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Comparative Economic Analysis and Investigation of Micro Lubrication Over Conventional Cooling in Manufacturing

Dipali K Bhise¹, Bhushan T Patil², Vasim A Shaikh³, and Sujata P. Deshmukh⁴

¹Research Scholar, Department of Mechanical Engineering, Fr. CRCE, Bandra (W), Mumbai 400 050, India, E-mail: dkbhise@gmail.com (corresponding author).

²Professor & Head, Department of Mechanical Engineering, Fr. CRCE, Bandra (W), Mumbai 400 050, India, E-mail: bhushan.patil@fragnel.edu.in

³Assistant Professor, Department of Mechanical Engineering, Fr. CRCE, Bandra (W), Mumbai 400050, India E-mail: vasim.shaikh@fragnel.edu.in

⁴Associate Professor, Department of Computer Engineering, Fr. CRCE, Bandra (W), Mumbai 400050, India, E-mail: sujata.deshmukh@fragnel.edu.in

Selected paper from 2022 International Conference on Embracing Industry 4.0 Technologies for Sustainable Growth
Engineering Management

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Abstract: Cutting fluid is a major concern in conventional cooling methods because of its high cost, effects on operator health, and environmental consequences. Microlubrication (MQL) is a better cooling method than traditional cooling. MQL can be used for machines with a high metal removal rate, such as those used in metal turning, milling, drilling, and boring. MQL has a lower lubrication consumption, a higher cooling rate, and a cleaner production than do conventional flooded lubrication. This study performed a cost-benefit analysis to compare MQL with conventional flood cooling methods. For both traditional flood cooling at 35 L/min and MQL cooling at 50 mL/h, face and slot milling techniques with constant machining settings were used. The quantity of components that must be produced to recoup the fixed and variable costs of MQL and conventional cooling were calculated by performing a breakeven point (BEP) analysis. The MQL methodology used 20% fewer components to recoup all expenses compared with conventional cooling. The findings indicated that MQL is more economical than traditional cooling. Moreover, the BEP for both cooling systems exhibited variances, and the BEP can be reached sooner for MQL than flood cooling lubricant.

Keywords: Microlubrication, cost analysis, bio-degradability, breakeven point.

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1. Introduction

Metal cutting techniques have been used for a long time. Coolant; machining operating conditions; and tool shape, material, and wear all play crucial roles in metal cutting operations. Heat is generated in the metal cutting zone during machining. This heat considerably affects tool life, reducing tool hardness, causing structural changes in the tool, and increasing tool wear. Thus, metalworking fluid is utilized to regulate temperature and provide lubrication. The use of cutting fluids can reduce power usage. Metalworking fluid is also used to remove chips and protect machine equipment and workpieces from corrosion. Thus, metalworking fluid can enhance productivity because it optimizes machining and tool performance (Byers, 2006).

Metalworking fluid has diverse applications. The most common method is flooding. Continuous flow is used at the tool and workpiece in this procedure. A recirculating system, filters, nozzles, pipes, and an oil recovery mechanism are required for flood cooling. Because cutting fluids are reused for a month and even for years occasionally, filtration and a recirculating system are required. Cutting fluid contacts with metal chips and debris. Impurities, chips, and dirt should be removed from the cutting fluid through filtration to enhance its performance (Byers, 2006, Irani et al. 2005). However, direct contact with cutting fluids can affect machine operators' health (Byers, 2006). Operators can develop eye, skin, and respiratory illnesses and experience discomfort in the nose and throat. In addition, throughout the machining process, the clean-cutting fluid becomes polluted. However, the disposal of this fluid can adversely affect the environment. Moreover, disposal can lead to substantial costs. Thus, reducing environmental contamination in the industrial sector is critical.

