. Co-digesting offers several advantages, including: dilution of potentially toxic compounds that may eventually be present in any of the co-substrates involved; adjustment of pH and moisture content; provision of the required buffer capacity to the mixture; increase in the amount of biodegradable material; and expansion of the range of bacterial strains participating in the process. Increased biogas and energy output, as well as enhanced process performance and stability, are all results of these advantages. pH, TS, VS, organic content, BOD, COD, DO, and other variables that impact co-digestion. When oxygen is not present, anaerobic digestion begins. A colony of bacteria breaks down all of the organic matter into biogas, which is composed of moisture, carbon dioxide, hydrogen sulfide, and methane. Anaerobic reactions involve four distinct stages of activity, including hydrolysis, acidogenesis, acetogenesis, and methanogenesis. In order to determine the final result—which includes organic loading, biogas yield, and the effective removal of various unnecessary gases—this review examines the co-digestion of different feed and inoculum in different mixed ratios under various influencing factors. It also examines the physical, chemical, and biological pretreatment of the feed to improve COD removal and biogas yield.

Keywords: Anaerobic co digestion, Feedstock, Parameters, Pre-treatment

INTRODUCTION

Every year, an estimated 11.2 billion tonnes of solid waste are collected worldwide, and the decay of the organic portion of solid waste contributes about 5% of global greenhouse gas emissions. The modern economy's growing volume and complexity of waste poses a serious threat to ecosystems and human health (UNEP, 2024). On an annual basis, India generates 65 million tonnes of trash. In 2020, the Ministry of Housing and Urban Affairs (MoHUA) estimated that Indian states generated 14.7613 Mt/d of waste. According to the physiochemical features of wastes in several of India's biggest cities, more than half of fresh waste contributes to organic matter and has a high energy and nutritional content. In fact, in developing nations, improper MSW management techniques intensify environmental degradation and pose a risk to public health. India is confronting a seemingly impossible issue in processing and managing accumulated waste, in addition to the enormous quantity of fresh waste each day. A significant portion of the collective efforts to lower pollution and greenhouse gas emissions as well as to lessen the effects of global climate change is being played by sustainable waste management, waste avoidance, and waste reduction [1]. Few cities of the nation are constantly practicing the technology of composting. The technology is easier to implement and economically feasible. Moreover, the composting decreases organic waste volume and weight, perhaps eliminating pathogens and weed seeds; yet, it may result in nitrogen loss, processing time, equipment expenditures, and slower nutrient release [2]. Some of the cities are practicing the Incineration technology to burn the commingled wastes. However, more pollutants and toxins from incinerators will lower the quality of the air in the surrounding region. The detrimental impact of incineration on the quality of the ambient air is more evident. The implementation of an effective solid waste management system will not be enhanced by these technology solutions. Anaerobic digestion technology may be the best option for using municipal solid wastes for energy recovery and the production of beneficial material.

Anaerobic digestion is a process in which complex organic matter is broken down in the absence of oxygen by a variety of anaerobic microorganisms. It may be appropriate to use multiple wastes for energy recovery and the production of beneficial material through this technology. This could lead to the production of biogas. When waste



TREATMENT OF SEWAGE USING MOVING BED BIOFILM REACTOR (MBBR)

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ABSTRACT

Contaminants include viruses, bacteria, and protozoa can be found in sewage. The advancement of ecologically sustainable and economically viable wastewater treatment technology is imperative due to the growing worldwide demand for clean water resources. In this project, a state-of-the-art and incredibly successful biofilm-based technology called the Moving Bed Biofilm Reactor (MBBR) is used to purify sewage water. In order to promote the growth of microorganisms and aid in the biodegradation of organic and inorganic contaminants found in sewage water, the MBBR biofilm reactor uses suspended plastic carriers as a growing substrate. The development of biofilms on the carrier surfaces promotes microbial activity, resulting in a vibrant and varied microbial community that can break down a variety of pollutants. Because of its compact and modular design, the reactor may be used for both new wastewater treatment plants and the retrofit of existing ones. It is shown how effective MBBR is at eliminating contaminants such organic matter, nitrogen, and phosphorus, and how it might potentially meet strict discharge regulations. Furthermore, the adaptability of the reactor to changing wastewater conditions is demonstrated by an examination of its capacity to manage varying hydraulic and organic loads. To achieve improved overall treatment performance, the combination of MBBR with other treatment processes—such as activated sludge systems or tertiary treatment—is also discussed. At first, the aeration process took five days and eight hours to complete, with the Trail 1 result. next, the filter media process tank was used for ten days and eight hours of operation. Initially, the following findings were noted: pH = 8.34, TDS = 1138 mg/l, Temperature = 28.5oC, COD = 0, DO = 3.5 mg/l.

Keyword: Moving Bed Biofilm Reactor, Activated Sludge Process, Aerobic Digestion, Biological Treatment, Drains, Dry Weather Flow, wastewater treatment

1. INTRODUCTION

An essential component of environmental management that guarantees the preservation of water resources and public health is the treatment of sewage water[1]. Novel technologies have been created recently to improve wastewater treatment operations' sustainability and efficiency. One such cutting-edge innovation that is becoming more well-known is the Moving Bed Biofilm Reactor (MBBR). MBBR is a biofilm-based treatment strategy that is a strong contender for treating sewage water since it has a number of benefits over conventional techniques[2]. Sewage generation has increased at an unparalleled rate as a result of modern society's growing urbanization and industrialization. Even if they work well, conventional wastewater treatment techniques may have problems with energy usage, space needs, and their capacity to adjust to changing pollutant loads[4]. The investigation of novel technologies such as MBBR has been propelled by the necessity for treatment options that are both sustainable and efficient. Using suspended plastic carriers inside the reactor to promote the growth of biofilm is the fundamental idea behind MBBR[5]. These carriers offer a surface on which microorganisms can adhere and establish a dynamic biofilm, thereby fostering an environment that is favorable for the biological breakdown of pollutants found in sewage water. The carriers' mobility makes it possible for the wastewater to be mixed [6] and in contact with them continuously, which improves the treatment process efficiency.

When it comes to treating sewage water, MBBR is becoming more and more popular because of its many benefits. Because of its small size, treatment plants don't need as much space, which makes it appropriate for both new installations and facility upgrades [7]. A diverse microbial community is encouraged by the biofilm's large surface

ELECTRONICS AND COMMUNICATION ENGINEERING

S.NO	ACADEMIC YEAR	NAME OF THE STUDENT	TITLE OF THE PAPER	NAME OF THE CONFERENCE	ORGANIZING AGENCY
1	2023-2024	Sujitha S, Karthika R, Sruthi Rega K,	IOT and Machine Learning based Crop Growth Analysis and Disease Detection in, Greenhouse Environment	National Conference on Applications of AI And IOT In Engineering And Technologies (Ncaaiet-24)	Sri Bharathi Engineering College for Women
2	2023-2024	Lavanya.M, Srigurupriya A.M Geetha Shree V	Environmental Pollution Sensing Using IOT		
3	2023-2024	Manju.K,	Review On Evolution Of Optical Fiber Communication		
4	2023-2024	Faheema.M.B, Kiruthika.G, Udhaya.M,	An IOT Based Household Waste Management System using Lorawan And Block chain Technology		
5	2023-2024	S.Samweslin	Exploring Unsupervised Learning techniques for Upper limb function assessment using wearable sensor data : A review	2nd National Conference on "Emerging Trends and New Vistas in Applied sciences-2024	Arasu Engineering College, Kumbakonam
6	2023-2024	T.Mohamed Musharaf, A.Manikandan, A.Mohamed Afsal, G.Harish	Inline Pipe Inspection Robot	Indian Patent	
7	2023-2024	S.Rishi Kumar, S.K.Visagan, S.Ganesh	Bioinspired Inch Worm Wall Climbing Robot With Hybrid Mechanism	Indian Patent	

