



## RESEARCH PAPER PUBLICATIONS IN 2022-23

Number of research papers published per teacher in the Journals notified on UGC care list during the year 2022-23

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Prof. Dr. Benny Joseph

(PRINCIPAL)





1(2022-23)

Journal of Ambient Intelligence and Humanized Computing  
<https://doi.org/10.1007/s12652-022-03713-3>

ORIGINAL RESEARCH



## Breast cancer detection in mammogram: combining modified CNN and texture feature based approach

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Received: 19 April 2021 / Accepted: 10 January 2022

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### Abstract

Customized deep neural networks are being used to assess medical imaging and pathology data. The proper assessment of malignancy using digital mammography images is a challenging task. This study implements a system for autonomously diagnosing cancer using an integration method, which includes CNN and image texture attribute extraction. The nine-layer customized convolutional neural network is used to categorize data in the CNN stage. To improve the effectiveness of categorization in the extraction-based phase, texture features are defined and their dimension is reduced using Uniform Manifold Approximation and Projection (UMAP). The findings of each phase were combined by an ensemble algorithm to arrive at the ultimate conclusion. The final categorization is presumed to be malignant if any of the stage's output is malignant. On the MIAS repository, our ensemble method's testing specificity and accuracy are 97.8% and 98%, respectively, while on the DDSM repository, they are 98.3% and 97.9%. The combination method improves measurement metrics across each phase independently, as per the experimental findings.

**Keywords** CNN · Texture feature · Local binary patterns · Integration method · UMAP

### 1 Introduction



Mammographic screening technologies are currently an essential technique for the early detection of breast cancer. Despite this, a radiologist cannot properly categorize mam-

radiologists in improving diagnosis by lowering the number of missed tumors and biopsy specimens (false positives). Several feature extraction methods and classification algorithms have previously been used to detect and classify key points in medical images in general, and breast tumors in



2(2022-23)

## Flame dynamics of premixed CH<sub>4</sub>/H<sub>2</sub>/air flames in a microchannel with a wall temperature gradient

Satender Singh, Jithin Edacheri Veetil, Neeraj Kumbhakarna, Ratna Kishore Velamati  & Sudarshan Kumar 

Pages 989-1013 | Received 06 Oct 2021, Accepted 19 Jun 2022, Published online: 13 Jul 2022

Cite this article  <https://doi.org/10.1080/13647830.2022.2095927>



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### Abstract

The effect of hydrogen (H<sub>2</sub>) addition on the flame dynamics of premixed methane/air mixtures in a microchannel was investigated through two-dimensional numerical computations using a detailed chemistry model. Detailed numerical simulations were

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3(2022-23)





International Journal of Hydrogen Energy



Volume 47, Issue 71, 19 August 2022, Pages 30660-30670



## Effect of hydrogen addition on the dynamics of premixed C<sub>1</sub>–C<sub>4</sub> alkane-air flames in a microchannel with a wall temperature gradient

Jithin Edacheri Veetil<sup>a</sup>  , Neeraj Kumbhakarna<sup>b</sup>, Satender Singh<sup>c</sup>, Ratna Kishore Velamati<sup>d</sup>, Sudarshan Kumar<sup>e</sup>

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<https://doi.org/10.1016/j.ijhydene.2022.07.030>

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### Abstract

The effect of hydrogen (H<sub>2</sub>) addition on the flame dynamics of premixed C<sub>1</sub>–C<sub>4</sub> alkane/air mixtures in a microchannel is investigated using a detailed-chemistry model through two-dimensional numerical computations. A detailed computational study have been performed in a 2 mm diameter tube with 120mm length and a wall temperature gradient



**4(2022-23)**

## A Review on Power Generation Enhancements in a Pumped Storage Powerhouse by Using Appropriate Guide Vane Sealing Material

