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Number of research papers per teachers in the
Journals notified on UGC website during the year 2022-23

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CRITERION: 3.3.2

Number of research papers per teachers in the Journals notified on UGC website during the year 2022-23

S.No.	Title of paper	Name of the author/s	Name of journal	Link landing to the paper (article) / Link to the Journal website	UGC CARE list/Scopus /Web of Science/ other
CIVIL					
1	An Experimental Investigation Of A Micromechanical Method To Simulate The Degrading Effects Of The Alkali-Silica Reaction OnConcrete	Dr.R.Saravanan	International Journal of Foodand Nutritional Sciences	https://www.ijfans.org/uploads/paper/7a9792929212733638f54b5da7f1fab8.pdf / https://www.ijfans.org/	UGC
2	Removal of BTEX (benzene, toluene, ethyl benzene and xylene) from aqueous solutions using surface-modified zeolite	Dr.R.Saravanan	Global NEST	https://journal.gnest.org/publication/gnest_04639 / https://journal.gnest.org/	Scopus
3	Seismic Performance Of Outrigger System In High Rise Structures Under Seismic Loading	Dr.R.Saravanan	YMER	https://ymerdigital.com/uploads/YMER2111E5.pdf / https://ymerdigital.com	Scopus
4	Evaluating Strength Characteristics Of Fly Ash Concrete With Different Grades Of Concrete With Natural And Recycled Aggregate	Dr.R.Saravanan	IJFANS International Journal of Foodand Nutritional Sciences	https://www.ijfans.org/uploads/paper/1536953266dabea2399c5946f39ae0a2.pdf / https://www.ijfans.org	UGC
CSE					
5	An unique secure cracking with efficient path detection routing techniques	Dr. S. kannan	Scientific Bulgarian Communicatios ns	https://scibulcom.net/en/article/7yRhJ4McA29JUxhbsUNa / https://scibulcom.net/en/home	SCOPUS
6	Block Chain based Disk Space Rental System	Ms.R. Suganthalakshmi	International Research Journal on Advanced Science Hub	https://www.rspsciencehub.com/article_23818_957e3aa88c35d9524ab4137ef90c5fd6.pdf#:~:text=Block%20chain-based%20disk%20rental%20system%20is%20a%20distributedsystem,and%20transparent%20environ-ment%20for%20disk%20rental%20transactions.%20%28Y. / https://www.rspsciencehub.com/	UGC

7	Deep Learning based plant Disease Prophecy using Leaf Image	Ms. R. Suganthalakshmi Ms.G.Chandraprabha Ms.K.Abhirami Ms.S.Puvane swari	International Research Journal of Modernization in Engineering Technology and science (IRJMETS)	https://www.irjmets.com/uploadedfiles/paper/issue_1_january_2022/18556/final/fin_irjmets1643102367.pdf / https://www.irjmets.com/	UGC
8	Analysis of cloud Analytic tool.	Ms.R.S.Karth iga Dr. S. M. Uma Ms.S.Priyad harshini	International Journal for Science and Advance Research in Technology (IJSART)	https://ijsart.com/Content/PDFDocuments/IJSARTV8I755667.pdf#:~:text=In%20this%20paper%2C%20we%20are%20going%20to%20analysis,processing%2C%20power%20computing%20and%20cloud%20models%20of%20analytic. / https://ijsart.com/	UGC
9	Unsupervised image clustering using different CNN architecture.	Ms.S.Priyad harshini Ms.D.R.Sara nya	International Journal for Science and Advance Research in Technology	https://ijsart.com/Content/PDFDocuments/IJSARTV8I755595.pdf / https://ijsart.com/	UGC
10	Detection of number plate and Helmet violation using Deep Learning Algorithm	Ms.S.Puvaneswari	EasyChair Publications No. 9916, 31.3.2	https://easychair.org/publications/preprint/MCgG / https://easychair.org/publications/home	SCOPUS
11	Block Chain based certificate validation system	Ms. R. Suganthalakshmi Ms.G.Chandra prabha Ms.K.Abhirami Ms.S.Puvaneswari	International Research Journal of Modernization in Engineering Technology and science	https://www.irjmets.com/uploadedfiles/paper/issue_7_july_2022/28889/final/fin_irjmets1659003745.pdf / https://www.irjmets.com/	UGC
12	Cyber bullying detection on social media	Ms. R. Suganthalakshmi	Easychair No 9916 31.3. 2023	https://easychair.org/publications/preprint/6sZw#:~:text=To%20prevent%20from%20this%20kind%20of%20negative%20we,may%20help%20identify%20and%20prevent%20harmful%20behaviour%20online. / https://easychair.org/publications/home	SCOPUS
13	An Efficient approach for diagnosing Breast cancer using Deep Learning Technique	Mr. S. Rajarajan	SpecialUSIS UGDYMAS	http://www.sumc.lt/index.php/se/article/view/818 / http://www.sumc.lt/index.php/se/issue/view/10	SCOPUS
14	RFID & Password based door lock system with notification	Mr. S. Rajarajan	International Research Journal of Modernization in Engineering Technology and science	https://www.irjmets.com/uploadedfiles/paper/issue_6_june_2022/27179/final/fin_irjmets1656695685.pdf / https://www.irjmets.com/pastvolumeissue.php?p=0&keywor=rfid	UGC

ECE					
15	Real time experimental investigation of adaptive optics compensation technique for free space optical communication	Pasupathi, T. and Arputha Vijaya Selvi.J,	Photonic Network Communications	https://link.springer. com/article/10.1007/ s11107-022-00973-z / https://link.springe r.com/journal/111 07	SCOPUS
16	Hybrid Cluster Made Content Forwarding and Light Weight SignEncryption IoT Based Named Data Network Using African Buffalo Optimization Algorithm,	Vijayakumar, Vijaya Karthik SV, & ArputhaVijaya Selvi J	Journal of Intelligent & Fuzzy Systems	https://content.iosp ress.com/articles/jo urnal-of-intelligent- and-fuzzy-systems/ifs212674 / https://www.iosp ress.com/catalog/ journals/journal- of-intelligent-fuzzy-systems	SCOPUS
17	Sensing and Analysis of Greenhouse Gas Emissions from Rice Fields to the Near FieldAtmosphere	Rajasekar, P,& ArputhaVijaya Selvi J	Sensors	https://www.mdpi. com/1424-8220/22/11/4141 / https://www.mdp i.com/journal/sensors	SCOPUS
18	NDN Content Poisoning Mitigation Using Bird Swarm Optimization and Trust Value	Vijayakumar, Vijaya Karthik SV, & ArputhaVijaya Selvi J	Intelligent Automation& Soft Computing	https://www.techsci ence.com/iasc/v36n1/49956 https://www.techs cience.com/journal/iasc	SCOPUS
19	Design and Implementation ofMIMO-FSO Communication system for disaster management	Pasupathi. T, Jeyamalar. U, & N.Mangaiyarkarasi	International journal for science and advanced research in Technology	https://ijsart.com/Ho me/IssueDetail?id=5 6748 / https://ijsart.com/	Others
20	Algorithms and Techniques for Artificial Intelligence Based Border Security System	SwethaaSM , Ramana Bharathi S, Balakrishnan R, Mangaiyarkarasi N	International Journal of Research Publication and Reviews	https://ijrpr.com/uploads /V4ISSUE4/IJRPR12125.pdf / https://www.ijrpr.com/	Others
EEE					
21	Investigation on CEED-RES Problem Using Modified Lagrange Method	Dr.R. Arulraj	Distributed Generation & Alternative Energy Journal (River Publishers)	https://journals.riverpublisher s.com/index.php/DGAEJ/articl e/view/19231 / https://journals.riverpublisher s.com/index.php/DGAEJ/abou t	SCOPUS
22	A review on partial discharge diagnosis in cables: Theory, techniques, and trends	Dr.P.Narasimman	Measurement	https://www.sciencedirect.co m/science/article/abs/pii/S02 63224123004463 / https://www.sciencedirect.co m/journal/measurement	SCOPUS, Annexure-I
23	Analysis of Optimal Load Management Using a Stand-Alone Hybrid AC/DC Microgrid System	Mr.S. Vasantharaj	International Transactions on Electrical Energy Systems	https://www.hindawi.com/jou rnals/itees/2023/7519436/ / https://www.hindawi.com/jou rnals/itees/	SCOPUS

		MECH			
24	Comparative Study of Mechanical Strength and Piezoelectric Coefficient of Post-processed Polyvinylidene Fluoride Nanofibrous Films	M Satthiyaraju, K Ananthakumar, R Shankar, CK Arvinda Pandian	Materials, Design and Manufacturing for Sustainable Environment	https://doi.org/10.1007/978-981-19-3053-9_12 / https://link.springer.com/book/10.1007/978-981-19-3053-9	SCOPUS
25	Oxidation behavior of near nanostructured coating developed by the HVOF process	Shankar Rengarajan, Balasubramanian Karuppudayar Ramaraj, Sivapirakasam Suthangathan Paramashivan, Senthilkumar Velusamy	Materials and Corrosion	https://onlinelibrary.wiley.com/doi/10.1002/maco.202213440 / https://onlinelibrary.wiley.com/journal/15214176	SCOPUS, Annexure-I
26	Spark erosion behaviour of SiC and Yitria ceramic particles reinforced aluminium hybrid nano-composites	PP Shantharaman, V Anandakrishnan, S Sathish, M Ravichandran	JOURNAL OF CERAMIC PROCESSING RESEARCH	http://www.jcpr.or.kr/journal/archive/view/2710 / http://www.jcpr.or.kr/journal/journal/aboutthisjournal	SCOPUS, Annexure-I
27	Effects of injection parameters on CRDI-equipped stationary diesel engine fuelled with neat biodiesel mix derived from waste feedstocks	M. Anto Alosius, Pushparaj Thomai, Vikas Sharma, and Bharathi Chandrasekaran	Transactions of the Canadian Society for Mechanical Engineering	https://cdnsciencepub.com/doi/full/10.1139/tcsme-2022-0061 / https://cdnsciencepub.com/journal/tcsme	SCOPUS, Annexure-I
28	Hybrid optimization and modelling of CI engine performance and emission characteristics of novel hybrid biodiesel blends	Vinoth Kannan Viswanatha, Abdul Razak Kaladgi, Pushparaj Thomai, Ümit Ağbulut, Mamdooh Alwetaishi, Zafar Said, Saboor Shaik, Asif Afzal	Renewable Energy	https://www.sciencedirect.com/science/article/abs/pii/S0960148122011740 / https://www.sciencedirect.com/journal/renewable-energy	SCOPUS, Annexure-I
29	Experimental Investigation and Prediction of Performance, Combustion, and Emission Features of a Diesel Engine Fuelled with Pumpkin-Maize Biodiesel using Different Machine Learning Algorithms	N. Magesh, T. Pushparaj, V. Vinoth Kannan, Deepak Thakur, Abhishek Sharma, Abdul Razak, Abdulrajak Buradi,and Abiot Ketema	Mathematical Problems in Engineering	https://www.hindawi.com/journals/mpe/2022/9505424/ / https://www.hindawi.com/journals/mpe/	SCOPUS, Annexure-I
30	Comparative investigation of surface modification and corrosion behaviour on SS304 and SS316 Coated with Inconel 625 in Air and Molten Salt Environment	Sabanayagam Sundaram, Chockalingam Singaravelu, Vikneswaran Malaiperumal	Surface Topography: Metrology and Properties	https://iopscience.iop.org/article/10.1088/2051-672X/aca3be/meta / https://iopscience.iop.org/	SCOPUS, Annexure-I
31	Performance, emission characteristics of CI engines fueled with Annona seed biodiesel blends and 1-pentanol as an additive	Agilan. H, Pushparaj.T	ThermalScience	https://thermalscience.vinca.rs/2023/4/29 / https://thermalscience.vinca.rs/	SCOPUS, Annexure-I