8	2023-2024	A.Manimaran, Sheikmohammed A,M.Gowshik	Smart Shopping Cart Assistant	National Conference Envision on 5G in AI,IOT & Cloud Computing Applications	International Journal of Engineering Research & Technology (IJERT), Parisutham Institute of Technology, Thanjavur
9	2023-2024	Devadharshini Radhakrishnan, Christina S, Santhiya S J, Narmadha C	A Web-based Smart Plug for Analyzing and Controlling High-wattage Consumption with Internet Access		
10	2023-2024	H. Hajitha Banu, S.S. Ruthran, S. Shanmugaprabu Mohamed Yusufsha	An IOT Based Control System for a Solar Membrane Distillation Plant Used for Greenhouse Irrigation		

IoT and Machine Learning based Crop Growth Analysis and Disease Detection in Greenhouse Environment

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ABSTRACT

This research paper presents an innovative approach combining Internet of Things (IoT) technology with machine learning (ML) algorithms for plant growth monitoring and disease detection in smart greenhouse environments. The proposed system utilizes IoT sensors to collect real-time data on environmental factors such as temperature, humidity, soil moisture, and light intensity, as well as plant physiological parameters. Machine learning models are then employed to analyze this data and detect anomalies indicative of plant stress or disease onset. By integrating ML-based disease detection algorithms with automated control systems, the smart greenhouse can promptly identify and respond to potential threats, thereby optimizing plant health and crop yield. There are various mathematical models for describing the growth of the plants by applying Reinforcement Learning (RL) approach for optimal growth control.

Keywords:

- Internet of Things(IoT)
- Machine Learning (ML)
- Smart Greenhouse
- Plant growth monitoring
- Disease detection
- Sustainable Agriculture

1. INTRODUCTION:

In recent years, the agricultural industry has witnessed a significant transformation driven by

advancements in technology, particularly the integration of Internet of Things (IoT) and machine learning (ML) techniques. One notable application of this convergence is the development of smart greenhouse systems, which offer unprecedented capabilities for monitoring and optimizing plant growth conditions. These systems leverage IoT sensors to gather real-time data on environmental parameters such as temperature, humidity, soil moisture, and light intensity, providing growers with valuable insights into the conditions within the greenhouse. This research paper addresses this challenge by proposing an integrated approach that combines IoT technology with ML algorithms for plant growth monitoring and disease detection in smart greenhouse environments. Utilizing hydroponic systems as an alternative to traditional agriculture holds immense potential for addressing Egypt's burgeoning population growth. One of the primary obstacles encountered in protected agriculture involves maintaining optimal environment conditions within greenhouse structures. The traditional hydroponics agriculture systems are currently lacking significant advancements in networking technology, particularly in effectively controlling the various influencing factors within the greenhouse environment. Addressing these challenges requires continuous monitoring of essential growth parameters and real-time measurement of all relevant factors to ensure optimal conditions for plant growth and productivity. To overcome from these challenges a large set of datas were collected and regression model was created using machine learning algorithm. Here IoT automation is introduced by collecting various datas with the help of different sensors as PH sensor, EC sensor, water and air temperature sensor, light sensor, and GSM/GPRS. Machine learning is the current technology which is benefiting farmers to minimize the losses in the farming by providing rich recommendations

EXPLORING UNSUPERVISED LEARNING TECHNIQUES FOR UPPER LIMB FUNCTION ASSESSMENT USING WEARABLE SENSOR DATA: A REVIEW

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Abstract

Getting our arms back in action after an injury or condition is a big deal, and knowing exactly how they're doing is crucial for making sure we're on the right track. This review paper is like a guidebook, showing us how we can use some really cool tools and clever computer tricks to understand what's going on with our arms without someone having to watch us constantly. First off, we talk about why the traditional methods of checking arm movement might not always give us the full picture. Then, we dive into the exciting stuff – like how we can use these special sensors called IMUs, muscle trackers (EMG), and pressure sensors to keep track of every little movement our arms make during our daily activities. But wait, there's more! We also explore how computer algorithms can be our secret weapon. We break down the tricky math behind unsupervised learning, which is like teaching computers to recognize patterns in our arm movements without needing loads of examples to learn from. Then, we showcase all the awesome things researchers have already achieved with these tools – like figuring out different arm movements, understanding gestures, and even evaluating how well someone's doing in therapy. We use real-life examples and research findings to show just how helpful these methods can be for spotting when something's not quite right with our arm movements, keeping track of our progress in therapy, and giving us and our doctors clear feedback. Of course, there are still some hurdles to overcome, like dealing with different types of data and making sure the computer's decisions make sense to us humans. But we're optimistic! We finish off by highlighting just how exciting it is to think about all the ways these gadgets and computer smarts can really make a difference in helping us get better when our arms aren't quite up to speed.

In summary, this paper serves as a comprehensive resource for individuals interested in leveraging advanced technology and computational methodologies to effectively monitor and assess upper limb functionality. Its significance extends beyond scientific inquiry, as it aims to optimize rehabilitation strategies, facilitating the restoration of individuals capabilities and enabling them to resume their preferred activities with confidence.

Keyword: Upper limb function, IMUs, EMG, Machine Learning, Assessment, Rehabilitation

Introduction

Significance of upper limb assessment

The evaluation of upper limb function is crucial within both healthcare and ergonomic domains, encompassing various aspects of daily life, professional duties, and recreational activities. At the core of this assessment is the recognition of the upper limbs' vital role in human interaction with their surroundings, enabling the execution of essential tasks essential for autonomy and professional competence. In everyday situations, the upper limbs serve as primary conduits through which individuals engage with their immediate environment, from basic activities like holding a toothbrush to more complex tasks such as meal preparation. Their functionality is indispensable for maintaining independence and dignity in executing routine activities. In professional settings, the importance of upper limb function is heightened, as employees rely heavily on their arms, hands, and shoulders to perform a range of duties crucial for workplace efficiency, productivity,

Review on evolution of optical fiber communication

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Abstract: Optical fibers are considered as waveguides, applicable for light transmission applications. They have a core surrounded by a glass or plastic layer called cladding, characterized by a refractive index. Optical fibers work on the phenomenon of total internal reflection, primarily characterized by the structure's refractive index ability and polarization. This article mainly focuses on the evolution of optical fibers from their inception to the current generation and applications. The most common application of optical fibers is to create and amplify a narrow, intense beam of coherent and monochromatic light. Moreover, optical fiber sensors, widely used in optics and photonics applications, operate based on refractive index changes, serving as key components in optical biosensing for the detection of bio-molecules. To create and amplify a narrow intense beam of coherent and monochromatic light moreover optical fiber sensor in Optics and photonics applications. Thus the fiber optic cable plays major role in transmitting data's in various trending fields like IOT, AI telecommunication, etc.