*V. Sampathkumar, P. Sridharan, Parthiban K.P*

### Abstract

One of the essential needs of the growth of a country is generating and utilizing electricity. India has made a powerful contribution to electricity generation. India is a naturally wealthy country with mountains and water resources. There are strategies to shape new hydroelectric power plants in the upcoming years. It is particularly important to establish Pumped Storage Hydroelectric Power Plants. This research describes that the water leakage occurring in guide vane end sealing rubber material due to damage, does not enter the turbine runner resulting in the reduction of water flow through the turbine runner, so the required amount of electricity is not generated in a Pumped Storage Powerhouse. This water leakage problem also affects the pumping mode operations, which reduces plant efficiency. Hence Pumped Storage Powerhouse generates less targeted electricity generation, and more power is also required for pumping mode operations. This research is carried out with the use of four new guide vane end sealing rubber materials such as Hydrogenated Nitrile Butadiene Rubber, Ethylene Propylene Diene Monomer, Polyurethane and Filled Polytetrafluoroethylene to assess their life and to find out the best one which improves the power generation and reduces power consumption in pumping mode operation





5(2022-23)

Hindawi  
International Journal of Digital Multimedia Broadcasting  
Volume 2022, Article ID 4802872, 5 pages  
<https://doi.org/10.1155/2022/4802872>



## Research Article

# Effectiveness of Feature Extraction by PCA-Based Detection and Naive Bayes Classifier for Glaucoma Images

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Received 8 April 2022; Revised 21 September 2022; Accepted 8 October 2022; Published 15 October 2022

Academic Editor: Sayyouri Mhamed

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After cataract, glaucoma is one of the second leading retinal diseases in the world. This paper presents the methodology to detect the glaucoma using principal component analysis. The images are involved in dilation as a preprocessing, enhancement using the contrast limited adaptive histogram equalization method, and followed by the extraction of features using principal component analysis. The extracted features are classified using support vector machine, Naive Bayes, and K-nearest neighbor classifiers. Comparing with other classifiers, the Naive Bayes provides high accuracy of 95% which demonstrates the effectiveness of the feature extraction and the classifier.

## 1. Introduction

Glaucoma is the second-leading cause of blindness in the U.S. The prevalence of glaucoma in the world is 60.5 million in 2015, and by 2030, it is expected to increase up to 10 percentages of world population [1]. The high prevalence of undetected glaucoma in the society contributes to the high rate of blindness among the Indian people [2]. A physical eye examination technique can occasionally result in incorrect diagnosis. Automated and accurate diagnosis of retinal disease helps to prevent the loss of vision. A thorough eye examination for the detection of glaucoma involves tonometry, ophthalmoscopy, perimetry, gonioscopy, and pachymetry. Utilizing the right automated decision tools while imaging the retina improves the early detection of glaucoma and prevents visual loss. The brightest section within retinal fundus image is where the optic nerve exits the retina and to the brain, which is called the optic disc. To prevent vision loss, the optic disc region must be examined for the existence of glaucoma at an early stage. The nerve that transmits data

from the eye to the brain is called the optic nerve. When the optic nerve gets damaged, glaucoma occurs. Early on, there are no symptoms, but if a proper diagnosis is not made, vision loss sets in. The greater than usual pressure in the eye, which occasionally accompanies glaucoma, is referred to as ocular hypertension.



Initial enhancements are made to the input retinal images to improve their quality. The feature extraction technique has an impact on analyses on the detection and classification of glaucoma utilizing retinal images. Glaucoma progression is identified using morphological and nonmorphological elements. Glaucoma detection using CDR feature was performed by Xu et al. [3], Muramatsu et al. [4], Joshi et al. [5], and Yin et al. [6]. On the other hand, the categorization of the retina structures is not a characteristic of the nonmorphological features. The published investigations have demonstrated that morphological parameters like colour, pixel intensity, histogram, and texture are not used to detect glaucoma. A system based on hybrid feature extraction from fundus images using higher order spectra, trace








6(2022-23)

# Compression behaviour Mg-Zn-xSr-HA hybrid nanocomposites through powder metallurgy method

[George Recklin](#)<sup>a</sup>, [P.V. Pranav](#)<sup>a</sup>, [S. Christopher Ezhil Singh](#)<sup>a</sup>  , [Rajkumar S. Rai](#)<sup>b</sup>,  
[T. Mary Little Flower](#)<sup>c</sup>, [P. Sridharan](#)<sup>a</sup>

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## Abstract

In the present work, biocompatible materials such as zinc (Zn), Strontium (Sr) and Hydroxyapatite (HA) have been mixed with magnesium (Mg) to fabricate a biomaterial with enhance strength by powder metallurgy technique. The