Investigations of Surface Roughness and Temperatures in Vegetable Oil-based n-MQL Turning of AISI 4340 Steel

VeeraBhadraRao Miriyala¹, Bhushan T. Patil², Vasim A. Shaikh³, D.S.S. Sudhakar⁴, and Sujata Deshmukh⁵

¹Research Scholar, Department of Mechanical Engineering, Fr. CRCE, Bandra (W), Mumbai 400 050, India
E-mail: miriyala.v@fragnel.edu.in (corresponding author).

²Professor and Head, Department of Mechanical Engineering, Dean (R&D), Fr. CRCE, Bandra (W), India
E-mail: bhushan.patil@fragnel.edu.in

³Assistant Professor, Department of Mechanical Engineering, Fr. CRCE, Bandra (W), Mumbai 400050, India
E-mail: vasim.shaikh@fragnel.edu.in

⁴Professor and Head (IRG), Department of Mechanical Engineering, Fr. CRCE, Bandra (W), Mumbai 400050, India
E-mail: sudhakar@fragnel.edu.in

⁵Associate Professor, Department of Computer Engineering, Fr. CRCE, Bandra (W), Mumbai 400050, India
E-mail: sujata.deshmukh@fragnel.edu.in

Selected paper from 2022 International Conference on Embracing Industry 4.0 Technologies for Sustainable Growth
Engineering Management

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Abstract: Machining of hard materials has been difficult and expensive because of poor surface smoothness, early tool failures, etc. When used in machining hard materials, such as medium and high carbon, cast steels, Inconel, and other alloys, nanomaterials combined with base fluids, such as water and oils, provide superior results in terms of surface finish and low cutting temperatures. To enhance our understanding of the field of machining and its applications, a comprehensive literature assessment on machining steels using nanofluids with/without the minimum quantity lubrication (MQL) approach was conducted. This research aims to investigate the performance of nanofluids (n-Al₂O₃, n-MoS₂, and n-graphene) mixed with coconut oil in various proportions and injected into the tool–work interface using the MQL mist system. Output responses, such as surface roughness values, and cutting temperatures, were measured. The cutting temperatures were determined using an infrared camera and a k-type thermocouple, and the surface roughness was determined using a Talysurf surface meter. Cutting parameters, such as cutting speed, feed rate, and depth of cut, were maintained constant throughout the experiments. The experiments comprised a single factor (MQL fluid) with eight levels. Multiresponse optimization using grey relational coefficients showed that n-Al₂O₃ and n-MoS₂ hybrid combinations with coconut oil yielded better results, i.e., higher ranks, compared with n-graphene mixtures in coconut oils. The experimental findings demonstrated that nanofluids outperformed pure coconut oil. Nano-Al₂O₃ combined with coconut oil produced a superior surface finish, lowered the cutting temperatures, and ensured minimum chip thickness.

Keywords: Turning, nanomaterial, MQL, hybridization

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1. Introduction

Machining of hard steel materials (hardness between 45 and 68 HRC) at high speeds, feed rate, or depth of cut results in severe tool wear owing to high heat generation at the tool–chip interface, surface integrity issues of the workpiece, etc. (Awale and Inamdar, 2015), (Das et al., 2017). One such hard material widely used in the industrial front is the AISI 4340 steel, which is a type of Ni-Cr-Mo steel material (also known as medium carbon steel) and is known for its good toughness and strength (yield and tensile). This steel is used chiefly in general engineering industries, automobile parts, machine building, etc. The material exhibits good mechanical properties when heat treated and possesses excellent wear resistance properties. Therefore, such steels are in demand even today. The process of machining (tool wear, surface deterioration, etc.) with such steel workpieces, specifically termed as hard turning, has been attempted and researched using different techniques, viz. use of advanced cutting tools, such as CVD and PVD coated tool inserts (Sushil et al., 2017); application of forced cooling systems with different temperature gradients, such as cryogenics (Roy et al., 2018), (Bag et al., 2020) and/or in ambient conditions; and use of nanomaterials in machining, to achieve better surface qualities



Examining the barriers to operationalization of humanitarian supply chains: lessons learned from COVID-19 crisis