Keywords: Optical Fiber evolution, fiber laser, generation of Fiber.



Fig (a) Applications of fiber optics

Introduction

Light is an important parameter in our daily life. They are mainly used in optoelectronics and optical fiber telecommunication in order to transmitting data's. Compact disc, laser printers, digital cameras are some well-known applications [1-5,9,10]. The crucial role of an efficient and reliable smart infrastructure as a prerequisite for implementing future smart city applications and systems. It emphasizes the integration of various basic infrastructures, including water distribution, electricity grids, and transport, with information technologies, distributed sensing systems, and communication networks. The application areas span across smart healthcare, industrial processes, and the Internet of Things (IoT), where machine-to-machine (M2M) communication and optical technologies are identified as key drivers for integrated and smart infrastructures. Optical technologies including photonic devices and systems play a significant role in IoT applications, particularly in the device layer (sensors and actuators) and the network layer (transport capabilities). The layered architecture of the Internet of Things is illustrated, highlighting the role of optical technologies in various smart infrastructure domains. The text underscores the evolving role of optical communication and switching technologies in providing high-performance and reliable transport networks for IoT systems. The specific constraints and requirements on IoT devices vary based on the application, with optical communication systems and sensor devices tailored to specific IoT scenarios. The role of optical technologies in supporting applications for smart systems and infrastructures, particularly in the context of the Internet of Things (IoT). While wireless systems have been extensively explored for IoT applications, there is comparatively less focus on the significance and application of optical technologies, making this paper a contribution to filling that gap. The structure of the paper includes a discussion on recent developments in optical sensor technologies, an overview of ongoing work in remote optical sensing and optical sensor networks, and a report on efforts to establish a network infrastructure

An IoT Based Household Waste Management System Using LoRaWAN and Blockchain Technology

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Abstract – An IoT based household waste management system for a clean and smart society is aimed to manage the waste from each and every house of the society more efficiently. To implement the IoT based waste management system we need high data availability which is provided by the Low-Power Wide-Area Network (LPWAN) and blockchain technologies. This paper discusses the collection and decomposition of waste in a smart way using IoT. This paper focuses on the segregation of the waste at two levels where the first level of segregation is on the individual house of the society and the second level of segregation is at the society. This paper implements a solution for a high data availability based on Low Power Wide Area Network (LPWAN) and Blockchain technologies to provide the required data needed for the IoT waste management system. The final result that we can observe by following these methods is a clean and smart society.

Keywords-Internet of Things, Waste Management system, LoRaWAN, Block chain Technology.

1. INTRODUCTION

A smart city is developed with the help of innovative technologies with sensor networks, cameras, wireless devices, fast network like 5G, IT infrastructure and data centers to efficiently offer necessary services like electricity, water supply, transportation, sanitation, recycling, etc. A city has markets, institutions, offices, and various small and large scale homes. We cannot build a smart city without making a smart waste management system. Waste management is considered as a vital part of city management. Commercial and household activities produce organic and inorganic waste materials [1]. A large amount of waste is produced by the household activities. Dustbin is the only way to collect them and wait for the municipal corporations to take them for disposal. These dustbins are placed in public places and in front of households in the city. Due to the day by day rapid increase of waste these bins are overfilled most of the time. Improper waste management can make a

serious health risk and lead to the spread of infectious diseases. This pollutes the surrounding environment [2]. The various biodegradable waste combinations can produce poisonous gases like methane if the dustbin is not disposed for many days. The biodegradable and non-biodegradable waste separation and waste management becomes the main problem with rapidly increasing population in the urban areas. For this we need a system that can provide an earlier intimation to the concern authority about the filling of the dustbin.

For that IoT based smart dustbin is an effective and helpful tool in the waste management. It is a highly innovative system which will help us to keep the cities clean in a smart and effective way. The basic idea in this paper is to design a smart trash detection system which would automatically notify the officials about the current status of various dustbins in the city. A message or mail is sent to the user and the message will highlight the level of garbage collected in the cities. To achieve this we are using Internet of Things (IoT). IoT is a network of devices that contain sensors which allows things to connect and exchange data. It has a large role to play in future of smart cities which in turn are supposed to be environment friendly. With IoT in place, it will become easier for municipal bodies to monitor the whole waste management process in the cities. It gives real time indication of the trash level in the bin at any given time. Using that data we can optimize waste collection routes. By this trash collection system of the waste management in a city will become more systematic and yield better results. In order to use the IoT technology for the smart bins all over the city we need a high availability of data. For that we are using the LoRaWAN technology combined with Blockchain technology for the transfer of data all over the city. This is initiated to focus on providing a maximum amount of data sent by the sensors. With the use of these technologies we can have a highly effective data transfer system for our waste management system. It provides a distributed authentication

Environmental Pollution Sensing Using IoT

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ABSTRACT

Air quality, water pollution, and radiation pollution represent significant challenges in the environment, posing genuine threats to ecosystems and human well-being. These environmental factors require careful consideration and effective mitigation strategies to ensure a sustainable and healthy future. Environmental pollution contributes to health issues such as heart muscle difficulties and respiratory problems, impacting human civilization significantly. The primary objective of this paper is to provide a holistic solution to the problem of pollution in modern society. By implementing comprehensive strategies, we aim to monitor and address major health concerns, societal challenges, and environmental issues associated with pollution. Effective monitoring is essential for global sustainable growth, ensuring the maintenance of a healthy society. Over recent years, environmental monitoring has

Evolved into a Smart Environment Monitoring (SEM) system, leveraging Advancements in the Internet of Things (IoT) and the development of modern sensors. This transformation enhances our ability to collect and analyze data, paving the way for informed decisions that contribute to the overall well-being of society and the environment. The review is structured based on the applications of Smart Environment Monitoring (SEM) methods, with subsequent in-depth analyses for each purpose. Within this framework, examination includes the sensors utilized, machine learning techniques applied, and classification methods employed. The comprehensive analysis extends beyond the initial review, incorporating major recommendations and insights derived from the discussion results and research trends. This structured approach aims to provide a thorough understanding of SEM research implications and emerging directions. The research information is sourced from devices and sensors strategically placed in diverse locations. Post data collection, a comparison of this information is facilitated through the Centralized Pollution Control Committee (CPCC).

Keywords:

- IoT sensors
- Pollution
- Health problems
- Environmental issues
- Smart environment monitoring
- Smart sensor
- Wireless sensor networks

1. INTRODUCTION

Overseas expansion hinges on various factors like the economic system, education, agriculture, and businesses, with a notable emphasis on the atmosphere. Here, a clean, pollution-free, and safe environment is seen as the core strategy essential for fostering global development [1-3]. Managing the environment encompasses efforts to prevent and control accidents, minimize pollution, and address challenges arising from adverse weather conditions. The focus is on proactive measures to resolve issues and maintain environmental stability in the face of potential hazards and weather-related problems[4]. Certainly, with recent strides in science and technology, particularly in artificial intelligence (AI) and machine learning, Environmental Monitoring (EM) has evolved into a Smart Environment Monitoring (SEM) system. These advancements enable more precise monitoring of environmental factors, allowing optimal control of pollution and other adverse effects. The shift towards smart cities design replaces outdated methods, shaping more efficient and sustainable urban environments[5]. These technological progressions enable EM methods to more precisely monitor environmental factors, maintaining vigilant oversight over pollution and other adverse consequences[6]. Thercent advancements in sensor technologies, especially within Wireless Sensor Networks (WSN), enable real-time observation of the atmosphere across various temporal dimensions[7]. Indeed, the integration of technologies like IoTand wireless networks has simplified and made environment monitoring more sophisticated with AI control. Smart Environment Monitoring (SEM) systems, documented in literature, employ various smart sensors [8,9-12], wireless sensor networks (WSNs)[13,14,15-17] and IoT devices [18,19,20,21,22,11,22,23].Wireless networks and wireless sensor networks (WSNs) utilize AI-based monitoring and control methods. Internet of Things