7(2022-23)

# Tribological and mechanical properties Mg-Zn-xSr-HA hybrid nanocomposites prepared by powder metallurgy technique

Rosh George<sup>a</sup>, Cris Benny<sup>a</sup>, Thomaskutty Mathew<sup>a</sup>, M. Shyamlal<sup>a</sup>,  
S. Christopher Ezhil Singh<sup>a</sup>, T. Mary Little Flower<sup>b</sup>, R. Malkiya Rasalin Prince<sup>c</sup>

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## Abstract

In this work, biocompatible minerals such as zinc (Zn), strontium (Sr), and hydroxyapatite (HA) were combined with magnesium (Mg) to create a biomaterial





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Criterion: 3.3.1

8(2022-23)



## Journal of Applied Research and Technology

www.jart.icat.unam.mx



Journal of Applied Research and Technology 20 (2022) 703-717

Original

### Wind energy conversion system-based PMSG for maximum power tracking and grid synchronization using adaptive fuzzy logic control

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Received 10 14 2020; accepted 11 09 2021  
Available 12 31 2022

**Abstract:** This paper proposes an adaptive fuzzy logic-based Maximum Power Point Tracking (MPPT) for a Permanent Magnet Synchronous Generator (PMSG)-based variable speed Wind Energy Conversion System (WECS). The control algorithm, online updates the scaling factors of the Fuzzy Logic Controllers (FLCs) at a high convergence speed. The adaptive FLC is in-cooperated along with field-oriented control of PMSG to track the maximum power. The WECS is connected to the grid through a back-to-back converter. The grid side inverter is controlled by voltage-oriented control along with FLC, so that power quality standards of the grid are maintained. The performance of the system is verified using MATLAB Simulink and it is validated that power coefficient of WECS abide at its optimum value with dynamic conditions in wind speed. The WECS provides full reactive power support for the system with a unity power factor operation at the grid. The active power sharing of WECS to the grid/load changes with the availability of wind power.

**Keywords:** Wind energy conversion system (WECS), permanent magnet synchronous generator (PMSG), maximum power point tracking (MPPT), fuzzy logic control (FLC)

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Peer Review under the responsibility of Universidad Nacional Autónoma de México.





9(2022-23)

## Weapon Detection Using ML for PPA

[Nabeel Hashim](#), [D. Anto Sahaya Dhas](#) & [M. Jayesh George](#)

Conference paper | [First Online: 15 March 2022](#)

**313** Accesses

Part of the [Advances in Intelligent Systems and Computing](#) book series (AISC, volume 1415)

### Abstract

Security is always a top issue in every domain. Computer vision is used extensively in abnormal detection and monitoring to solve a variety of problems in physical protection applications (PPA). Old technology like pixel-based video analytics has a loophole in identifying the object, and the object identified with old technologies is less accurate. Weapon identification using cutting-edge technology like machine learning (ML), artificial intelligence, and deep learning can be used to identify weapons in the security area, as the world is constantly threatened by conflict or terror attacks. Using a convolution neural network (CNN), this paper shows an implementation of an automatic gun (or) weapon detection using (CNN). It focuses on detecting, classifying, and locating guns with pinpoint accuracy. This research proposes a groundbreaking real-time automatic weapon identification system for both surveillance purposes. Weapon detection in images/videos is accomplished by determining whether the





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NAAC Cycle 2

Criterion: 3.3.1

10(2022-23)

INTERNATIONAL JOURNAL OF HYDROGEN ENERGY XXX (XXXX) XXX



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## Effect of hydrogen addition on the dynamics of premixed C<sub>1</sub>–C<sub>4</sub> alkane-air flames in a microchannel with a wall temperature gradient

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**11(2022-23)**

ECS Transactions, 107 (1) 10423-10424 (2022)  
10.1149/10701.10423ecst ©The Electrochemical Society

## **Sustainable Green Connected Systems Through Integrated Organic Waste Management Eco-model for the Green Clean Campus**