Vishwas Dohale^{1,2} · Priya Ambilkar¹ · Angappa Gunasekaran³ ·
Vijay Bilolikar⁴

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Abstract

Humanitarian supply chains (HSC) have vital significance in mitigating different disruptive supply chain risks caused due to natural or man-made activities such as tsunami, earthquakes, flooding, warfare, or the recent COVID-19 pandemic. Each kind of disaster poses a unique set of challenges to the operationalization of HSC. This study attempts to determine the critical barriers to the operationalization of HSC in India during the COVID-19 pandemic. Initially, we determined and validated 10 critical barriers to HSC operationalization through a Delphi method. Further, we analyzed the barriers by computing the driving and dependence power of each barrier to determine the most critical ones. To do so, we coined a distinct form of interpretive structural modeling (ISM) by amalgamating it with the neutrosophic approach, i.e. Neutrosophic ISM. The findings indicate, “lack of Government subsidies and support, lack of skilled and experienced rescuers, and lack of technology usage” are the most critical barriers that influence the streamline operations of HSC during the COVID-19 outbreak, unlike other disruptions. This is the first-of-its-kind research work that has identified and analyzed the critical barriers to HSC operationalization during COVID-19 in

Vishwas Dohale and Priya Ambilkar the first authors and have equally contributed to this work.

✉ Angappa Gunasekaran
aqq6076@psu.edu

Vishwas Dohale
Vishwas.Dohale.2017@nitie.ac.in

Priya Ambilkar
Priya.Ambilkar.2017@nitie.ac.in

Vijay Bilolikar
vijaybilolikar@gmail.com

¹ Operations and Supply Chain Management (O&SCM), National Institute of Industrial Engineering, Mumbai, India

² Decision Science and Information Systems (DSIS), Indian Institute of Management (IIM), Nagpur, Maharashtra, India

³ Penn State Harrisburg, Middletown, PA, USA

⁴ Fr. Conceicao Rodrigues College of Engineering, Bandra (W), Mumbai, India



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INDUSTRIAL ENGINEERING JOURNAL

A NOVEL METHOD FOR IOT BASED SMART TRAFFIC SYSTEM

Dr. Sujata Deshmukh

Dr. Bhushan Patil

Dr. Ketaki Joshi

Chinmay Gaonkar

Ms. Prerna Pallan

Sumedh Bhatkar

Abstract

According to India's 2019 Urbanization Report, one-third of the country's population lives in cities. This has increased the demand for cities to provide unique services that leverage technological breakthroughs to alleviate and control traffic congestion. The primary objectives of smart traffic systems are to eliminate time delays and waiting times for vehicles to pass due to the hard-coded nature of the current traffic system. According to digital India, smart cities cannot be intelligent without traffic management systems; hence, monitoring, managing, simulating, optimising, and operating traffic in urban areas is necessary to accommodate density-based traffic rather than time-based traffic. The paper proposes a novel algorithm for intelligent traffic systems based on values from an Internet of Things (IoT)-IR sensor. This proposed program gathers data from multiple infrared sensors and automatically sets the timing mechanism for traffic systems based on the length of traffic. For this system, several sensors and considerations in sensor selection are examined from a managerial approach. The user may select and install two or three infrared sensors in this system, depending on the amount of traffic in the lane. The density of traffic on the roadways will be determined using infrared sensors mounted on each lane. These sensors will provide data to the Arduino, which will analyse it using a unique algorithm. Rather than the static approach used by the existing system, it dynamically adjusts the timing for each direction based on traffic density. The background programme analyses traffic on previously scheduled routes and plans the next cycle time in real time to minimise vehicle wait times during each cycle of the time mechanism.