(IoT) devices in WSNs contributes to efficient waste management, vehicle tracking, temperature regulation, and pollution control. This integration of IoT, AI, and wireless sensors is collectively referred to as SEM systems, revolutionizing modern environmental monitoring[19].Deploying wireless devices within a Wireless Sensor Network (WSN), the establishment of specific standards and protocols becomes crucial for the successful implementation of SEM (Sensor, AI, and IoT-based Environmental Monitoring) systems. Research efforts are underway to develop protocols and standards tailored to IoT-based SEM systems to enhance their effectiveness and interoperability [24].

2.RELATED WORKS

The escalating levels of air pollution, especially in densely populated urban areas, pose a significant threat to human health. As pollution consistently surpasses permissible levels, it is estimated that approximately 30% of annual environmental pollution is attributed to vehicle emissions [35].The

farming sector, SEM becomes instrumental in focusing on agricultural production as a pertinent issue for a country's economic growth [41].A substantial body of research on Strategic Environmental Management (SEM) encompasses diverse purposes and methodological approaches. The current study proposes the implementation of environment monitoring systems as a smart form of SEM, serving various purposes and employing distinct methods. The extensive contributions to SEM research are categorized into three main subsections: Smart Agriculture Monitoring systems (SAMs), Smart Water Pollution Monitoring systems (SWPMs), and Smart Air Quality Monitoring Systems (SAQMS).

Smart Water Pollution Monitoring (SWPM) Systems

IoT(Internet of Things), Wireless Sensor Networks (wsns), and compatible sensors form the foundation of Sensor-AI-IoTEnvironmental Monitoring (SEM) systems. Wsnsestablish data connectivity, enabling

An IOT Based Control System for a Solar Membrane Distillation Plant Used for Greenhouse Irrigation

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ABSTRACT

This project presents a control strategy that uses the Internet of Things (IoT) technology to manage a smart-grid framework including a solar desalination facility and a group of greenhouses that demand water for irrigation. In addition, the water public utility network has also been considered an agent of this smart-grid framework. The controller is

which, the associated economics costs stand out.

One way to decrease the costs of the freshwater produced by means of desalination processes is to combine them with renewable energies. In this way, Membrane Distillation (MD) technology is a thermal separation process with potential in comparison to other desalination technologies, since it requires a low operational temperature, what makes that it can be easily coupled with solar thermal energy [10]. Although this technology is currently more expensive than other desalination processes, i.e. reverse osmosis, it is adequate to develop small medium desalination applications to be implanted in places with good solar irradiance conditions and access to sea water, as happens in Almer'ia. Towards sustainable irrigated crops, the connection of greenhouses and Solar Membrane Distillation (SMD) facilities should

A Web-based Smart Plug for Analyzing and Controlling High-wattage Consumption with Internet Access

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ABSTRACT This paper outlines the design and execution of a complicated net-based clever plug system tailor-made for far flung evaluation and management of high-wattage energy consumption thru the internet. Employing a complete array of additives, together with Arduino UNO, Node MCU, Buzzer, LCD Display, Bridge Rectifier, Power Transformer, Current Transformer, Relay, Temperature Sensor, and Arduino IDE software, the machine empowers customers with the ability to meticulously monitor energy utilization, remotely administer related gadgets, and directly get hold of notifications regarding irregular intake styles. With a focus on delivering a user-centric interface and fortified security measures, this revolutionary answer drastically complements the benefit and efficacy of overseeing electric home equipment. Utilizing the Blynk monitoring app on a cell tool that the smart plug offers customizable signals and notifications, permitting customers to get hold of updates on electricity utilization thresholds, anomalies, or when particular devices are in use. It is incredibly simple to apply and the Internet of Things (IoT) closely is predicated on it.

Search Terms: Smart Plug, Internet of Things (IoT), Energy Monitoring, Remote Control, Arduino UNO, Node MCU, Web-Based Interface

ELECTRICAL AND ELECTRONICS ENGINEERING

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	Aravindh K, Mohamed Arshed J, Mohamed Jaffer Hussain S	Integrated Health Monitoring and Dynamic Ventilation Control	International Research Journal of Modernization in Engineering Technology and Science



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INTEGRATED HEALTH MONITORING AND DYNAMIC VENTILATION CONTROL

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ABSTRACT

The integration of comprehensive health evaluation and automated ventilation control has emerged as a critical solution in modern healthcare. This system delivers real-time data updates via IoT and LCD interfaces by using temperature monitoring alongside continuous tracking of vital indicators such as heart rate and oxygen saturation levels. Importantly, when abnormalities in heart rate or oxygen saturation levels are identified, an automated servo motor activates the ventilator, giving prompt respiratory support. Concurrently, an audible alarm system notifies all parties involved, including medical staff and concerned family, allowing for fast reaction and care. This ground-breaking solution tackles important issues in hospital environments. Its application transforms patient care by providing a proactive method of ventilation management and health monitoring. Improved patient safety and expedited response mechanisms benefit hospitals, lowering the risks of postponed intervention. Real-time updates and timely warnings can provide families peace of mind and encourage a greater sense of involvement and assurance about the well-being of their loved one. In addition to improving patient outcomes, this technological integration in healthcare also fortifies relationships between medical facilities and the patient support systems.

Keywords: LCD, IoT, Heart Rrate, Oxygen Saturation.

I. INTRODUCTION

The integration of advanced technology with holistic patient care is at the forefront of medical innovation in today's healthcare landscape. The combination of thorough health assessment and adaptive ventilation control marks a paradigm leap in our approach to monitoring and responding to crucial health indicators. This revolutionary device works by combining temperature monitoring with real-time monitoring of vital signs such as heart rate and oxygen saturation levels. The combination of these features enables dynamic updates via IoT connections and LCD screens, providing an instantaneous and comprehensive view of a patient's health. The ability of this system to react immediately to abnormalities in vital signs is essential to its effectiveness. The ventilator provides instant breathing assistance by activating its automatic servo motor in response to variations in heart rate or oxygen saturation levels. Concurrently, a system of auditory alerts rapidly notifies all parties involved, including hospital personnel and worried relatives, guaranteeing a prompt and well-coordinated reaction to the patient's requirements. This comprehensive approach addresses essential issues that arise in healthcare settings, providing a proactive and responsive foundation for patient care. Its deployment ushers in a new age in healthcare, redefining monitoring and intervention criteria. This approach, by bridging the gap between technology and compassionate care, not only improves patient safety in hospital settings, but also generates a stronger sense of confidence and involvement for families. This introduction emphasises the revolutionary potential of incorporating technology into healthcare, paving the way for a future in which patient well-being is seamlessly supported and prioritised.