32	Evaluation on Mechanical Properties of Natural Fiber Based Epoxy Resin Composites	S. Nelson Raja, K. Vadivel, S. Sabanayagam, M. Sakthivel	International Journal for Research in Applied Science & Engineering Technology	https://www.ijraset.com/research-paper/evaluation-on-mechanical-properties-of-natural-fiber / https://www.ijraset.com/	Others
33	Investigations on the microstructure and properties of yttria and silicon carbide reinforced aluminium composites	P.P. Shantharaman, V. Anandakrishnan, S. Sathish, M. Ravichandran, R. Naveenkumar, S. Jayasathyakaw	Heliyon	https://www.cell.com/heliyon/fulltext/S2405-8440(23)02669-5 / https://www.cell.com/heliyon/home	SCOPUS, Annexure-I
34	Impact of Combined Effects of Injection Pressure and EGR on Modified Stationary Engine Fuelled with Biodiesel Blend Made of Waste Feedstock Oils	M. Anto Alosius, Pushparaj Thomai, Justin Jacob Thomas& Vikas Sharma	Arabian Journal for Science and Engineering	https://link.springer.com/article/10.1007/s13369-023-07795-9 / https://link.springer.com/journal/13369	SCOPUS, Annexure-I

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6

An Experimental Investigation Of A Micromechanical Method To Simulate The Degrading Effects Of The Alkali-Silica Reaction On Concrete

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ABSTRACT

The multiscale nature of this long-term phenomenon makes the assessment of concrete structures impacted by alkali-silica reaction (ASR) a challenging problem. The formation of an expansive alkali-silica gel at reaction product level signals the beginning of the reaction within the components of the concrete. Given that the expansive gel is constrained within the concrete micro-structure, an internal pressure builds up and causes damage to the aggregate.The experimental analysis, which combines laboratory testing with literature data, reveals a statistically significant correlation between concrete expansion and the deterioration of the mechanical properties of concrete specimens damaged by ASR maintained under free-expansion circumstances. The strongest indicator of ASR signals in concrete, as opposed to compressive strength, is the elastic modulus, which exhibits the quickest rate of degradation and lowest residual value.A significant difference is seen when comparing the behaviour of unaffected and damaged concretes in terms of strength-stiffness correlations. The suggested multiscale material modelling technique yields a method for material characterization that can be expanded to the structural level as well as the reaction products.

Keywords: Alkali-Silica Reaction, Mechanical Properties, Concrete, Deteriorating,Characterization

Removal of BTEX (benzene, toluene, ethyl benzene and xylene) from aqueous solutions using surface-modified zeolite

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Graphical abstract
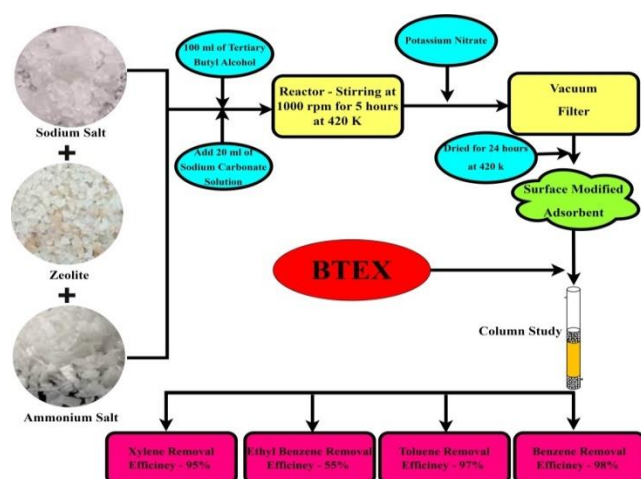
Abstract

BTEX, also known as benzene, toluene, ethyl benzene, and xylene, is a common gasoline oxygenate. The contamination of groundwater and surface water with BTEX and its primary breakdown product has drawn a lot of attention. However, surface-modified zeolite's sorption mechanisms and affinity for BTEX can be employed to potentially remove these toxins from water. Tert-butyl alcohol (TBA) was utilized to alter the morphology of the adsorbent. Based on the findings, it can be concluded that zeolites have a greater capability for removing emerging chemicals. Some of the emerging compounds' relatively large dimensions limit their natural ability to lower values. Gas chromatography was used to determine the BTEX concentration decrease range. The Yoon-Nelson and Adams-Bohart model's use of mathematical modelling to determine the efficacy of the column's adsorption. The model with the highest R^2 values for characterizing equilibrium isotherm data describes equilibrium adsorption data. To gain an understanding of the shape, pore structure, and active sites, the characterisation is concentrated on quantitative analysis using XRD, qualitative analysis using FTIR, and optical study using SEM.

Keywords: BTEX, surface modification, adsorption, characterization

1. Introduction

BTEX volatile organic chemicals, often known as monoaromatic hydrocarbons benzene (B), toluene (T), ethylbenzene (E), and xylene (X), are significant industrial solvents that are regularly found as industrial pollutants (Jiang *et al.,* 2022). According to the structure 6-carbon benzene ring serves as the primary structural component of the mono-aromatic ring compounds benzene, toluene, ethylbenzene, and xylenes. These chemicals, particularly benzene, are typically regarded as non-reactive species due to their closed structures (Zhang *et al.,* 2022). These volatile organic chemicals, which are used to make rubber, printing ink, leather, and gasoline, generate a lot of BTEX-contaminated wastewater that is released into the aquatic environment every year. The World Health Organization (WHO) states that leaks from underground fuel storage tanks into ground water are the most likely cause of BTEX pollution in the environment (Xu *et al.,* 2018). BTEX testing services, the most frequent ways to be exposed to BTEX compounds is by breathing contaminated air, especially in regions near petrol stations, in locations with high levels of automobile traffic, and when smoking cigarettes. Contrary to popular opinion, however, exposure to BTEX from water sources accounts for a very minor portion of daily intake compared to food and breathed air sources (Solovyeva *et*

SEISMIC PERFORMANCE OF OUTRIGGER SYSTEM IN HIGH RISE STRUCTURES UNDER SEISMIC LOADING

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ABSTRACT

The development of high-rise buildings has always faced challenges. Many structural systems have been developed to reduce the lateral displacement of tall buildings. Outrigger system is commonly used to decrease both horizontal movement and the moment of the foundation to the structure. It is also used to improve the performance of high-rise structures under seismic loads. In this paper, seismic analysis of high rise building with outrigger system has been provided to understand the behaviour of high rise building in terms of maximum storey draft, maximum storey displacement and storey stiffness. Three analysis models 30, 40 and 50 storeys with different vertical elements were carried out to investigate and analyse for the gravity loading and seismic loading using ETABS software. A total of 18 buildings model are tested. To evaluate the optimum position of outrigger system, different stiffness cases also have been performed in structures to get the overall behaviour of the building. The shear wall outrigger without belt truss gives better result than beam outrigger with belt truss.

Keywords: ETABS, High-rise buildings, Lateral Load, Outrigger System.

Introduction

Nowadays, the high-rise buildings have become very common around the world. They could be solutions for population density problems and the lack of available space for development. The lateral loads are always considered as the main issue in high-rise structures. As the height of the structure increases, the effect of lateral forces also increases. The high-rise structures need proper structural system to resist those loads and to be designed as per required of a particular seismic zone. Outriggers system are commonly used for controlling the lateral displacement of tall buildings. Outriggers are basically consisting of beams, trusses or shear wall members that connect a core to an outer column, to reduce lateral displacement and increase lateral stiffness. The outriggers also reduce the overturning moment developed in the core shear wall and transmit the reduced moment to the external columns. Outriggers in a structure can be in different shapes like single or multiple according to the height of the building. They are combined with the belt trusses and shear bands to increase their quality of resisting lateral loads.

EVALUATING STRENGTH CHARACTERISTICS OF FLY ASH CONCRETE WITH DIFFERENT GRADES OF CONCRETE WITH NATURAL AND RECYCLED AGGREGATE

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Abstract:
One of the byproducts produced during the combustion of coal is fly ash. Typically, coal-fired power plant's chimneys capture fly ash. Cement is made with fly ash, which is also sold in local markets as pozzolanic cement. In order to efficiently use flyash and to establish its water sorptivity, experiments are conducted. To quantify sorptivity based on the movement of water in capillaries, experimental research is conducted on three grades of cement concrete with 10, 20, 30, 40, and 50% substitution of cement by flyash with natural and recycled aggregate. Concretes with increasing percentages of fly ash replacement for cement displayed lower cumulative water absorption values, indicating lesser porosity in the cover zone. Utilizing the waste material and lowering CO_2 emissions will improve the environment as a result of the increased percentage of cement replacement.
Keywords: Compressive Strength, Fly Ash, Recycled aggregate, Split Tensile Strength, Water Sorptivity

1. INTRODUCTION

One of the byproducts of burning coal is fly ash. Two types of ash collectively referred to as coal ash is fly ash, which is typically collected from the chimneys of coal-fired power stations; the other type, bottom ash, is recovered from the bottom of coal furnaces. Both silicon dioxide (SiO_2), which can be amorphous or crystalline, and calcium oxide (CaO), which is an endemic component of many coal-bearing rock layers, are present at significant levels in fly ash. According to ASTM C618, fly ash is divided into two categories: Class F fly ash and Class C fly ash. The calcium, silica, alumina, and iron composition of the ash determines these classes main distinctions from one another.

In order to assess the durability of cement and fly ash concrete, Gopalan (1996) devised a test to measure the sorptivity of each material. To quantify sorptivity based on water capillary flow, they experimentally cast six grades of fly ash mixtures and three grades of cement concrete. By

AN UNIQUE SECURE CRACKING WITH EFFICIENT PATH DETECTION ROUTING TECHNIQUE TO AVOID DOS ATTACK ON ANONYMITY NETWORK

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ABSTRACT:

Security and anonymity are significant ideas in the field of communication. In recent computer world, maintaining the data is extremely troublesomesome interrupts may happen on the local system or network attack. Without security measures, our private data may be exposed to attack. Now a day's several attacks are evolved. One common strategy for attack includes sending huge measure of request to server or site and server will be not able to deal with the request and site will be disconnected for certain days or a few years relies on the attack .This is most critical assault for network called denial of service attack. In this paper, we discuss a unique secure cracking with efficient path detection routing technique is introduced and implemented to avoid the denial of service attacks. This technique is used to categorize the behaviour of node. This algorithm reduces the attacks effects and to prevent the Denial of Service attacks on the anonymity networks.This proposed framework secures communication against adversaries.If attacker is identified then the server can be saved in blocked list and future services could not be proceed. So, this technique protects legitimate traffic from DOS.This algorithm can allow the attack free communication nodes, it selects efficient route for communicationwhich shares the packets in frequent manner. It provides an easy way to find and communicate node in the peer-to-peer network. It increases the attack detection efficiency, and minimizing communication overhead, and packet loss rate.