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### **Abstract**

The sustainable green connected systems are considered as the engine room for fostering the Green-Clean Campuses. Biomass management with organic cycles is a crucial factor in tropical sustainable campuses as it tends to produce a huge amount of biomass with multiple organic cycles. This proposed biorefinery model at Chemperi, Kerala which is in a tropical region can connect Agri farming, pisciculture, piggery farming, and livestock farming for waste management with a centralized aerobic-anaerobic sewage recycling system. The model has proven benefits of cost optimization, reduced fuel conception, enhancing biodiversity with a sustainable ecosystem, and fostering sustainability. The output of these multiple farming provides fresh raw materials for the kitchen with economic and health benefits. This model established at Vimal Jyothi Campus was found to reduce biomass waste production, biorefinery waste management with energy-saving, inculcating sustainability practices in campus and establishment of Green Clean Campus. The model can be integrated with intelligent monitoring systems and automation.

**Keywords:** Integrated Organic Waste Management Eco-model, Green Clean Campus, Sustainable Green Connected Systems, 7Rs, Integrated LCA, CBE





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NAAC Cycle 2

Criterion: 3.3.1

12(2022-23)

www.ijcrt.org

© 2022 IJCRT | Volume 10, Issue 10 October 2022 | ISSN: 2320-2882

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ISSN : 2320-2882



## INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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# PRODUCTIVITY ASSESSMENT MODEL USING FUZZY LOGIC APPROACH

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**Abstract:** Productivity, more often defined as a ratio between an output value and an input value used to produce the output. Cement is one of the key essential materials in the construction industry. For the Indian cement industry, many challenges lie ahead. Increase in productivity is imperative in order to raise the standards of living and also to make the Indian exports globally competitive. Enhancement in productivity cannot be achieved without identifying and analyzing factors that adversely affect productivity. Measuring and quantifying the impact of factors influencing productivity of cement industries is a complex problem. Productivity barriers in cement industries are hampering its growth. Productivity problems can be minimized or avoided when their causes are clearly identified. Hence, exploring productivity determinants and their relationship with productivity of cement industries are important. A set of 49 productivity factors were extracted based on the related literature. The frequency of questionnaire data was obtained from SPSS software & then RII is calculated. Then Structural Equation Modeling is used to show the relationship between the most and least contributing factors. Finally productivity assessment models were then developed using fuzzy logic toolbox. So the study concludes that the power of fuzzy logic techniques can be very useful in the productivity problem environment and has future application.

**KEYWORDS:** Productivity, Productivity determinants, Cement industry, Influencing factor, Modeling

### 1. INTRODUCTION

Cement is one of the key essential materials in the construction industry. It is classified into various categories based on its composition and specific end uses. Cement is classified as either Portland, blended, or specialty cement. Portland cements are mostly used around the whole world. The key constituents used to manufacture cement include limestone, shells, and chalk or marl combined with shale, clay, slate, blast furnace slag, silica sand, and iron ore. To manufacture cement, limestone, sand, and other additives are combined in rotating kilns at temperatures of up to 1450°C. This process yields a granular intermediate known as clinker, which is then ground in mills to produce cement powder. The final cement mix will include around 5% gypsum and may also include other non clinker mineral by product like limestone, slag, and ash from coal fired power plants. The cement industry presents one of the most energy-intensive sectors within the Indian economy and is therefore of exacting interest in the context of both local and global environmental discussions. Increases in productivity through the adoption of more efficient and cleaner technologies in the manufacturing sector will be effective in merging economic, environmental, and social development objectives. A historical examination of productivity growth in India's industries embedded into a broader analysis of structural composition and policy changes will help identify potential future development strategies that lead towards a more sustainable development path. Production in the cement sector has been increasing over the last years. Despite its fluctuating pattern it shows a relatively stable trend over time. There are many reasons for this expected increase in coming years in cement production. Among them one is economic growth in developing countries. This inevitably leads to increased demand for building materials, including cement. Though many of the largest and fastest growing cement industries are now in the developing world, still for many developing countries, self reliance in cement production is a major industrial target as it reduces the dependence on imports and reduces the cost of construction. It also enables further development of the economy through improved infrastructure. These studies identifies the factors affecting productivity of Indian cement production industries and determine the weightage of each productivity factors using Relative Importance Index (RII) technique. It also aims to figure out the relationship between most contributing factor and least contributing factor that affect the productivity and thereby develop the productivity assessment model using Fuzzy Logic approach as well as a model combination of factors that improve the productivity.