OBJECTIVE

The goal of this project is to use Arduino-based technologies to construct an integrated health monitoring and ventilation control system. The device will allow real-time tracking of heart rate and oxygen saturation levels, as well as patient movements, using accurate pulse oximeter measurements, and will further improve patient care by deploying a servo motor for responsive breathing adjustment. Through intuitive data visualisation, safety safeguards such as crucial warnings, and a user-friendly interface, the system seeks to provide personalised health management. The initiative aims to develop healthcare technology by combining technical creativity and medical knowledge. It also emphasises the importance of ethical considerations and

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[3224]

MECHANICAL ENGINEERING

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	Sri Venkateshvara Vijaya Ragavan	Synthesis characterization of high entropy alloy powder through mechanical alloying	JMEPEG
2023-2024	M. Koglesh K. Akbar Batcha M.Alameen	Experimental analysis of briquetted of cashew shell and tamarind seed as source bio energy generation	E3S web of conference 405
2023-2024	K.Dhinsh kumar M.Sivanesh C.Muguthan	Development of neural network model and taguchi based optimization for dry sliding performance of ai 6095 alloy reinforced with Nano sic and grapheme Nano platelets	Material science forum , Trans tech publication ltd
2023-2024	M. Barath G. Kaviyaran	Neural network approach Influence of ceramics dry sliding wear in al-cu-zr metal matrix composite	Material science forum , Trans tech publication ltd
2023-2024	Sasikumar Rakesh Sridhiya	Node reinforcement strut based diamond metal lattice structures for light weight biomedical composite components	The patent office journal number 17/2024 dated on 26/04/2024



ORIGINAL RESEARCH ARTICLE

Synthesis and Characterization Study of $Al_{10}Cr_{25}Co_{20}Ni_{25}Fe_{20}$ High-Entropy Alloy Powders through Mechanical Alloying

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$Al_{10}Cr_{25}Co_{20}Ni_{25}Fe_{20}$ high-entropy alloys (HEA) with ultrafine grains was synthesized through 30 h of mechanical alloying (MA). The morphological study of prepared high-entropy alloy powders was done by using scanning electron microscope images. Crystallite size and lattice strain of prepared high-entropy alloy were investigated through x-ray diffraction technique. Consolidation and sintering of HEA powders done by two methods such as conventional sintering and spark plasma sintering methods at 1000° and 1200 °C. After 30 h of MA, crystallite size 44 nm and lattice strain 0.182 was obtained. The mechanical properties analysis of high-entropy alloy was done in terms of its density, hardness measurements and compression test. For conventional sintering, the hardness values of 135 ± 6 HV_{0.05} for 1000 °C and 186 ± 8 HV_{0.05} for 1200 °C were obtained. For spark plasma sintering, the hardness values of 167 ± 5 HV_{0.05} for 1000 °C and 212 ± 6 HV_{0.05} for 1200 °C was obtained. Ultimate compressive strength for conventional sintering at 1000 °C and 1200 °C was 246 ± 5 MPa and 305 ± 6 MPa. Ultimate compressive strength of HEA for spark plasma sintered composite at 1000 °C and 1200 °C was 369 ± 5 MPa and 442 ± 5 MPa and the total elongation was 17.7%. BCC and FCC biphasic mixture was obtained and confirmed by transmission electron microscopy images and electron backscattered diffraction analysis.

Keywords compressive strength, hardness, high entropy alloy, spark plasma sintering

1. Introduction

The high-entropy alloys (HEAs) have been developed since 2004 (Ref 1, 2), the alloy consists of four or more than four principal elements in equal or non-equal molar concentration. In developing of HEAs, body-centered cubic (BCC) and face-centered cubic (FCC) solid solutions are formed due to combination of multiple principal elements (Ref 3-5). High-entropy alloys were prepared by induction melting, and arc melting (Ref 6, 7) method was reported by earlier studies. Microhardness and wear resistance of $Al_{0.25}CoCrFeNi_{0.6}$ high-entropy alloy prepared by induction melting was studied by Sarnikova et al (Ref 6). The effect of Ce addition on purification and inclusion modification mechanism of equiatomic $CoCrFeNiMn$ high-entropy alloy prepared by arc melting was reported by Yin et al (Ref 7). The powder metallurgy route has increased for synthesizing HEAs with excellent mechanical

properties (Ref 8-12). Zhou et al investigated Fe-Cr-Ni-Al-Ti ferritic super alloy fabricated by powder metallurgy and reported that HIP consolidation gave prior particle boundaries (Ref 8). The thermal stability and oxidation behavior of powder metallurgical FeCrNiAl-based medium entropy alloys at 800-1000 °C were investigated by Yang et al (Ref 9). In addition, Rogachev et al (Ref 10) studied the long-term stability (up to 204 days) of mechanical alloyed $CoCrFeNiTi$ high-entropy alloy at 873, 1073 and 1273 K. $AlCoCrFeNiTiZn$ high-entropy alloy was fabricated by mechanical alloying and followed by sintering in tube furnace with controlled atmosphere by H. Kalaritari et al (Ref 11). They reported that BCC and FCC solid solution was obtained after 120 h of mechanical alloying. Comparative study of the microstructure and phase evolution of $FeCoCrNiAl$ high-entropy alloy-matrix with WC nanocomposite powders prepared by mechanical alloying was investigated by Cheng et al (Ref 12). They reported that after 10 h of MA, BCC gradually transformed to FCC phase and up to 100 h of MA, both BCC and FCC biphasic HEAs were formed.

Recently, mechanical alloying (MA) and followed by spark plasma sintering (SPS) is one of the promising method to develop HEAs with excellent mechanical properties (Ref 13-19). $AlCrCuMnNi$ high-entropy alloy was produced by mechanical alloying and followed by spark plasma sintering at different temperature by Toroghinejad et al (Ref 13). They reported that the hardness, density, and wear resistance increased with increasing spark plasma sintering temperatures due to the sintering quality and formation of intermetallic compounds. Similar results were obtained by Karimi et al (Ref 14) for $CoCuFeMnSi$ high-entropy alloy fabricated by mechan-

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Experimental analysis of Briquetted cashew shell and tamarind seed as source of bio energy generation

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Abstract. Sustainable development implies development brought to the present society without giving up on the scope of needs that future generation requires. For achieving sustainable development various goals were been fixed and indicators are been used to measure up the progress. Energy utilization is one of the important aspects for development of a country, technology etc. The energy utilized has mostly been fossil based such as coal, oil etc. These sources have been used in electric generation in most countries and crude oil refined petrol and diesel have been used for transporting purpose. The usage of the fossil-based fuels which has more carbon content in them possess the threat of polluting the environment by causing emission into the atmosphere, Moreover the availability of reserves of these sources are also become thin as these are non-renewable source of energy. For overcoming these obstacles, the developed countries are being focussing on renewable sources of energy for managing the energy demand and to have eco-friendly environment. The advancements in the field of bioenergy have contributed energy generation from different sources through various techniques. One of the important aspects about the bioenergy generation is utilizing the waste, end products of the biomass to energy. Various wastages from agro to food industries are not managed as it degrades on its own. However, these organic wastages can be viewed as a source for energy generation. The objective the experiment is analyse tamarind seed, cashew seeds and blend of both in powder form and briquetted for energy generation. The experimental result indicates that the briquetted form of is more suitable in terms of properties with higher fixed carbon contents.