KEYWORDS: unique secure cracking technique, peer-to-peer communication, nodedetecting, efficient path detectionrouting protocol,Security, anonymity network,and denial of service attack.

INTRODUCTION:

[4] Anonymity network were primarily intended to save communication with robust security.Anonymity is accomplished by embedding client information within various layers of encryption and by sending the traffic through a set of relay/routing nodes or proxies. Two principle objectives the sender of data over the system looks to guarantee: the privacy and the security of the conveyed data. Classification and security of the information can be accomplished throughencryption instruments. Encryption when all is said in done is fit for concealing the substance of the data in the system. Moreover, in some cases, the sender might wish to hide his/her identity.This goal can be accomplished using unknown frameworks. Traffic investigation is the specialty of inspecting and blocking messages transmitted over the system to construct data, hence it damages client security.

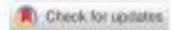[6] Anonymity frameworks allude to a foundation that can give obscurity on the

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Block Chain Based Disk Space Rental System

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Abstract

Now a day's electronic devices such as computers, smart phones and cameras produce enormous volumes of data each day, which require more and more storage resources. In order to fulfill this necessity, cloud storage renting systems were created. Cloud storage renting disk space allows people to expand their storage capacity without having to buy and maintain additional hardware. It can help users save money on hardware and reduce the need for physical space in their home or office. It can also be used to store large amounts of data in a secure and cost-effective manner. Renting disk space also allows for easier sharing of data between multiple users, making collaboration easier and faster Cloud storage renting disk space allows people to expand their storage capacity without having to buy and maintain additional hardware. It can help users save money on hardware and reduce the need for physical space in their home or office. Another issue with such systems is lack of trust. To overcome these problems we use block chain technology in disk rental system. This system is designed to be a peer-to peer services where users can rent out disks to each other without the need for a third party immediately. We use the smart contracts which automate the rental process Here we used Proof-of-Work (PoW) consensus algorithm. This algorithm is used to verify transactions and add new blocks to the chain and also solve complex mathematical problems. If this system is implemented it Enhance security, Transparency, Lower cost, Automation, and improved efficiency. Finally the system also provides a renting system to ensure that users are able to easily identify and reliable disk rental.

1. Introduction

Block chain-based disk rental system is a distributed system that enables peer-to-peer (P2P) disk rental transactions. It uses the block chain technology to record and manage the rental transactions of disks over a network. (Ma, X. Li, and Wu) This system helps to create a secure and transparent environment for disk rental transactions. (Y. Zhang et al.) It enables users to rent disks securely and easily without the need for any third-party intermediaries. It also allows users to track their rental transactions and maintain records of all their disks. Furthermore, the system also provides a secure platform to store data and information related to the disk rental transactions. (Tang, X. Chen, and W Li) This system enables users to securely and efficiently manage their disk rental transactions and also make payments in a secure and transparent way. (X. Zhang et

DEEP LEARNING BASED PLANT DISEASE PROPHECY
USING LEAF IMAGE

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ABSTRACT

Accurate diagnosis of leaf disease is a complex challenge faced by farmers during the growth and production stages of crops. In order to address this problem, the paper proposes a method based on K-means clustering and an improved deep learning model for accurately diagnosing common diseases of leafs and a recommendation with fertilizer. First, to diagnose three diseases, K-means algorithm is used to cluster sample image and then feed them into the improved deep learning model. This paper investigate the impact of various K values and models(VGG-16), VGG-19 and the improved deep learning model on leaf disease diagnosis.

Keywords: Deep Learning, K-Means Clustering.

I.   INTRODUCTION

Economy contributes the most for the productivity of the agriculture. In agricultural field, the disease in plants is more common and the detection of disease in plants has become more feasible due to the above reason. These days' plant disease detection has acquired enlarging scrutiny in surveilling crops of large and various fields. Farmers undergo significant hassles in chop and changing from one disease administer principle to a different one. Plant disease detection is a significant challenge in the Agriculture sector. Some of the plants show visible symptoms on the plant leaf. The occurrence of plant diseases has a negative impact on agricultural production. If plant diseases are not discovered in time, food insecurity will increase. There are more than dozen common diseases in leaf. These leaf patterns can be used to identify different diseases and take immediate action to prevent the spread. This paper proposes a leaf disease diagnosis method based on the K-means clustering and deep learning combination to improve leaf disease diagnosis accuracy. The main contributions of the work are summarized as follows: First is to use K-means clustering to segment disease images. The second is to propose a deep learning model for leaf disease diagnosis, which is improved based on VGG-19. Third is that our method can be used to classify and diagnose leaf diseases.

II.   METHODOLOGY
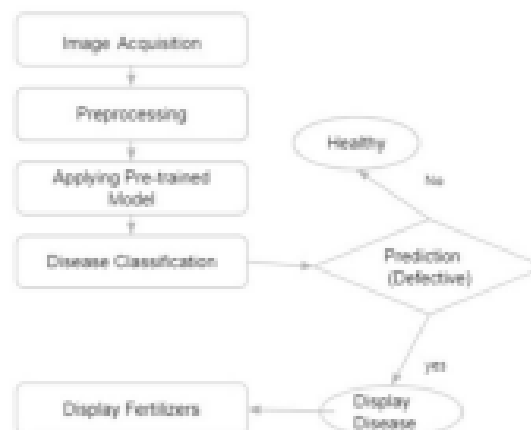
Diseases in plants are a major concern to the farmers these days. Many times, the farmers are not sure which pesticides or insecticides are needed to treat a particular diseased plant because, they are not sure of the type

Analysis of Cloud Analytic Tool

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Abstract- *Cloud computing is a common word for everything that provide hosted services over the world wide web. Cloud computing provides three major services: Platform as a service (PaaS), Software as a service (SaaS) and Infrastructure as a service (IaaS).To implement a cloud computing model, cloud infrastructure requires the hardware and software components. Cloud computing is the on-demand computing. In this paper, we are going to analysis the most excellent cloud analytics tools on the marketplace.*

Keywords- Cloud computing and analytic tools

I. INTRODUCTION

Cloud computing is the on-demand accessibility of computer resources, particularly storage of data and power computing, without straight management of user. In cloud data is distributed over various locations and every locations is considered as data center. Cloud computing relies on using a "pay-as-you-go" model by distribution of resources. So it can avoid the capital cost of users but may increases the operational cost of ignorant users. The main aim of cloud computing is to take advantages from all of the technologies by the users, without having a more understanding about or skill with all of them.

The cloud goal is to reduce the expenses and assist the users concentrate on their main business instead of having delay by software barrier.The cloud computing major tool is virtualization. Virtualization software do computing tasks by separating a hardware device into more "virtual" devices, each devices can be effortlessly useable and manageable.

Cloud analytics describe the function of analytic the data against a private or public cloud for bring a outcome of users significance. It involves use of scalable cloud computing with great analytic software to data pattern identifications and to mine latest insights. It is one kind of analytics model that transfer processing of data and storage operations to a public or private cloud. Due to needs of several analytics requirements for companies used this model.

cloud analytics:

The process of analytics a data in a private or public cloud is called cloud analytics. Cloud analytics services and applications are provided based on subscription or price model.

Gartner defines the six major analytics elements such as distribution or storing of outcomes, sources of data, models of data, applications processing, power computing and cloud models of analytic.

The products and services of cloud analytics examples are software-as-a-service business intelligence (SaaS BI), hosted data warehouses and social media analytics based on cloud.

Software-as-a service business intelligence (called as *cloud Business Intelligence* or *on-demand Business Intelligence*) used to send business intelligence (BI) applications from a hosted locations to users. It is a scalable model and establish business more easier and low price, but in-house application, product might not provide the same characteristics. For social media applications cloud based analytics tools provide the remote delivering of tools for choosing the application from social media sites, to gather data for the applications, services for storage and software based on data analytics in social media.

A hosted data warehouse is a centralized depository for data that is provided to accessible of data from remote

Unsupervised Image Clustering Using Different CNN Architecture

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Abstract- *Clustering is a fundamental problem in many data-driven application domains, and clustering performance highly depends on the quality of data representation. Hence, linear or non-linear feature transformations have been extensively used to learn a better data representation for clustering. In recent years, a lot of works focused on using deep neural networks to learn a clustering-friendly representation, resulting in a significant increase of clustering performance. This project aims at providing insight on the transferability of deep CNN features to unsupervised problems. We study the impact of different pre trained CNN feature extractors on the problem of image set clustering for object classification as well as fine- grained classification. We propose a rather straightforward pipeline combining deep-feature extraction using a CNN pretrained on Image Net, VGG16 and Res Net and a classic clustering algorithm to clustering sets of images. This approach is compared to state-of-the-art algorithms in image-clustering and provides better results. These results strengthen the belief that supervised training of deep CNN on large datasets, with a large variability of classes, extracts better features than most carefully designed engineering approaches, even for unsupervised tasks.*

I. INTRODUCTION

Clustering is an interesting field of Unsupervised Machine learning where we classify datasets into set of similar groups. It is part of 'Unsupervised learning' meaning, where there is no prior training happening and the dataset will be unlabeled. Clustering can be done using different techniques like K-means clustering, Mean Shift clustering, DB Scan clustering, Hierarchical clustering etc. The key assumption behind all the clustering algorithms is that nearby points in the feature space, possess similar qualities and they can be clustered together.

In Introduction you can mention the introduction about your research

Up to know, we have only explored supervised Machine Learning algorithms and techniques to develop models where the data had labels previously known. In other words, our data had some target variables with specific values that we used to train our models. However, when dealing with real-world problems, most of the time, data will not come with predefined labels, so we will want to develop machine learning models that can classify correctly this data, by finding by themselves some commonality in the features, that will be used to predict the classes on new data.

Unsupervised learning main applications are:

- Segmenting datasets by some shared attributes.
- Detecting anomalies that do not fit to any group.
- Simplify datasets by aggregating variables with similar attributes.
- Dimensionality Reduction

Throughout this article we will focus on clustering problems and we will cover dimensionality reduction in future articles.

Clustering Analysis

In basic terms, the objective of clustering is to find different groups within the elements in the data. To do so, clustering algorithms find the structure in the data so that elements of the same cluster (or group) are more similar to each other than to those from different clusters.

In a visual way: Imagine that we have a dataset of movies and want to classify them. We have the following reviews of films:

The machine learning model will be able to infer that there are two different classes without knowing anything else from the data. These unsupervised learning algorithms have an incredible wide range of applications and are quite useful to solve real world problems such as anomaly detection, recommending systems, documents grouping, or finding customers with common interests based on their purchases.

Some of the most common clustering algorithms, and the ones that will be explored throughout the article, are:

DETECTION OF NUMBER PLATE AND HELMET VIOLATION USING DEEP LEARNING ALGORITHM

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ABSTRACT

The continuous mobilization of vehicles has led to a surge in the number of road accidents across the world. To get better at this, the government is trying to focus on the safest and most preventive measures in traffic. The practice of direct observation is found to be time taking and a lot of human effort is needed. So, our main idea is to introduce a helmet and license plate detection mechanism. This project attempts to implement a detection process through a few machine-learning algorithms by using predefined libraries. This system notices a person with/without a helmet thereby imposing fines on the detected candidate's license plate. Further, this research work concludes that the automatic identification of helmets can overcome the challenges faced by the manual data collection process. Moreover, this project work assumed that, through data collection, the algorithm can help to track helmet use and promote its active use by people to ensure road safety.