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NAAC Cycle 2

Criterion: 3.3.1

13(2022-23)

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ISSN : 2320-2882



## INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

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# ANALYSIS OF CONCRETE FILLED DOUBLE SKIN COLUMN WITH FRP WRAPPING

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**Abstract:** In this study modelling and analysis of Concrete filled double skin steel tube column is presented. CFDST consists of two steel layers embedding a concrete layer in between. CFDST have many advantages such as high strength, high bending stiffness, good seismic and fire performance. But the columns were proven to have certain shortcomings such as ageing of structures, corrosion of steel tubes. Therefore, the implementation of strengthening techniques with the new material is essential to eliminate this problem. In order to strengthen the CFDST column FRP wrapping is introduced in this study. The study and comparison of confinement effect under eccentric loading on varying different parameters of FRP was carried out. CFDST columns wrapped with FRP are modelled and analyzed using Finite element software ANSYS Workbench 16.1. From the analysis results it is found that the load capacity can be increased with the introduction of FRP confinement.

**Keywords:** CFDST, FRP, ANSYS

## 1. INTRODUCTION

CFDST column is a composite member, which consists of inner and outer steel skins with the annulus between the skins filled with concrete. From structural point of view, this form of column has higher strength (uni-axial, flexural and torsion). By replacing the central concrete with a steel tube of much smaller cross section area, the strength-to-weight ratio of the columns is improved significantly. Furthermore, the inner tube expands laterally during compression and hence increases the confining pressure provided to the concrete. Thus, the initial confining pressure builds up more rapidly than that in CFST columns that enhances the elastic strength and stiffness. From environmental point of view, CFDST column uses less concrete, which creates a more sustainable environment by reducing the embodied energy levels of the column. From cost effectiveness point of view, the tubes act as both the longitudinal reinforcement and formwork that save the construction cost and cycle. There are different possibilities to build CFDST columns combining tubes with different shapes (circular, square, rectangular). However, in general, those formed by circular columns have proved to be the most efficient in bearing the same ultimate load that column with the same steel cross-section area of other types. The cavity inside the inner tube provides a dry atmosphere for possible catering of facilities or utilities like power cables, telecommunication lines and drainage pipes. This form of construction is particularly useful for maritime structures, in which the subsea facilities can be accommodated in the dry atmosphere. In recent years, many steel and CFDST structures have been found to be suffering from a variety of deteriorations, including cracking, yielding and large deformation. These deteriorations are caused by a variety of factors, including fire, ageing, environmental degradation and corrosion. There are several strengthening or rehabilitation techniques that can be applied to enhance performance, including section enlargement, external bonding using steel plates and fibers, among others. Fiber Reinforced Polymer (FRP) composites can be used for rehabilitation. One of the main forces driving the development of external strengthening methods that uses the FRP composite is that they enable deteriorated members to be upgraded without significantly altering the appearance of the member. In addition, FRP composites are light weight, durable, and resistant to corrosion, and have high tensile strength, stiffness





14(2022-23)



# NUMERICAL INVESTIGATION AND COMPARISON STUDY OF COLD FORMED STEEL CASTELLATED I-SECTION

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**Abstract:** In this study modeling and analysis of Cold Formed Steel Castellated I-Section is presented. A castellated steel beam is per definition a wide flange (WF) or I shaped steel profile with openings, to reduce self-weight and improve the effectiveness in terms of material use. Recently, extensive study on these castellated steel beams has been conducted, involving different shapes in web openings. The main goal of these research works was to evaluate and analyze its optimum opening sizes and shapes configuration. More in-depth research work to the behavior and the influence of holes to WF beams need to be conducted. In this paper, cold formed 5 number of I-beam with constant dimension and varying load studies conducted. Additional castellated beam with circular and hexagonal shaped web opening is chosen as alternate. The study involves a modification in the variation of circular and hexagonal web openings both in the horizontally direction with single and 5 number of holes. A numerical study based on the finite element method conducted with the Abaqus /CAE 6.12 software is used to analyze the elastic and buckling behavior of the beam. The obtained results are compared from the finite element analysis to optimize the section element.