1 Introduction

The rising population and environmental sustainability objectives, there is a growing need for alternate and ecologically acceptable energy sources. Both industrialised and developing nations are concentrating on building infrastructure based on renewable energy sources to

Development of a Neural Network Model and Taguchi-Based Optimization for Dry Sliding Wear Performance of Al 6065 Alloy Reinforced with Nano SiC and Graphene Nanoplatelets

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Keywords: Al 6065 alloy, Nano particles, Taguchi, Artificial Neural Network

Abstract. The Al6065 alloy is widely used in various applications, including tubing for furniture, railway and bus structures, pylons, platforms, and pipelines. However, due to the wear experienced in these applications, it is essential to enhance the wear confrontation of this alloy. To address this issue, this research focuses on reinforcing Al6065 with nanoparticles of silicon carbide and graphene by means of the stir casting method. The wear behaviour of the alloy is studied by varying the rotational speed, load, and composition of reinforcement in the stir casting machine using Taguchi design of experiment. The rate of wear and friction coefficient are measured as responses. The obtained results are then analysed and optimized for the minimum of the output responses using S/N ratio analysis. Further, ANOVA is carried out to determine the influence of each parameter, and a model of the neural network is developed to predict the response. The findings indicate that cumulative the percentage of reinforcement enhances the wear resistance of the alloy. The optimized values of the rotational speed, load, and composition of reinforcement lead to improved wear resistance, with a corresponding decrease in the coefficient of friction. The ANOVA results reveal that the rotational speed and load significantly affect the responses, while the reinforcement composition has a moderate effect. The developed neural network model accurately predicts the

Neural Network Approach on Influence of Ceramics on Dry Sliding Wear in Al-Cu-Zr Metal Matrix Composite

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Keywords: Aluminium alloy, Aluminium oxide Nano, ANN, Taguchi

Abstract. This research aims to investigate the dry sliding wear behavior of Al-Cu-Zr (ACZ) metal matrix composite (MMC) at various Aluminium oxide (AOX) Nano particles composition. ACZ alloy is widely used in on road and space mobility applications where the focus is on wear resistance. To enhance the resistance towards wear, Al alloy is reinforced with AOX nanoparticles at 3%, 6%, and 9% addition using stir casting process. The wear assessment is conducted at varying Composition (COMP), load (LD), speed (Ns), and sliding distance (SLDN). The wear rate (WRT) and Frictional force (FRFC) are analysed for different process parameters. To optimize the experiments, Taguchi signal-to-noise ratio (STNR) is used. Taguchi analysis show that the optimal conditions for minimum WRT and FRFC are at 6% AOX addition, 12.5 N load, 500 rpm speed, and 35 mm SLDN. Furthermore, an artificial neural network model (ANNM) is developed to forecast the WRT and FRFC. The neural network model is trained using the experimental data and the optimized process parameters. The neural network is a powerful tool that can learn the complex relationship between input and output variables. The model is validated using the experimental data, and the results show that the neural network model can predict the WRT and coefficient of friction with high accuracy. The Taguchi optimization and neural network model can provide a systematic approach to optimizing the process parameters and predicting the WRT and coefficient of friction. This approach can be applied to other materials and processes to improve their performance and reduce costs.

Introduction

Aluminium alloys are prone to wear, which limits their application in high-wear environments. ACZ MMCs are particularly interesting due to their good wear resistance, high strength, and low density[1]. The strengthening mechanism of the ACZ system is based on the precipitation of the intermetallic phase Al₂CuZr[1][2]. A number of studies have been conducted on the application of ACZ MMCs. For example, A work considered the effect of AOX size at particle level and composition on the mechanical characteristics of ACZ MMCs. The outcomes exhibited that the adding of 10 vol.% of AOX with an average particle magnitude of 300 nm improved the hardness, tensile strength, and wear resistance of the ACZ [3].

One research compared the mechanical characteristics of ACZ produced by two methods, namely powder metallurgy and casting methods. The results showed that the powder metallurgy method produced composites with higher hardness, tensile strength, and wear resistance than the casting method[4]. The effect of the sliding Ns on the wear parameter of ACZ MMCs has been studied. The results showed that the wear nature of the ACZ MMCs improved with increasing sliding

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(57) Abstract :
 This method encompasses the formation of a diamond-based metal lattice structure characterized by strut junctions that are integrated with spherical nodes. The process involves sequentially depositing layers of metallic powder, such as Ti6Al4V, and subsequently sintering these layers with a laser beam targeted at specific locations. This procedure is repeated until a node-reinforced metal lattice structure is achieved. Diamond lattice structures are structures built by repeating the diamond unit cell. The diamond unit cell is a unit cell with strut members disposed at 109.48o between all the strut members. These structures are ideal for lightweight components in windmill applications and biomedical implants, enhancing load-bearing capabilities and biocompatibility.

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COMPUTER SCIENCE ENGINEERING

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	Preethi.B	Solar Power Data – Driven Iot Smart	ICSTEM 2024



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Solar-Power Enabled Data-Driven IoT Smart Garbage Pail for Individuals and Disabled

[Balamurugan, S. Appavu alias](#) ; [Preethi B.](#) ; [Sheriff, Mohamed Ashik R.](#) ; [Vigneshwar B.R.](#) ;

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Abstract

According to the increasing population, our disposal of waste has been increased. The main aim is to provide help for the physically challenged people in the disposal of waste. In this motive we have created one smart garbage pail based on IoT. To provide convenience in this task, we have developed the bin to move on its own path to collect the dust. Main function of the smart bin is to deliver the trash bin close to a user who are physically challenged. By adding the ultrasonic sensor, it avoids the obstacles and deviates its path. In addition to that, it can automatically get opened when the user approaches the dustbin. Another purpose of the garbage pail is voice recognition accessed. By accessing the voice, the dustbin will move accordingly. Arduino UNO is act as a heart component of our smart garbage pail. A smart garbage pail comes the user and collects the dust, we can access it through voice reignition. It can also avoid obstacles. © 2024 IEEE.

Author keywords

Arduino UNO; IoT; sensor technology; smart devices; Smart garbage pail; Ultrasonic Sensor

Indexed keywords

SciVal Topics

COMPUTER SCIENCE AND APPLICATION

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	Ahamed Yusouf .B	Next –Gen hiring flask-Based AI interview analysis through audio and video processing	International Journal Of Creative Research Thoughts
2023-2024	Aafiya	Advancing Alzheimer’s disease detection harnessing graph network for Enhanced Early Identification	International Research Journal on Advanced Engineering Hub
2023-2024	Chithra	Enhancing Echocardiography segmentation integrating Enforced Temporal Consistency	International Journal of Advanced Research in Management, Architecture, Technology and Engineering
2023-2024	Rajeshwari .G	Vehicle Identification and Counting (VIC) Using Machine Learning Algorithm- ORB	IEEE
2023-2024	Biruntha .K	An Elegant Evaluation: Triangulating Clustering Methods for Customer Segmentation	IEEE



“NEXT-GEN HIRING FLASK-BASED AI INTERVIEW ANALYSIS THROUGH AUDIO AND VIDEO PROCESSING”