I.INTRODUCTION

All over the world around 1.35 million lives are lost each year, 50 million people are getting injured due to road accidents, according to a report titled " The Global status Revised Manuscript Received on December 05, 2019 report on road safety 2018" released by world health organization. It is very hard to imagine that this burden is unevenly borne by motorcyclists, cyclists, and pedestrians. This report noted that a comprehensive action plan must be set up in order to save lives. Two-wheeler is a very popular mode of transportation in almost every country. However, there is a.

high risk involved because of less protection.When a two-wheeler meets with an accident, due of sudden deceleration, the rider is thrown away from the vehicle. If head strikes any object, motion of the head becomes zero, but with its own mass brain continues to be in motion until the object hits inner part of the skull. Sometimes this type of head injury may be fatal in nature. In such times helmet acts as life savior. Helmet reduces the chances of skull getting decelerated, hence sets the motion of the head to almost zero. Cushion inside the helmet absorbs the impact of collision and as time passes head comes to a halt. It also spreads the impact to a larger area, thus safeguarding the head from severe injuries. More importantly it acts as a mechanical barrier between head and object to which the rider came into contact. Injuries can be minimized if a good quality full helmet is used. Traffic rules are there to bring a sense of discipline, so that the risk of deaths and injuries can be minimized significantly. However strict adherence to these laws is absent. Hence efficient and feasible techniques must be created to overcome these problems. To reduce the involved risk, it is highly desirable for bike-riders to use helmet. Worrying fact is that India ranks in top as far as road crash deaths are considered. Rapid urbanization, avoiding helmets, seat belts and other safety measures while driving are some of the reasons behind this trend according to analysis done by experts. In 2015 India signed Brasilia Declaration on Road Safety, where India committed to reduce road crash deaths to 50 percent by 2020. Observing the usefulness of helmet, Governments have made it a punishable offense to ride a bike without helmet and have adopted manual

BLOCKCHAIN BASED CERTIFICATE VALIDATION SYSTEM

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ABSTRACT

Education is necessary for each and everyone. During the course of education, the students achieve many certificates. With their certificates they can apply for job at public or private sectors, where all these certificates are needed to be verified manually. There can be incidents where students may produce fake certificate and it is difficult to identify them. This problem of fake academic certificates has been a longstanding issue in the academic community. To make the data more secure and safe, everything needs to be digitalized with the principle of Confidentiality, Reliability, and Availability. All of these can be achieved with a technology named Block chain. The Block chain technology provides inherent security quality where it can be used to generate the digital certificate which is anti-counterfeit and easy to verify. Each certificate will have a unique hash key which can be used to validate the authenticity of the certificate by any organization through the portal. The benefit this a system is that the student also faces less risk of losing or damaging a certificate and the validation of the certificate can also be done quite easily.

Keywords: Block Chain, Digital Certificates, Confidentiality, Reliability, Availability.

I.   INTRODUCTION

In India, usually a student's studies goes like taking admission in kindergarten, after that changing of school for primary, secondary, and high school studies. After completing high school students, need to get admission into college. For graduation, there's also once again changing of college. This is the basic cycle for student's study years. After this, some students continue to pursue higher studies. So the problem with this cycle is that a student needs to produce all his certificates in each stage for validation. This poses a risk of losing and damaging the certificate. And it is tedious for the validator to authenticate each certificate. With such a huge population in our country, almost every year 26.3 million students graduate. It is very hard to keep track and validate such a huge amount of records. Due to this, an unwanted scenario rises i.e. tampering and production of fake or duplicate certificates. There are a lot of hidden agencies in our country who are running this scam behind everyone's back. Technology has moved quite forward until now. Distinguishing between a fake and an original certificate will require a lot of concentration and result in wastage of precious time.

For removing this disadvantage, a technology named Blockchain comes into our life as a savior. The data in a Blockchain cannot be changed under realistic conditions. Even if data is changed, it just takes a second to let us know about the tampering. In Blockchain a data or a node is validated only when multiple parties approve it. So, the system would be Reliable and Authenticated at any instance of time. Now, the issue of tampering is solved.

Certificates distributed in colleges or universities are mostly in the form of hard copy. Whenever applicants apply for the job at any public or private sector they have to produce those hard copies, while the organizations have to verify all certificates manually which is very time-consuming process and there are chances that some may have produce the certificate which is not legit and that may get unnoticed by the verifier during the process because of this ineligible candidate will got a chance. There had been lot of cases in past where people are caught selling fake certificates of different organization at low cost. To eradicate such problem and diminish the production of fake certificates we can use the Blockchain technology. Blockchain can be used to store the data of the certificate that can be validated by anyone from any place.

The Blockchain is a decentralized shared distributed ledger; the data stored in the Blockchain is almost un-modifiable. It is a type of database which is not centralized and governed by the set of rules. In this study, we are going to develop the decentralized certificate verification application on the Blockchain. We are selecting this technology because it is traceable, tamper proof and encrypted. By integrating the Blockchain technology

CYBER BULLING DETECTIONON SOCIAL MEDIA USING MACIHNE LEARNING

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ABSTRACT:

Now a days peoples use Social media to create ,share and exchanges information and ideas in virtual communities and network. The followings are Instagram, Face book, Twitter etc. As the technology the cyberbulling is also enhanced. The online harassment, defame a person with bad words in fake id. so we build a website to detect cyberbullying by analyzing the emotional content of text. It uses a dataset of online conversations to train and test a model that classifies text as either cyber bullying or non-cyber bullying. The model uses natural language processing techniques such as sentiment analysis and topic modeling to identify patterns of abusive language and offensive content. The model's accuracy is evaluated using precision, recall, and F1 score, and is found to be effective in detecting cyber bullying with an accuracy of 87%. The results suggest that emotion analysis can be an effective tool for detecting cyberbullying and may help identify and prevent harmful behavior online.

I.INTRODUCTION

Now more than ever technology has become an integral part of our life. With the evolution of the internet. Social media is trending these days. But as all the other things misuses will pop out sometimes late sometime early but there will be for sure. Now Cyberbullying is common these days. Use of social networking has become widespread over the years, though, in general people find immoral and unethical ways of negative stuff. Often this internet fight results into real life threats for some individual. Some people have turned to suicide. It is necessary to stop such activities at the beginning, Any actions could be taken to avoid this for example if an individual's tweet/post is found offensive then maybe his/her account can be terminated or suspended for a particular period. There are so many other reports suggested us that the impact of Cyberbullying is affecting badly the peoples and children between age of 13 to 20 face so many difficulties in terms of health, mental fitness and their decision making capability in any work.

II.LITERATURE SURVEY

Title. Cyberbullying Detection using Pre-Trained BERT Mode
Author & Year : J. Yadav, D. Kumar, and D. Chauhan 2022
Description : Less features

Title: Cyberbullying Detection in Social Networks Using Deep Learning Based Models
Author & Year : M.Dadvar and K.Eckert;2021
Description : More complex

Title: Collaborative detection of cyberbullying behavior in Twitter data
Author & Year : A. Mangaonkar, A. Hayrapetianand R. Raje ;2022
Description : Efficiently

Title: Automatic detection of cyberbullying on social networks based on bullying features
Author &Year: R. Zhao, A. Zhou, and K. Mao

An Efficient Approach for Diagnosing the Breast Cancer Using Deep Learning Technique

S Rajkumar, STiroumal Mouroughane, G Amirthayogam, S Rajarajan, Akil Ramesh

PDF

Abstract

Background: Now a days breast cancer is one of the deadliest diseases found in most of the matured women. The Cancer disease is curable if it is diagnosed at initial stages. But once it goes to the final stages it is very hard to cure and which leads the patient to death.

Objectives: In this paper, we proposed a model to diagnosis the cancer which gives a clinical support to the physician for initial diagnosis of breast cancer. In general, the cancer disease is identified if there is a tumour growth is appeared in the human body. But before the tumour grows, there may be change in textures of the different biological parts in the region of breast where tumours can be grown. Here, in this paper, we propose an image processing technique to detect the change in structural parameters of the mammography images.

Methods: The proposed image processing technique and convolutional neural network were combined here which forms a layered approach in deep learning. Here, we prefer manual prediction of the images rather than automatic bulky predictions so as to ensure an image is correctly predicted whether it is malignant or benignant.

Results and Conclusion: As based on the experimental results, we prove that the proposed work attains outstanding results compared to the ideal CNN approach in terms of wide variety of parameters such as accuracy of detection, Sensitivity, Specificity, Positive Predictive Value (PPV), Negative Prediction Value (NPV), Mathew's

RFID AND PASSWORD BASED DOOR LOCK SYSTEM WITH NOTIFICATION

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ABSTRACT

In our proposed system, a magnetic door lock is administered via RFID reader that initiates the authentication as well as validation of the user or controls the access in short. The system is more convenient to install and implement as access security solution of a particular arena due to its cost effectiveness with respect to the satisfactory level of protection provided. Another advantage is that the system consumes considerably less space for installation and maintenance purpose. In this concept for radio frequency identification (RFID) is used to recognize the user identity using like a smart card solution.

Keywords: RFID Tag, RFID Card, Solenoid Locker, Node MCU.

I.   INTRODUCTION

RFID is a short form of Radio Frequency Identification. It is working under inductive coupling principle, based on a radio frequency or radio waves. RFID uses electromagnetic field to identify objective or tracking the objects automatically even 100 meters distance.

Radio Frequency Identification refers to a wireless system comprised of two components, tags and readers. The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag. RFID tags are smart labels that can store a range of information from serial numbers. Whenever the object is in the range of the reader, the RFID tag are used to transmit feedback signal to the reader. The RFID Contains a transmitter and receivers. So it is very similar to the technology used in bar code. In the case of the bar code the scanner should be in a line of site. RFID is a not a line of technology as far as the object is in range of the reader object is able to identify the reader and able to send the feedback signal to reader. (The object can be in random position)

II.   METHODOLOGY

The purpose is to carry out a security system by combining mobile phone and IoT using RFID. Here is a Room security solution based on IoT using RFID.RFID tags work by using a microchip and an antenna to receive and transmit information. RFID tags that are battery-operated use an onboard battery as their power supply. Whenever the reader scans the passive RFID tag, the energy is transmitted by the reader to the tag.

Advantages

- Easy to use no need to carry keys often.
- RFID locks are water proof.
- It can be programmed and reprogrammed as to user convenient.

RFID and solenoid locker

The card reader on the door constantly emits a Radio Frequency energy Field. When a card crosses the field, the power from the field energizes a copper wire inside the card, which powers the chip containing the card number and any other unique data. The door contains an solenoid lock which is designed to perform locking and unlocking operations on a door when it receives a correct pass code the door will open if not it remains locked.