**KEYWORDS:** Cold-formed steel, castellated i- beam, circular, hexagonal, Abaqus

## INTRODUCTION

Cold-formed steel (CFS) section is the term used for products which are made by rolling or pressing thin gauges of steel sheets into goods. CFS goods are created by the working of thin steel sheets using stamping, rolling or presses to deform the steel sheets into a proper product at significantly cooler temperatures, often at even room temperature. The advantages of using cold-formed steel over hot rolled sections include high strength to weight ratio, precision in dimensions obtained (close tolerances), easier to produce any desired shape, use of all conventional jointing methods, easier to transport and erect. A castellated steel beam is an I-shaped beam section with a variety in shape opening in the web. The opening can be hexagonal, rectangular, circular, diamond or oval in shape. The origin of the name “castellated” is derived from the pattern of holes in the web, because castellated means “built like a castle or regular holes in the walls, like a castle”. The castellated steel beam is made by expanding a standard rolled shape in a manner which creates a regular pattern of holes in the web. At first, the chosen pattern is made along the web on a path that will be cut. The cut half beams are separated and then welded together based on the chosen opening shape. The use of castellated steel beams nowadays has been rapidly catching attention due to its advantages. A castellated steel-beam in a structure gives the advantage of its lighter weight. Castellated steel beams can also utilize the placement of installations. Basically, steel sections that satisfy strength requirement have difficulty in satisfying serviceability requirements. Castellated steel beams can be the way to overcome that problem by providing a greater depth, and thus a greater moment of inertia. Furthermore, the modification of web openings affects the failure modes and stability of castellated steel beams itself. Numerous researchers have been dedicating their work to studying the effect of modification of web shaped opening. In this paper, a deepen research on the behavior of castellated steel beams with circular and hexagonal shaped opening was conducted.

The aim of this study is to compared to the hot rolled sections, the use of cold rolled sections is very limited in the construction industry owing to the fact that not much research has been done in predicting the performance of cold form steel sections used as a beam at higher loads.



15(2022-23)

Hindawi  
Wireless Communications and Mobile Computing  
Volume 2022, Article ID 6229356, 10 pages  
<https://doi.org/10.1155/2022/6229356>



## Research Article

# 5G-Telecommunication Allocation Network Using IoT Enabled Improved Machine Learning Technique

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Received 6 March 2022; Revised 15 April 2022; Accepted 24 April 2022; Published 10 June 2022

Academic Editor: Mohammad Farukh Hashmi

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Recent improvements in communication technology have undergone a significant shift over the last two decades, with state-of-the-art communication equipment, standards, and protocols simplifying the lives of consumers everywhere. For more than a decade, advancements in communication technology have mostly focused on increasing the speed with which information can be delivered and retrieved from anywhere in the globe at any time of day or night, regardless of location. Four-generation (4G) communication technologies, which have already been developed and implemented, are used to offer users with seamless access to multimedia content at transmission rates of 100 megabits per second (Mbps). It is becoming more vital to create new technologies in order to meet the growing need for faster speed as well as a variety of other advanced features. 5G networks have just recently been built as a result of extensive research and development. This has resulted in the gradual replacement of existing 4G services with new 5G networks, which are capable of transmitting multimedia content such as audio-video and high definition images, among other things, at data transmission rates in the gigabyte range or higher (up to several gigabits per second). Further recent development, in addition to the Internet of Things (IoT), which was made possible by future communication technology, is the Internet of Things-based social network. Aspects of this include the ability to connect and expanding Internet connectivity to all physical devices that consumers use to access common commercial and industrial services available on the Internet. In spite of this, with the advancement of existing high-speed communication networks, the effective interaction of devices with their inputs and responses via the Internet may be made possible through 5G Internet of Things networks. This new generation of automation and communication systems has emerged as innovative platforms for the next generation of automation and communication systems to be developed further in the future. M2M data may be utilised to more efficiently distribute resources if machine learning (ML) and optimum cell clustering are applied to the situation. It is because of this heterogeneity that the ML is able to make the best use of the remaining resources of the M2M network in order to optimise efficiency. Over the last several years, the shortage of radio frequency spectrum has proven to be the most challenging hindrance to wireless communication. This has occurred from the large number of high-frequency devices that need significant amounts of bandwidth allowance. Cognitive radio networks have been designed to meet this higher demand as a result of this increased demand.