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Abstract: By developing a cutting-edge web-based interview platform, the project "Hiring Flask-based AI Interview Analysis through Audio and Video Processing" seeks to transform the hiring procedure. With Flask serving as the foundation, the system incorporates AI to provide thorough interview analysis. During applicant interviews, OpenCV is used for video processing, with a focus on computer vision techniques to assess non-verbal clues, facial expressions, and other visual elements. PyAutoGUI is also used to offer automation capabilities, which could improve user experience and streamline the interview workflow. The project attempts to give a smart and effective tool for objective candidate assessment by combining Flask, OpenCV, and PyAutoGUI, providing a seamless and automated solution for the hiring business. This cutting-edge platform offers a strong foundation for AI-driven analysis of audio and video files, as well as user-friendly automation features made possible by PyAutoGUI. The project is a viable option for businesses looking to integrate automation technologies, artificial intelligence (AI), and Flask to streamline their employment processes because of its dual focus on cutting-edge technology and user convenience. Compared to conventional synchronous video interviews (SVIs), employment screening can be done more effectively with the implementation of AI-based decision agents and asynchronous video interviews (AVIs). Nevertheless, no research has been done on the social effects of employing synchronization and AI decision agents in video interviews. This study used a unique experimental setup based on the theories of social interface and media richness, to compare job applicants' perceptions of fairness between the AVI setting and the SVI setting using an AI decision agent (AVI-AI), as well as human ratings and job applicants' response behaviors between the SVI and AVI settings. The 180 observations' worth of data showed that first impressions and physical appearance greatly influenced structured interview scores, even in cases when the video interview was not synchronous, and AVIs were less effective than SVIs.

Index Terms - corrupted, illegal mining, spam aware, Interrupt occurrence.

Advancing Alzheimer's Disease Detection Harnessing Graph Convolutional Networks For Enhanced Early Identification

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Abstract

There is an urgent need for improved methods of early diagnosis in order to combat the devastating effects of Alzheimer's disease (AD), a major player among neurodegenerative diseases. Understanding the critical need for early detection to get the best possible therapy results, this research explores the use of the Graph Convolutional Networks (GCN) algorithm to detect early-stage Alzheimer's disease. The work captures detailed interactions between various brain areas by integrating neuro imaging data to generate brain connectivity diagrams. Improving GCN's performance in graph analysis, testing its discriminatory strength, and gauging its resilience on different datasets are the main aims of this study. We must study fresh and advanced methodologies since traditional diagnostic methods frequently fail to uncover subtle early-stage AD features. An exciting new direction for improving accuracy and enabling prompt intervention is the suggested GCN-based model, which aims to decode these subtle signals suggestive of AD. The research is in line with the overarching goal of improving the sensitivity and efficacy of AD diagnostic tools. There is a pressing need for more sophisticated methodology as traditional methods can miss small but significant changes in brain connections that occur before obvious symptoms. This study uses GCN to improve AD early detection methods, which might change the way the illness is diagnosed and treated forever.

Keywords: Alzheimer's disease (AD), Brain Connectivity Graphs, Diagnostic Accuracy, Early Detection, Graph Convolutional Networks (GCN).



ENHANCING ECHOCARDIOGRAPHY SEGMENTATION INTEGRATING ENFORCED TEMPORAL CONSISTENCY

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Abstract:

The field of echocardiogram segmentation is explored in this study, which presents a new method that adopts ETC. When it comes to detecting cardiovascular diseases, echocardiography is crucial, and for correct clinical evaluations, proper segmentation is key. An improvement in the accuracy and consistency of delineating cardiac structures across time can be achieved with the incorporation of ETC, which seeks to increase the temporal coherence of segmented structures over

I. Introduction

When assessing heart function in a clinical setting, ultrasonography (US)

successive frames. This work aims to optimize echocardiography segmentation algorithms using ETC, test the approach's efficacy across different datasets, and determine its influence on segmentation accuracy. By tackling these goals, the study hopes to increase diagnostic reliability and clinical decision-making by overcoming the present limits in echocardiography segmentation's temporal consistency.

Keywords: ETC, Machine Learning, Cardio, Temporal consistency

imaging is usually preferred. The fact that it is noninvasive, inexpensive, and available in real-time is a major factor in its appeal [1].

Vehicle Identification and Counting (VIC) Using Machine Learning Algorithm- ORB

Publisher: IEEE

Cite This



S. Manimozhi ; S. Arumugam ; G. Rajeshwari [All Authors](#)

28

Full

Text Views



Abstract

Abstract:

Counting vehicles is an essential function for smart city applications, traffic management, and surveillance.

Document Sections

I. Introduction

II. Literature Review



III. Methodology

There are several applications for the technology used to detect vehicles in recorded video. In this research work, the Oriented FAST and Rotated BRIEF (ORB) method is used to develop a rudimentary model for vehicle detection and counting. The video clip used as input, numerous frames are retrieved, and shadow and backdrop are approximated. To identify every moving object from the estimated backdrop, the subsequent frame is subtracted. Vehicles are identified, categorized, and counted for traffic estimation based on moving objects, utilizing object detection methods and OpenCV. When used with OpenCV, the ORB algorithm offers a

An Elegant Evaluation: Triangulating Clustering Methods for Customer Segmentation

Publisher: IEEE

Cite This



S. Manimozhi ; D. Ruby ; K. Biruntha [All Authors](#)

114

Full

Text Views



Abstract

Abstract:

In the Business world, the customer satisfaction is vital. In order to improve the sales and patterned the satisfaction of customer, the preferences of the customer, quality and quantity of the product is analyzed. Various parameters are used in business aiming to improve the sales and customer satisfaction. The Agglomerative clustering, K-Means Clustering and Density Based Spatial Clustering (DBSCAN) techniques are used in this study. In the Density based clustering techniques used to fragment the customers based on the customer preference and behavior. The Intra-cluster variance is minimized with K-Means clustering. By employing the three algorithms, the customers are categorized based on who share similar interests by extracting and analyzing patterns from the customer data at hand. The evaluation reveals that K-means Clustering and Agglomerative Clustering achieves the highest silhouette score when conducting customer segmentation, surpassing other methods. The comparative analysis conducted in this study on feature-based

Document Sections

I. Introduction

II. Literature Review

III. Methodology

IV. Results and Discussion



V. Conclusion and Future

PHYSICS

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	D. Jevin Christy	Thermal Imaging of Paddy Seeds for Quality Assessment	Journal of Tropical Agriculture



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Thermal imaging of paddy seeds for quality assessment

Kumar D.^a ; Jevin Christy D.^a; Sakthibalan S.^a; Srivind J.^a; Kesavan K.^a; Eevera T.^b; Thilagar S.H.^c
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Abstract

The emission of infrared radiation from objects of investigation provides a viable non-contact imaging mode through thermal imaging which is a motivation to conduct thermal imaging experiments on seeds for assessing the quality of paddy seeds. It consisted of seed collection, segregation, sample preparation, thermal imaging, and analysis besides test of germination for comparison. We collected paddy seeds from local seed distributors and segregated them into low, medium, and high-quality seeds based on their physical characteristics. Then, the seeds were kept in moistened filter paper, dried, and placed over a petri dish. Next, seeds of a particular quality in a petri dish were under irradiation of a halogen lamp for 40 seconds followed by a video recording of the emission of samples using an infrared thermal imaging camera for a period of 60 seconds. We could collect and carefully tabulate emission temperatures of the sample of each quality for every 10 seconds using the video image. Finally, the sample time-temperature plot has shown that a higher-quality seed radiates at higher temperature (39°C to 33.9°C) than low-quality seeds (36.9°C to 32.8°C). In order to compare the behavior of IR thermal emission of paddy seeds, a preliminary study of germination test was conducted which has shown that germination (%) in CO 50 seeds is higher than ADT 42 seeds and variation of seedling emergence among the seeds. In conclusion, the current research suggests that infrared thermal imaging techniques may be considered to assess the quality of the seeds, however, it requires confirmation with more experiments on various paddy samples. © 2024, Kerala Agricultural University. All rights reserved.