ORIGINAL PAPER

Real time experimental investigation of adaptive optics compensation technique for free space optical communication

Pasupathi T.[1] · Arputha Vijaya Selvi J.[1]

Abstract

The variation in refractive index of the atmosphere causes wavefront aberration of optical signal propagating through the random atmosphere. This leads to various effects such as beam spreading, wandering and scintillation (intensity fluctuation) which are responsible for severe signal degrading of the free space optical (FSO) communication system. Incorporation of adaptive optics (AO) technique mitigates the effect of wavefront aberration distortions and reducing the signal fading. Non-conventional adaptive optics is demonstrated using complex search algorithms which requires large number of iterations and computations to obtain the optimum value of the results. In this paper, Convolutional Neural Networks (CNN)-based novel wavefront aberration compensation technique is proposed. The aim of this work is to experience and validate the CNN-based wavefront sensorless adaptive optics (WFSLess AO) technique for 70 m realtime FSOC. The major issues such as time-consuming iterative processes and latency in complex search algorithms and similar algorithms are greatly avoided by detecting the wavefront distortion from the direct images of the optical beam used in the experimentation. LeNet CNN architecture is realized to compensate wavefront distortion for the acquired data sample under different weather condition. Experiments are conducted on Xilinx Spartan-6 FPGA using high level synthesis. The performance of the proposed scheme is compared to existing approaches (T Weyrauch and MA Verontsov in Appl. Opt. 44:6388–6401, 2005; MJ Booth in Opt. Express 14:1339–1352, 2006; H Linhai and R Changhui in Opt. Express 19:371–379, 2011) and it shows an effective Strehl Ratio, Root Mean Square and reduced computation time thereby resolves the latency issue while maintaining accuracy which is a serious problem in AO systems.

Keywords Free pace optical communication · Convolutional neural network · Strehl ratio · Bit error rate · Meteorological · Wavefront · Adaptive optics · RMS

1 Introduction

Free space optical communication (FSOC) has numerous features compared to other technologies such as RF and fibre optic. More recently, it has drawn much attention among the researchers to provide wide bandwidth communications due to its remarkable advantages including license free spectrum, flexibility, easy of deployment, high speed (Tb/s) and EMI free solutions, also FSO is an alternative

and attractive solution for the "Last mile" problem [1, 2]. In FSO, laser or high power LEDs are used as the transmitter to encode the given information into an optical beam using necessary modulation techniques, whereas photo detector is used as a receiver to reconstruct the information from the received optical signal. The performance of FSOC link mainly depends on transmitter and receiver opto-electronic assembly and various atmospheric factors such as fog, snow, rain, etc. The random fluctuations in the atmosphere due to atmospheric turbulence severely degrade the quality of the wavefront, thus resulting in intensity fading and signal losses at the receiver end [3]. In FSO, scattering of light and absorption of photon can be mitigated using diversity techniques, in which hybrid FSO/RF schemes increases the power at the transmitter. Use of longer wavelength laser source is also a potential solution to mitigate the scattering effects. Atmospheric turbulence effects can be mitigated

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Hybrid cluster made content forwarding and light weight sign encryption IoT based Named Data Network using African Buffalo optimization algorithm

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Abstract. Information Centric Network (ICN) is a newer technology in handling web content distribution that has recently emerged in order to tackle the risk of data security. For handling content distribution, ICN provides data security via a name-based approach. Named Data Networking (NDN) is an ongoing ICN realisation that was incorporated recently. Named Data Networking (NDN) has recently grown in popularity and significance as a new internet design that solves certain limitations in traditional internet communications. NDN is perfectly adapted for the Internet of Things (IoT), which is today dominated by huge, and emerging applications. In this work, we propose an IoT enabled hybrid cluster-based routing protocol with mitigation of content poisoning attack for information-centric Wireless Sensor Network (WSN)-NDN. In this method, hybrid K-medoids clustering is used with African Buffalo Optimization Algorithm (ABOA), which is to find an optimal shortest path between the cluster heads, and light weight encryption. It is developed by using Hyperelliptic Curve Cryptography (HCC) to mitigate content poisoning. Our proposed system has effective data security as it has encrypted data in the cluster head. The smart health care monitoring system has been used for our proposed method. The proposed method has been subjected to extensive analysis by comparing with other existing methods that should improve performance justified in terms of several metrics by introducing the malicious nodes (10%, 20%, and 30%).

Keywords: Named data network, clustering algorithm, content poisoning, african buffalo optimization, hyperelliptic curve cryptography

Abbreviations

IoT – Internet of Things
CS – Content Store
WSN – Wireless Sensor Network
ABOA – African Buffalo Optimization Algorithm
HCC – Hyperelliptic Curve Cryptography
TCP/ IP – Transmission Control Protocol /
            Internet Protocol

ICN – Information Centric Network
DNS – Domain Name Service
DM – Data Message
PIT – Pending Interest Table
IM – Internet Message
NDN – Named Data Network
FIB – Forward Information Base
HC – Hop Count
TL – Threshold Limit
OSPFN – Open Shortest Path First for Named Data
           Networking
NLSR – Named data Link State Routing protocol

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Sensing and Analysis of Greenhouse Gas Emissions from Rice Fields to the Near Field Atmosphere

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Abstract: Greenhouse gas (GHG) emissions from rice fields have huge effects on climate change. Low-cost systems and management practices to quantify and reduce GHGs emission rates are needed to achieve a better climate. The typical GHGs estimation processes are expensive and mainly depend on high-cost laboratory equipment. This study introduces a low-cost sensor-based GHG sampling and estimation system for rice fields. For this, a fully automatic gas chamber with a sensor-integrated gas accumulator and quantifier unit was designed and implemented to study its performance in the estimation efficiency of greenhouse gases (CH_4, N_2O, and CO_2) from rice fields for two crop seasons. For each crop season, three paddy plots were prepared at the experimental site and then subjected to different irrigation methods (continuous flooding (CF), intermittent flooding (IF), and controlled intermittent flooding (CIF)) and fertilizer treatments to study the production and emission rates of GHGs throughout the crop growing season at regular intervals. A weather station was installed on the site to record the seasonal temperature and rainfall events. The seasonal total CH_4 emission was affected by the effects of irrigation treatments. The mean CH_4 emission in the CIF field was smaller than in other treatments. CH_4 and N_2O emission peaks were high during the vegetative and reproductive phases of rice growth, respectively. The results indicated that CIF treatment is most suitable in terms of rice productivity and higher water use efficiency. The application of nitrogen fertilizers produced some peaks in N_2O emissions. On the whole, the proposed low-cost GHGs estimation system performed well during both crop seasons and it was found that the adaption of CIF treatment in rice fields could significantly reduce GHG emissions and increase rice productivity. The research results also suggested some mitigation strategies that could reduce the production of GHGs from rice fields.

Keywords: greenhouse gases (GHGs); irrigation treatments; automatic gas chamber; rice fields

1. Introduction

Rice is the second major staple food in 48 countries of Asia and is being grown on about 153 Mha, which is equal to 11% of the world's arable land [1]. A major concern in the cultivation of rice is the fact that it is one of the main agricultural sources of emissions of greenhouse gases (GHGs) like CH_4, N_2O, and CO_2 [2]. Rice crops have 169% higher global warming potential than maize and 460% higher than wheat crops. The Global Warming Potential (GWP) rate is higher in southern and eastern parts of India due to the larger extension of rice cultivation fields. This is mainly due to the contribution of higher CH_4 emission to total greenhouse gas emissions in rice production compared to othercrops. It is estimated that by 2030, the demand for rice production may increase by 40% due to the growing population. Hence, the resulting GHG emission rate may increase by 35% to 60% [3], which will lead to increased global warming [4]. The excessive application of inorganic fertilizers in the rice field to increase productivity may also increase GHGs emissions from rice fields. GHG emissions from paddy fields depend on various factors like the irrigation-water level, amount of fertilizer used, rice varieties, and soil

Tech Science Press

NDN Content Poisoning Mitigation Using Bird Swarm Optimization and Trust Value

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Abstract: Information-Centric Networking (ICN) is considered a viable strategy for regulating Internet consumption using the Internet's underlying architecture. Although Named Data Networking (NDN) and its reference-based implementation, the NDN Forwarding Daemon (NFD), are the most established ICN solutions, their vulnerability to the Content Poisoning Attack (CPA) is regarded as a severe threat that might dramatically impact this architecture. Content Poisoning can significantly minimize the impact of NDN's universal data caching. Using verification signatures to protect against content poisoning attacks may be impractical due to the associated costs and the volume of messages sent across the network, resulting in high computational costs. Therefore, in this research, we designed a method in NDN called Bird Swarm Optimization Algorithm-Based Content Poisoning Mitigation (BSO-Content Poisoning Mitigation Scheme). By aggregating the security information of entire routers along the full path, this system introduces the BSO to explore the secure transmission path and alter the content retrieval procedure. Meanwhile, based on the determined trustworthy value of each node, the BSO-Content Poisoning Mitigation Scheme can bypass malicious routers, preventing them from disseminating illicit content in the future. Additionally, the suggested technique can minimize content poisoning utilizing removing erroneous Data packets from the cache-store during the pathfinding process. The proposed method has been subjected to extensive analysis compared with the ROM scheme and improved performance justified in several metrics. BSO-Content Poisoning Mitigation Scheme is more efficient and faster than the ROM technique in obtaining valid Data packets and resulting in a higher good cache hit ratio in a comparatively less amount of time.

Keywords: Named data network; content poisoning; bird swarm optimization; content validation; fake content

1 Introduction

The Internet of Things (IoT) is built on an ever-increasing number of small, embedded devices and advances in wireless technology that allows objects to communicate, analyze and synchronize with other IoT objects. Despite the extensive research on IoT, its definition remains ambiguous. According to most

Design And Implementation of MIMO-FSO Communication System For Disaster Management

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Abstract- *Communication plays an integral role in disaster management. All conventional methods of communication including telephone, radio, and television could be down during disaster. Therefore it is crucially important to have completely functional communication. In this paper, the concept of Free Space Optical Communication (FSOC) is introduced for disaster management, which is one of the most promising wireless communication techniques. FSOC enables us to offer extremely large capacity, high-immunity to interference, low latency, low-energy consumption, large data rate of transmission, reliable and secure communication. Besides all these, FSO faces challenges during transmission due to atmospheric turbulence like rain, fog, snow, cyclones, earthquake etc. Diversity technique is used in this paper to mitigate the fading effects due to the above mentioned effects. This paper proposed a novel method of MIMO-FSO techniques to improve the transmission capacity during disaster. The capacity of MIMO-FSO networks is increased using Polarization Division Multiplexing (PDM). In this paper, the most suitable modulation techniques among OOK, BPSK, OFDM is identified using simulation experiment. The overall performance of the FSOC system is evaluated using Bit Error Rate (BER), Power level at the receiver under various turbulence conditions.*

Keywords- Atmospheric Turbulence, Binary Phase Shift Keying (BPSK),), Multiple Input-Multiple Output (MIMO), Polarization Division Multiplexing (PDM), On-Off Keying (OOK).

I. INTRODUCTION

Disaster Management is a process which deals with the techniques and method to protector preserve lives and property. Disasters are serious disruptions to the functioning of a community that exceed its capacity to cope using its own resources. Disasters can be caused by natural, man-made and technological hazards, as well as various factors that influence the exposure and vulnerability of a community. Communication during and immediately after a disaster situation is a vital component of response and recovery. Despite massive technological changes in recent years,

communication problem persist: including system failure, system overload, and incompatibility communication systems used by different agencies. This paper proposes a technique based on free space optics communication during disaster scenario. The optical signal is less prone to rain than fog and hence, this might be useful to establish temporary communication in flood affected areas. The performance of FSO system over Malaga fading channels has proved that effective fading mitigation techniques are required to satisfy the typical (BER) and capacity targets for FSO applications at the range of practical signal-to-noise ratios (SNRs). Wireless radio system use MIMO technique by deploying multiple apertures at the transmitter and the receiver, the FSO system performance can be significantly enhanced. Multiple-Input and Multiple-Output (MIMO) is a method for multiplying the capacity of a radio link using multiple transmission and receiving antennas to exploit multipath propagation. The antennas at each end of the communications circuit are combined to minimize errors, optimize data speed and improve the capacity of radio transmissions by enabling data to travel over many signal paths at the same time. Creating multiple versions of the same signal provides more opportunities for the data to reach the receiving antenna without being affected by fading, which increases the Signal-to-Noise Ratio and error rate. By boosting the capacity of Radio Frequency (RF) systems, MIMO creates a more stable connection and less congestion. At one time, in wireless the term "MIMO" referred to the use of multiple antennas at the transmitter and the receiver. In modern usage, "MIMO" specifically refers to a practical technique for sending and receiving more than one data signal simultaneously over the same radio channel by exploiting multipath propagation. Although this "multipath" phenomenon may be interesting, it's the use of orthogonal frequency division multiplexing to encode the channels that's responsible for the increase in data capacity. MIMO is fundamentally different from smart antenna techniques developed to enhance the performance of a single data signal, such as beam forming and diversity.This paper discusses the performance of MIMO-FSO communication system using PDM under different atmospheric turbulence conditions. In MIMO FSO, capacity of the link is increased by combining polarization division

Algorithms and Techniques for Artificial Intelligence Based Border Security System

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A B S T R A C T

The increasing security threats and challenges related to border control have prompted the development of AI-based border security systems. These systems combine various sensors and technologies, including cameras, radars, and lidars, to detect and track people and vehicles crossing the border. Machine learning algorithms are used to analyze the collected data and identify potential threats or suspicious activities. This paper proposes an AI-based border security system that is transparent, accountable, and compliant with ethical and legal standards. The proposed system has been evaluated in a real-world setting, and the results demonstrate its effectiveness in improving the efficiency and effectiveness of border security operations.

Keywords: Algorithms, Artificial Intelligence, Border Security, Classification, Data Processing, Detection, Machine Learning, Sensors

1. Introduction

Border security has always been a critical concern for nations across the world. With the increasing frequency of security threats, including terrorism, drug trafficking, and illegal immigration, the need for effective border security systems has become even more pronounced. Traditional approaches to border security, such as physical barriers and human patrols, have limitations in detecting and preventing security breaches. In past years, there has been growing interest in the application of AI-based border surveillance systems that can deal with huge amounts of data in real-time to recognize the potential threats or suspicious activities. AI-based border security systems are designed to address the limitations of traditional border security approaches by providing a more efficient and effective way to monitor and secure borders. These systems use various sensors and technologies, such as cameras, radars, and lidars, to detect and track people and vehicles crossing the border. Machine learning algorithms are used to analyze the collected data and identify potential threats or suspicious activities [1].

The development of AI-based border security systems has opened up new possibilities for improving border security operations. These systems have the potential to increase the accuracy and speed of threat detection, reduce false alarms, and enhance situational awareness. However, the use of AI in border security also raises ethical and legal concerns, such as the potential for bias, invasion of privacy, and violation of human rights. Therefore, it is crucial to develop AI-based border security systems that are transparent, accountable, and compliant with ethical and legal standards.

In this paper, we propose an AI-based border security system that is designed to improve the efficiency and effectiveness of border security operations. The proposed system incorporates a range of sensors and technologies, including cameras, radars, and lidars, to detect and track people and vehicles crossing the border. Machine learning algorithms are used to analyze the collected data and identify potential threats or suspicious activities. The proposed system is designed to be transparent, accountable, and compliant with ethical and legal standards.

The rest of the paper is organized as follows. The literature survey section provides an overview of the existing research on AI-based border security systems. The block diagram and model of the proposed system section presents a block diagram and a model of the proposed AI-based border security system. The Algorithms section provides a detailed description of the machine learning algorithms used in the proposed system. The Results and Discussions section presents the results of the evaluation of the proposed system in a real-world setting. Finally, the Conclusion section summarizes the key findings of the paper and discusses the implications for future research and development in this area [2].

2. Block diagram and system model

The proposed AI-based border security system consists of several key components, including sensors, data processing modules, and a central control system.

Investigation on CEED-RES Problem Using Modified Lagrange Method

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Abstract

The notion of a micro grid system is used to prevent transmission losses and to ensure a dependable power supply to a limited geographical area. It has been a mandatory protocol to apply accessible Renewable Energy Sources (RES) in order to reduce hazardous pollutants released into the atmosphere as a result of fossil fuel burning. Economic load dispatch (ELD) is concerned with the most cost-effective sizing of distributed energy resources (DERs). By limiting the hazardous content of pollutants emitted into the atmosphere, emission dispatch determines the ideal size of DERs.

A multi-objective Combined Economic-Emission Dispatch (CEED) is created, which determines the appropriate DER sizing while minimizing both fuel costs and pollution emissions. Using Python programming in IDLE, this work conducts all ELD, Emission Dispatch, and CEED on a renewable-integrated micro grid and grid connected mode independently. The results are then compared with conventional method effectiveness of the proposed technique. In this paper, the algorithm proposed in python language to check the accuracy, multidisciplinary integration and ease of understanding. This article is developed based on conventional CEED solution and validated with the help of Python programming for a typical IEEE test system.

A review on partial discharge diagnosis in cables: Theory, techniques, and trends ☆

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Abstract

Power cables, the most critical component of the power system, must be extremely reliable in order to avoid revenue losses due to premature failure. The dielectric properties of cable insulation may deteriorate due to ageing phenomena, which may have a negative impact on the polymer materials used for insulation. Therefore, the early detection of such depletion, and the severity of degradation while the equipment is in operation, aids in the avoidance of a total failure. Partial discharge (PD) detection and analysis have been adopted as a predictive test to characterize and assess the state of electric cables in advance. This review provides an in-depth discussion of the reactions that occur in the insulation system of the cables. Moreover, this paper presents a comprehensive review of the state-of-the art of various PD detection techniques regarding sensor types. The drawbacks and challenges of different PD measurement techniques have been elaborated. Following that, the numerous PD localization methods are discussed, as well as the necessity of computational intelligence approaches and their pros and cons. Last but not least, the authors provide a deep insight into the theoretical and practical implications of deep learning in PD localization, as well as recommendations for future research directions. This review will provide valuable insights and act as a starting point for researchers to lead the development of more efficient approaches for diagnosing PD in the cable.

Introduction

Cables have a significant impact on the overall power network's reliability and accessibility, as cable failures nearly invariably result in catastrophic losses. Condition monitoring inspections and tests can be used to assess the extent of ageing deterioration in cables [1]. Cable insulation must be in excellent working conditions with no outages in order to assure continuity. The majority of the electrical problems that happen in the 21st century are likely to be caused by insulation deterioration. Partial discharges (PD) are regarded as one of the most reliable indicators of potential discharging of weak areas in cable insulation, which may ultimately result in cable system collapse [2]. Most high voltage equipment that was installed in the 1950s and 1960s has reached the end of its useful life [3]. A solid scientific

Analysis of Optimal Load Management Using a Stand-Alone Hybrid AC/DC Microgrid System

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Abstract

Typically, diesel or other fossil fuel-based related applications meet electricity demand. Nonetheless, as the cost of fossil fuels rises, as do their harmful emissions, there is a sudden transition toward stand-alone hybrid renewable energy systems (HRESs). The proposed project proposes electrifying VIT University in Vellore, Tamil Nadu, India, using an off-grid HRES. The goal of enhancing hybrid energy system (HES) regulation, size, and component selection is to provide society with a cost-effective power supply. This article's primary purpose is to show how to utilize HOMER Pro Software to reduce total net present cost, cost of energy, and CO_2 emissions. After that, the findings were compared to four different HRES configurations. The efficient solution for transmitting power at the lowest energy cost is configuration 1 ($solar + fuel\ cell + battery + wind + diesel\ generator$) which is found to be the optimal solution for supplying energy with 0% unmet load at the least cost of energy, which is at 24.91 Rs/kWh. These data are used to calculate the optimal size of energy storage components based on long-term system behavior using HOMER and to forecast short-term generation and demand changes while maintaining system dependability and grid voltage. Using and incorporating model predictive control (MPC) for an

Comparative Study of Mechanical Strength and Piezoelectric Coefficient of Post-processed Polyvinylidene Fluoride Nanofibrous Films

M. Satthiyaraju, K. Ananthakumar, R. Shankar, and C. K. Arvinda Pandian

Abstract The polyvinylidene fluoride electrospun nanofibers were fabricated through the electrospinning technique. The electrospun PVDF nanofbrous films were post-processed as annealed and mechanically stretched for enhancing its mechanical strength and piezoelectric coefficient to utilize for the different piezoelectric applications. The FESEM images are shown beadles and randomly oriented nanofibers. After post-processing, the mechanical strength and elongation due to break were significantly enhanced. The annealed and stretched sample P-A-S is shown increment up to 22.74 and 35.15% due to the interconnection of nanofibers. Moreover, the piezoelectric coefficient D33 is enhanced to the significant level up to 23.94% of increment of P-A-S nanofiber films. These research woks will assist the future work to obtain the various interesting findings to enhance the piezoelectric properties of the piezoelectric polymers which can be used for wearable electronics, energy harvesting, biomedical, sensors, and actuators applications.

Keywords PVDF · Nanofiber · Post-processing · Mechanical strength · Piezoelectric coefficient

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ARTICLE

Oxidation behavior of near nanostructured coating developed by the HVOF process

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Abstract

Microstructured and near nanostructured Cr_3C_2–Ni–Cr–B–Si coatings were deposited on Inconel 718 superalloy by high-velocity oxygen fuel thermal spray technique. The oxidation behavior of microstructured and near nanostructured Cr_3C_2–Ni–Cr–B–Si coated superalloy at 900°C in air for 50 cycles under cyclic heating and cooling conditions was studied. The kinetics of oxidation of both nanostructured and microstructured coated superalloy was analyzed by weight change measurement. It was noticed that the uncoated and coated alloy obey the parabolic rate law of oxidation. X-ray diffraction, field-emission scanning electron microscopy/energy dispersive x-ray analysis, and elemental mapping techniques were used to analyze the oxidized samples of coated and uncoated samples. In the coated superalloy, iron, silicon, and titanium were oxidized in the inter-splat region, whereas the splats which consist mainly of Ni and Cr remain unoxidized. Because of the formation of compact and adhesive thin NiO and Cr_2O_3 scale on the surface of the coating during oxidation, the developed nanostructured coated superalloy shows better oxidation resistance than the microstructured one.