Author keywords

Emission; Halogen lamp; Infrared thermal imaging; Paddy seed; Seed quality; Temperature

RESEARCH PUBLICATIONS
ENGLISH

ACADEMIC YEAR	NAME OF THE STUDENT	PAPER TITLE	NAME OF THE JOURNAL
2023-2024	Anjum Fathima C Abida Parwin S	Cognitive Perspective Surfacing by Margaret at wood	INGEMIOUS (proceedings)
2023-2024	Anantha Jothi A	Bridging Minds and Narrative: A pathway to achieve Global Goals	
2023-2024	Hemashri M B Kiruthiga R	A study on the Theme of Self Discovery in Jon Fosse's a Shining	
2023-2024	Indhubarathi M Lintha F	The Sense of Disillusionment Portrayed in Chimamanda Ngozi Adichie's the thing Around your Neck	
2023-2024	Logeshwari B P Nithya Sri R K Ragavi R	Truth Construction on Gayatri Chakraborty Spivak's can the subaltern speak	

A COGNITIVE PERSPECTIVE: *SURFACING* BY MARGARET ATWOOD

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Abstract

This paper examines Margaret Atwood's "Surfacing" from cognitive and psychological perspective focusing on madness, journey of the self, theory of mind, emotions, memory throughout the story. The cause and effect of the unnamed narrator's psychological transformation, nostalgic, madness, to leave human world thus to live in isolated way. The traumas encounters by the protagonist reached such a height and she became victim of neurosis as well as psychosis. This study highlights the common human experiences woven throughout Margaret Atwood while also deepening our knowledge of the novel by dissecting the psychological and cognitive elements. In the end, emphasis how cognitive psychology is still relevant today for understanding the complexity of human behaviour and relationships as they are represented in literature.

Keywords: Memory, Journey of the self, Theory of Mind and Human morality, Psychological and Cognitive Perspective

Cognitive psychology is a branch of psychology that focuses on mental processes and how they affect emotions and behaviour. Cognitive psychologists study attention, learning, memory, sensation, perception, and language. Before cognitive psychology became popular in the mid-20th century. Margaret Atwood's second novel *Surfacing* provides a

BRIDGING MINDS AND NARRATIVES: A PATHWAY TO ACHIEVE GLOBAL GOALS

A. Anantha Jothi

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Periyar Maniammai Institute of Science & Technology
Vallam, Thanjavur*

Abstract

*This paper presents an integration of cognitive science and literature that offers an achievable path to solving the issues highlighted in the Sustainable Development Goals (SDGs). By exploring the cognitive processes that drive human behavior and perception. Literature provides useful insights on society's attitudes, beliefs, and decision-making processes related to sustainable development challenges. A case study of Khaled Hosseini's novel *The Kite Runner* highlights the link between cognitive science and literature in achieving sustainable development goals. Through interdisciplinary collaboration and innovative approaches, the integration of cognitive science and literature can enhance awareness, understanding and help the future generation attain a sustainable future.*

Keywords: interdisciplinary research, cognitive science, literature, empathy, behavioral change, sustainable development goals.

The Sustainable Development Goals (SDGs) offer a comprehensive framework for tackling global issues such as environmental degradation, poverty, inequality, and climate change. To achieve these aims, we need to understand human behavior, values, and cultural dynamics beyond policy and technology. Cognitive science offers insights into individual thoughts, beliefs, and decisions on sustainability challenges, while literature reflects diverse cultural perspectives and

A STUDY ON THE THEME OF SELF- DISCOVERY IN JON FOSSE'S *A SHINING*

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(Deemed to be University), Thanjavur

Abstract:

*Jon Fosse's works often explores into existential themes and *A Shining* is no exception. In this novella, the theme of self-discovery is prominent, as the character struggle with his identities, desires, and the search for meaning in his life. The journey of self-discovery is often filled with struggle and ambiguity, mirroring the complexities of human existence. In *A Shining*, one can witness the character who finds himself often isolated and disconnected from others. Through the interactions and experiences, he begins to confront his own inner confusion and uncover deeper truths about him. This paper explores the theme of self-discovery, reflecting all the dimensions of reality in association with the nature of identity, existence, and the search for meaning in a complex and often confusing state of mind.*

Keywords: self-discovery, identities, reality, complexities, boredom, anxiety, love, emptiness.

Norwegian Literature is a body of writings produced by Norwegian writers from the 16th century. After 16th century Bokmal and Nynorsk, two Norwegian languages, were used by the writers to produce literary works. Norway was introduced to the European style of writing after the advent of Christianity. The 20th century marked the beginning of a new

**THE SENSE OF DISILLUSIONMENT
PORTRAYED IN CHIMAMANDA NGOZI
ADICHIE'S *THE THING AROUND YOUR NECK***

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Abstract:

The Thing Around Your Neck, a selected short story by Chimamanda Ngozi Adichie explores themes of alienation and disillusionment experienced by Africans who migrated to America. Adichie expressed the pain of slavery through the character Akunna. The story unfolds the depressions faced by African people. In Particular, Adichie portrays the women of Nigeria as victims of patriarchal society. The protagonist Akunna is seen as a representation of how women were marginalized at home and in society. *The Thing Around Your Neck* deeply conveys the reduced inequalities faced by many women.

Keywords: *alienation, Hybridity racism, marginalization, inequalities*

Adichie is a voracious reader from her young age. She was inspired by Chinua Achebe's *Things Fall Apart* once she published the novel *Purple Hibiscus* a critic called her "Chinua Achebe's Achebe's twenty first century daughter. In the website of Chimamanda Ngozi Adichie, she was interviewed by Daria Tunca there she says "Chinua Achebe is always important to me because his works influenced not so much style as my writing philosophy reading him

TRUTH CONSTRUCTION ON GAYATRI CHAKRAVORTY SPIVAK'S *CAN THE SUBALTERN SPEAK?*

B.P. Logeshwari, R.K. Nithya Sri & R. Ragavi
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Abstract:

Gayatri Chakravorty Spivak's Can the Subaltern Speak? is one of the most influential essay on the post-colonial era. The essay deals with the orient and occident countries. The essay is employed with the truth construction theory. The essay encloses topic such as colonialism, deconstruction and feminism. It talks about the condition of women in the post-colonial era. This paper attempts to illustrate the representation of truth constructed on her essay.

Keywords: Colonialism, Orient, Occident, Deconstruction.

The word Subaltern means referring someone who is low ranking in social, political, or any hierarchy. Also refers the subordination of race, gender, class, culture and caste. They are the group of people subjected as dominants by the ruling classes. The Subaltern ensemble the representation of the oppressor and oppressed. This position shows the individuals had been marginalized. Spivak's magnificent essay, *Can the Subaltern Speak?* shows the subaltern concept in the theoretical perspective. Deconstruction theory opposes and interprets the