KEYWORDS
Cr_3C_2–NiCrBSi coating, cyclic oxidation, HVOF spray process, superalloy

1 | INTRODUCTION

High-temperature components such as compressor and turbine will work up to 1300°C under highly loaded conditions for about 50 000 h and this adverse atmosphere leads to high-temperature oxidation of the components. It is considered one of the major drawbacks in the hot sections of gas turbines, boilers, industrial waste incinerators, metallurgical furnaces, petrochemical installations, and so forth.[1–3] Gas turbine engine used in power generation and aero engine application requires improved material properties to withstand the high-temperature oxidizing environment. Therefore, there is

an increasing demand for the use of superalloys in this field.[4,5] Superalloy provides a low thermal expansion, tensile strength, high creep strength, and thermal conductivity against high-temperature oxidation. As Ni-based superalloy shows good oxidation resistance, it is widely used in gas turbine engines.[6] Inconel 718 is extensively used in steam and gas turbines as it can withstand high-temperature and also acquires good mechanical properties of low-cycle fatigue strength up to 650°C. Oxidation is unavoidable when it is used under high-temperature environment with excess air or oxygen for an elongated period of time.[7] So, to extend the lifetime of metallic components used at high

Spark erosion behaviour of SiC and Yitria ceramic particles reinforced aluminium hybrid nano-composites

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The Aluminium hybrid nano composite (Al-SiC-Yttria) was produced through powder metallurgy using Silicon Carbide (SiC) and Yttrium Oxide (Y_2O_3) as reinforcement particles. This work aims to arrive at the optimum Electric Discharge Machining (EDM) parameters for Al-SiC -Y_2O_3 hybrid nano composites. Current (I), Pulse on Time (PTon) and Pulse off Time (PToff) were selected as parameters and the influence on material removal (MR) and Surface roughness (SR) have been investigated. This work presents an experimental study to achieve optimal EDM parameters by employing Grey Relational Analysis (GRA). The dominance of process parameters on the response parameters were analysed using Analysis of Variance (ANOVA) as well. I: 5 A, PT on : 50 μs, and PToff : 20μs were found to be the optimal machining parameters for the EDM of Al-SiC-Y_2O_3 composites.

Keywords: Aluminium nano composite, Silicon carbide, Yitria, Optimization, Taguchi grey relational analysis.

Introduction

Metal matrix composites (MMC) find their applications in automobile parts, lawn and garden equipments, heat shields, fuel cells, cutting tools and bearing surfaces [1]. Experimental survey on various metal matrix composites reveals that these applications require high strength and hardness [2]. Aluminium composites are widley used materials because of its less density and excellent properties [3]. Recently nano composites are synthesized with improved properties when compare with MMCs [4].

Hence, conventional machining processes are not suitable for machining complex shape of metal matrix composites and thermoelectric process has been employed to machine these composites without affecting the surfaces of the composites. In EDM, the erosion of work piece is achieved through high frequency controlled pulses produced in the dielectric medium available between the tool and work [5-7]. The machining rate, SR and improvement of SR were implemented in EDM of Al -Al_2O_3 composite using Taguchi method by Hwa Yan Che et al. [8]. The

surface characteristics of Al-SiC composite were evaluated, analysed and compared by Müller and Monaghan [9]. Ramulu et al. performed the fatigue test and fractography analysis on EDM machined Al-15%SiC composite material and reported that fatigue strength was found remarkably decreased in EDM processing, with degradation increasing with higher MRR [10]. Müller and Monaghan investigated the machinability of Al-SiC composite using EDM and Laser cutting processes and compared the results and described that the EDM process ensures the less thermal damage than laser cutting [11]. Mohan et al. summarized that the percentage addition of SiC in Al-SiC composite had an opposite effect of MRR and required result on TWR and surface finish in electric discharge machining process [12]. Tsai et al. obtained the optimum MRR corresponding to a sintering pressure of 20 MPa and mixing ratio of Cu-0 wt%Cr in EDM [13]. George et al. attempted to optimize the EDM parameters for carbon-carbon composites. The MRR increases with increase in highest process parameter values [14].

The effects of surface integrity were examined in wire EDM of WC-Co composite. The erosion wear tests were conducted to measure the loss in weight, erosion wear rate in WC-Co composites [15]. The ZrB_2-Cu composite tool was used EDM and the 40%

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Effects of injection parameters on CRDI-equipped stationary diesel engine fuelled with neat biodiesel mix derived from waste feedstocks

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Abstract

This present work deals with the effects of injection parameters such as pilot-main injection mass ratio and dwell time on combustion, performance, and emission characteristics of a diesel engine. A single cylinder diesel engine is used in this research work with the flexibilities to modify different variables via open electronic control unit. Biodiesel mix (BDM) used in the present work is derived from waste feedstocks of used cooking oil and chicken fat. Throughout the experiment, engine load and speed were maintained constantly at 4.51 brake mean effective pressure and 1500 rpm, respectively. Different pilot mass ratios (10%, 20%, and 30%) and dwell times (20° crank angle (CA), 30° CA, and 40° CA) were tested and results were compared with conventional mode combustion. The results indicated that the pilot injections helped to reduce the ignition lag period and also shortened the combustion duration. The highest brake thermal efficiency of 34.78% was identified with the lowest pilot mass of 10%. According to the results, increased dwell time decreased the oxides of nitrogen emissions but increased the hydrocarbon emissions. The experiment revealed that BDM made of waste feedstocks could be an effective alternative for engine applications with optimized engine operating conditions.

Key words: Injection parameters, pilot-main injection, dwell time, emission, biodiesel mix, waste feedstock

1. Introduction

The growth in electric vehicle research and stringent emission norms in recent years have urged the automobile manufacturers to find new combustion modes. However, the after-treatment systems currently used to meet the emission norms are complicated, expensive, and reduce fuel economy. The trade-off between soot and nitrogen oxide (NO_x) is a huge challenge faced by researchers. Simultaneous reduction of NO_x and soot can be achieved by deploying strategies like low temperature combustion (LTC) modes (Heywood 1988; Soloiu et al. 2018; Rajkumar and Thangaraja 2019). Partially premixed combustion is one of the promising LTC concepts that provide good efficiency and lesser emissions (Jain et al. 2017). Injection parameters like injection pressure, number of injections, pilot-main timing, and mass ratio are the key factors to obtain a minimal amount of NO_x with improved efficiency (Rajashekhar et al. 2012; Benajes et al. 2017; Loyte et al. 2022). Multiple injections were studied by various researchers and it was concluded that the main injection with a single pilot injection is sufficient to achieve a better partially premixed combustion (PPC) mode of operation (Han et al. 1996; Payri et al. 2020; Asadi et al. 2020). Main injection timing should be

fixed initially to optimize the split injections; advanced main injection timings advance the CA50 (the crank angle at which 50% of fuel energy releases) and offer maximum fuel conversion efficiency (Zhang 1999). After a pilot fuel injection, there is a minor peak in the heat release rate (HRR), which is related to the heat released due to the pilot fuel and is termed as pilot thermal region (PTR). By the time of the main injection, the PTR increases the in-cylinder temperature and therefore aids the combustion (Han et al. 1996). It is essential to quantify the mass of pilot fuel for controlling the NO_x formation without increasing the soot. A small amount of pilot injection supports to enhance combustion of the main injection event and weakens the trade-off between NO_x and specific fuel consumption (Ishida et al. 1994; Tanaka et al. 2002). Various injection strategies studied by Thurnheer et al. (2011) suggest that dwell time (crank angle difference between a pilot and main injection event) influences the ignition delay and combustion period of fuel (Thurnheer et al. 2011). A longer dwell time from the main injection causes earlier combustion of pilot fuel, but increases the ignition delay. Too early pilot injection leads to poor fuel evaporation, missing fuel spray from the piston bowl, and over-advanced combustion
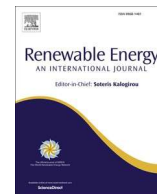
Hybrid optimization and modelling of CI engine performance and emission characteristics of novel hybrid biodiesel blends

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ARTICLE INFO

ABSTRACT

Different meta-heuristic optimization algorithms have been used in a variety of fields due to their intelligent behavior and fast convergence. However, use of these algorithms in the engine behavior optimization is very-limited. The development of so-called hybrid optimization technique when these algorithms are combined with experimental design technique is an upcoming method in the field of renewable energy. Hence in this research, meta-heuristic optimization algorithms and experimental design methods were combined to optimize the engine behavior. Additionally, artificial neural networks (ANN) were employed to forecast the performance and emission behaviors of a CI engine running on a novel hybrid biodiesel blend of *Cucurbita pepo. L* (pumpkin) and *Prosopis juliflora*, mixed with a novel *Elaeocarpus ganitrus* (Rudraksha) additive. To assess the success of the ANN, four statistical benchmarks (R^2, and MSE) were used. Experiments were designed according to Design of Experiments (DOE) rules with performance and emission parameters as outputs. Response surface methodology (RSM) was employed to find the effect of interaction factors. Single objective and multi-objective optimization using highly efficient hybrid RSM-particle swarm optimization (RPSO) and dragon fly algorithm (RMODA) were employed to optimize the response of the obtained RSM equations. The outcomes demonstrated that RSM and ANN were excellent modelling techniques for these kinds of situations, with good accuracy. In addition, ANN's prediction performance ($R^2 = 0.978$ for *BTE*) was somewhat better than RSM's ($R^2 = 0.960$ for *BTE*). On the other hand, the PJB20 blend with 5 mL additive increased *BTE* by 52.8% and reduced *BSFC* by 34.9% at maximum load. The smoke opacity was lowered by 7.1% when compared to pure diesel, without any engine modifications. CO_2 emission was seen to be shortened by 19.14%. Finally, it can be concluded that this novel biodiesel can be possibly utilized in CI engines with no modification and the engine characteristics can be controlled by optimization and prediction models.

1. Introduction

The continuous deterioration of carbon fuel sources around the world combined with rising energy consumption demands, has necessitated the development and use of alternative fuels. Biodiesel, compared with other alternatives, has gained a lot of interest because of its obvious benefits, such as simplicity, being renewable, having the

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Hindawi

Research Article

Experimental Investigation and Prediction of Performance, Combustion, and Emission Features of a Diesel Engine Fuelled with Pumpkin-Maize Biodiesel using Different Machine Learning Algorithms

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The current study examines the usage of biodiesel as a diesel substitute that is produced through the transesterification of pumpkin and maize with the addition of a diethyl ether (DEE) additive. Pumpkin-maize (PM) biodiesel and addition of diethyl ether (DEE), as well as their blends of 10%, 20%, 30%, 40%, and 50% with diesel, were used in performance, combustion, and emission examinations under various load conditions. According to the experimental findings, adding 5 ml of the DEE boosts BTE by 31.91 percent (B20 blend) compared to diesel. While the diesel equivalent of BSFC decreases by 9.519%. NO emission dropped by 34.91 percent at peak loads, HC emissions were augmented by 32.43%, and smoke opacity improved by 27.24%. To enhance the engine performance, combustion, and emission features of the substitute biodiesel diesel, the study emphasises the precise mix proportions of PM biodiesel with DEE addition. Using ANN, BTE, and NO were predicted with R^2 values of 0.93 and 0.95, respectively. As can be observed, the R^2 value for the ANN model was almost one, suggesting that the ANN models had better predictive power than other machine learning (ML) models.

1. Introduction

The energy crisis has enraged people all around the world owing to the rapid depletion of fossil fuel supplies and ecological damage. In addition to being a necessity in modern living, fuel significantly contributes to air pollution [1]. Concerns regarding the degradation of the world's fossil fuel supplies have been expressed because of the vast usage of such resources [2]. On the other hand, during the last several decades, environmental deterioration caused by the burning of these fuels has proven to be a major worry for humanity. As a result, researchers are searching for substitutes for conventional fuels as petroleum-based fuel stocks are depleted and the environment is being damaged. Biodiesel, a

Surface Topography: Metrology and Properties

PAPER

Comparative investigation of surface modification and corrosion behaviour on SS304 and SS316 Coated with Inconel 625 in Air and Molten Salt Environment

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Abstract
The high operating temperature-based industry extensively requires coating of material surfaces that are subjected to a high-temperature environment to improve their surface and resistance to corrosion. The current study investigated the surface modification and corrosion behaviour of Inconel 625 coated SS304 and SS316 materials in an air and molten salt environment at 800 °C. The plasma spray method was used to coat the Inconel 625 powder over the substrates. Techniques like quantitative weight gain/loss method, surface roughness, hardness measurement, and characterization through microstructure analysis were used to characterize and analyze the corrosion behaviour and microstructure of Inconel coated SS. It was observed that the coat had a noticeably layered structure with layers parallel to the surface of the substrate. The experimental results revealed that the uncoated SS suffered corrosion in the form of residue and peeling up of its oxide scale. Whereas the surface of the IN625 coated SS showed excellent resistance to corrosion formation. It was found that the coating lowered the mass gain of the SS316 by 65% when compared to uncoated SS.

Abbreviations

Al	Aluminium
APS	Air Plasma Spray
Al_2O_3	Aluminium Oxide
ASTM	American Society for Testing and Materials
B	Boron
C	Carbon
Cl	Chlorine
Cr	Chromium
Cr_2O_3	Chromium Oxide
CrO	Chromium Oxide
EDAX	Energy Dispersive x-ray Spectroscopy
Fe	Iron
Fe_2O_3	Iron Oxide
FeO	Iron Oxide
FeS	Iron Sulphide
FeS_2	Iron di-sulphide
HCMSDS	Hot Corroded Molten Salt Deposited Specimen
HVOF	High Velocity Oxy Fuel
IN	Inconel
K	Potassium
KCl	Potassium Chloride
Kp	Parabolic rate constant
Mn	Manganese
Mo	Molybdenum
Na_2SO_4	Sodium Sulphate
Nb	Niobium
Ni	Nickel
NiO	Nickel Oxide
O_2	Oxygen
OM	Optical Microscopy

PERFORMANCE, EMISSION CHARACTERISTICS OF CI ENGINES FUELED WITH ANNONA SEED BIODIESEL BLENDS AND 1-PENTANOL AS AN ADDITIVE

by

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Fossil fuel is one of the predominant sources for automobiles are facing depletion across the world. This depletion put up a greater demand for the need of alternative fuel sources for automobiles. As a solution for this issue, many researchers formulated and synthesized biodiesel from the oil extract of plant seeds and bio waste materials. The present work involves the synthesis and extraction of methyl ester from the oils of Annona seed and blended with diesel along with 1-Pentanol as an additive. Three-blend mixture of biodiesel is prepared with methyl ester of 10%, 20%, and 30% of Annona seed oil with 10 ml of 1-Pentanol in it. The formulated biodiesel is evaluated for its performance using the Kirloskar Diesel engine under different loading conditions. The evaluation is carried out in terms of brake thermal efficiency, brake specific fuel consumption, and other parameters along with emission characteristic analysis of CO, NO_x, and CO_2, From the observed results, the biodiesel blend with 30% of Annona seed methyl ester showed better performance. However, the emission analysis over different gases showed biodiesel with 10% of Annona seed methyl ester showed reduced emission.

Key words: *Annona seed, 1-Pentanol, Diesel engine,*
brake thermal efficiency, brake specific fuel consumption, emission

Introduction

The population across the world is in increasing trend and people sought to travel to various locations for their needs. Most of the transportation needs are satisfied through automobiles that are operated through the products of fossil fuels. Diesel is one of the common fossil fuels and it is being depleted due to its excessive consumption [1, 2]. The usage of diesel causes an adverse impact on the environment as its increases air pollution and results in ozone depletion. Several organizations established strict regulations and monitoring to control the adverse effect of emissions from diesel [3]. For overcoming the existing problems in diesel usage, the concept of biodiesel was developed and is used in the Diesel engine. The biodiesel can be either used in a pure form directly or blended at a certain proportion with the diesel in CI engine [4]. Most of the developed biodiesels are found to reduce emissions with-

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Evaluation on Mechanical Properties of Natural Fiber Based Epoxy Resin Composites

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Abstract: In this modern world, huge amounts of waste are produced in both natural wastes and human wastes as well. So, recycling and reusing those wastes a lead to a better world in the future, and it will protect the environment. Composite materials have played a vital role because of their adjective properties such as lightweight, lower density, lower corrosion and acceptable mechanical characteristics.

It has a variety of applications like aerospace, automobiles and marine areas. Moreover, composite materials have been replaced the steel without losing the physical and mechanical properties.

This research paper leads to the desired mechanical and physical properties among the three combinations of natural fibers like neem fiber, raavi fiber and human hair fiber based composites samples along with suitable weight percentages. The composites samples were fabricated by using epoxy resin as a binder.

The desired sized test samples were undergone the various mechanical testing to determine their impact, hardness and tensile characteristics. From the results, clearly indicated that combination of neem-raavi reinforced composites are achieved a superior mechanical properties.

Keywords: Composite materials, Hair fiber, Mechanical characteristics, Natural fiber, Neem fiber, Raavi fiber.

I. INTRODUCTION

Focus on the economic and environmental aspect, composite is replaced by conventional materials without compromising the physical and mechanical characteristics. Mainly fiber composite materials are used instead of heavy materials because of their strength-to-weight ratio.

While using natural composite materials can able to optimize 60 to 80% of weight than aluminium matrix composites. Polymer based fiber composites are achieved a better impact strength compared with epoxy based fiber composites, and epoxy composites have reasonable tensile properties [1].

Adding more fiber content in resin based fiber composites increases the mechanical properties like impact, hardness, tensile and flexural strength [2,3].

Deproteinized natural fibers have improved mechanical characteristics than other natural composite materials [4]. Increasing the weight percentage of fiber content in composite materials that gives the best and most reasonable physical and mechanical properties and elongation ratio [5].

Adding more natural fibers in epoxy resin composites will optimize the voids during the fabrication of composite materials and improves better flexural properties [6,7].

Alkali treated natural fibers comparatively affects both tensile and flexural property [9,10].

II. METHODOLOGY

Neem, raavi and human hair fibers are used in this research to evaluate their mechanical characteristics. Natural fibers like neem, raavi and human hair are readily available in the market. All three fibers were treated with diluted NaOH solution for at least 24 hours, and then treated fibers were allowed to dry at atmospheric temperature. The composite samples were prepared using the hand layup method, and during the fabrication of composite samples, epoxy resin and hardener were added to achieve the desired weight percentage which is shown in fig 1 [1]. The fabricated three composite samples have undergone different mechanical testing such as impact, hardness and tensile as per the ASTM standards. The impact test was conducted using izod testing equipment (KL-300, S.NO 96/1054, Krystal Elmec). The hardness values were measured using vickers hardness tester. The tensile test was conducted using a universal testing machine (UTM 40, S.NO 11/98-2450, FIE).

Research article

Investigations on the microstructure and properties of yttria and silicon carbide reinforced aluminium composites

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A R T I C L E   I N F O

A B S T R A C T

Powder Metallurgy (PM) was used to synthesize SiC (0, 5, 10, 15 & 20 wt%) and 1 wt% Yttria (Y_2O_3) reinforced aluminium (Al) metal matrix composites. The Al–SiC–Y_2O_3 hybrid composites samples were prepared for density (ρ), hardness (VHN), mechanical, tribological, and micro-structural studies in accordance with ASTM standards. SEM images revealed an even spreading of SiC particles throughout the Al matrix and composition was verified by the characterization techniques. The addition of SiC and Y_2O_3 to their respective composites improved the VHN and 'ρ'. The compressive strength (CS) of Al–SiC–Y_2O_3 composites increased while increasing the SiC. The higher compression strength (405 MPa) was obtained for the Al − 1 wt% Y_2O_3-20 wt% SiC-hybrid composites. The thermal conductivity (K) of Al–SiC–Y_2O_3 samples diminishes, as the hard SiC particles are gradually added. Furthermore, it was observed that accumulative the wt% of SiC in the aluminium metal matrix (AMMC) results in a novel material with a decreased wear rate. The better properties was achieved for the samples contain 20 wt% of SiC content in Al − 1 wt% Y_2O_3 matrix.

1. Introduction

Metal matrix composites (MMCs) have established an excessive deal of consideration in last few decades due to their outstanding features that combine the best of matrix phase and reinforcing qualities [1–4]. In general, the best matrix materials are ductile metal alloys, while the best reinforcement particles are hard ceramics. Aluminium, copper, titanium and magnesium are some of the commonly researched matrix materials [5,6]. Aluminium (Al) is the most favoured matrix material among these materials due to its extraordinary properties. Modern reinforcing ceramic materials have a wide range of applications in mechanical, electrical, electronics, aeronautic, automobile, and chemical engineering, among others, due to their exceptional physical and mechanical qualities and characteristics. In recent years, Al matrix composites have become increasingly popular for military and automotive applications due to its superior properties [7].

Impact of Combined Effects of Injection Pressure and EGR on Modified Stationary Engine Fuelled with Biodiesel Blend Made of Waste Feedstock Oils

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Abstract

The aim of this present work was to investigate the combined effects of injection pressure and exhaust gas recirculation (EGR) on the combustion, performance and emission characteristics in a modified stationary diesel engine. Biodiesel blend (BDB) method also has been approached in this present work to improve the fuel properties by mixing two feedstock of different saturated fatty acid composition. Biodiesel blend was prepared from waste feedstock oils of waste cooking oil and chicken fat oil. A new method of raw bio-oil mixing has been carried out for BDB production and reduced the production cost. The engine was tested with three injection pressures (300, 400 and 500 bar) and two different EGR rates (10% and 20%) at full load, and experimental results were compared with biodiesel conventional combustion (BDC) mode. The outcomes showed that the amount of oxygen presents in biodiesel blend is not enough to support the combustion at high EGR rate of 20%. High injection pressure of 500 bar with the minimum amount of 10% EGR operating condition, named as P500E10, offered the high brake thermal efficiency of 34.93%, which is 11.56% higher than BDC. Nitric oxide emissions, the major constrain for biodiesel usage in engine applications, also reduced at P500E10 by 2.56% as compared to BDC. The overall experimental results showed that the BDB prepared with waste feedstocks would be an impressive alternative resource for engine applications along with suitable injection pressure and EGR rate.

Keywords Injection pressure · Exhaust gas recirculation · Waste cooking oil · Chicken fat · Waste to energy · Engine emissions

Abbreviations

BDB	Biodiesel blend
BDC	Biodiesel conventional combustion
BSFC	Brake-specific fuel consumption
BTE	Brake thermal efficiency
CFO	Chicken fat oil
CFB	Chicken fat oil biodiesel
CD	Combustion duration
CN	Cetane number
EGR	Exhaust gas recirculation
ID	Ignition delay
RBOB	Raw bio-oil blend
SFA	Saturated fatty acid
USFA	Unsaturated fatty acid
WCO	Waste cooking oil
WCOB	Waste cooking oil biodiesel

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