Keywords: *IoT, Smart Traffic Management, Smart City, Traffic Congestion, Arduino, IR Sensors*

1. INTRODUCTION

In urban areas, as the population grows, so does the number of automobiles on the road. Even Nevertheless, in many major cities, traffic is still managed manually by a centrally controlled traffic system, as a human must be there to ensure that cars pass without causing too much commotion and that they follow correct order and traffic rules. The key issues in India, according to the report "Smart Transportation - Transforming Indian Cities," are insufficient and inefficient public transportation infrastructure, transportation emissions and air quality, and improperly integrated Intelligent Transportation Systems (ITS). It has also been observed that during peak hours, drivers on popular roads are forced to wait for long periods of time when delayed at a signal, as cars continue to line up on the road. According to a Hindustan Times report, traffic congestion in Mumbai causes drivers to spend 53 percent extra time on the road [1]. For these conditions, a proper traffic management system is required, which will ensure that traffic is correctly handled without the need for human intervention. The transportation system is one of several interconnected subsystems that make up a city. It is the foundation of the global economy [2]. It is also a vital component of the smart city [3]. As the world population grows, so does the number of automobiles on the road, increasing the frequency of traffic jams [4] [5]. In certain cases, cell phone snatching at traffic signals has been observed in metropolitan areas [6]. It also has a detrimental effect on the ecosystem [7] and on industrial efficiency [8]. The paper offers a unique method for intelligent traffic systems based on IoT-IR sensor readings. This suggested programme collects data from various infrared sensors and automatically sets

traffic system timing based on traffic length. The proposed approach to smart traffic management can be helpful in eliminating manual participation and improving traffic efficiency.

2. LITERATURE REVIEW

Many researchers have sought to overcome the difficulties associated with vehicle detection and tracking. S. Indu et al. [9] and H. H. Kenchannavar et al. [10] presented systems that use motion detection techniques to identify automobiles as moving blobs and follow them for several consecutive frames. The optical flow algorithm, framework differencing, and background subtraction are employed to detect vehicles during the day. While these systems are highly accurate at detecting and tracking automobiles during the day, they fail at night due to inadequate illumination. Rajiv Kumar Nath et al. [11] used template matching to detect night vehicles. However, the method is not very useful because it requires building a large library of templates and estimating correlation is a difficult task. Pazoki A. R et al. [12], and Wei Zhang et al. [13] presented algorithms for night vehicle detection based on headlight pairing and tracking.

The city of Pittsburgh, Pennsylvania, Artificial Intelligence (AI) based new smart traffic management system called Surtrac. In 2016, employing radar sensors and cameras integrated into Pittsburgh's traffic lights, this system cut travel time by 25% and congestion by 40% at 50 junctions [1]. In addition, AI uses the big data collected by these sensors to identify the most problematic traffic conditions and optimize circulation in real-time urban ways [1].

BERT based Hierarchical Alternating Co-Attention Visual Question Answering using Bottom-Up Features

Dipali Koshti¹, Dr. Ashutosh Gupta², Dr. Mukesh Kalla³

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Abstract: Answering a question from a given visual image is a very well-known vision language task where the machine is given a pair of an image and a related question and the task is to generate the natural language answer. Humans can easily relate image content with a given question and reason about how to generate an answer. But automation of this task is challenging as it involves many computer vision and NLP tasks. Most of the literature focus on a novel attention mechanism for joining image and question features ignoring the importance of improving the question feature extraction module. Transformers have changed the way spatial and temporal data is processed. This paper exploits the power of Bidirectional Encoder Representation from Transformer (BERT) as a powerful question feature extractor for the VQA model. A novel method of extracting question features by combining output features from four consecutive encoders of BERT has been proposed. This is from the fact that each encoder layer of the transformer attends to features from the word to a phrase and ultimately to a sentence-level representation. A novel BERT-based hierarchical alternating co-attention VQA using the Bottom-up features model has been proposed. Our model is evaluated on the publicly available benchmark dataset VQA v2.0 and experimental results prove that the model improves upon two baseline models by 9.37% and 0.74% respectively.

Keywords: VQA, Visual-Question Answering, BERT-based VQA, Hierarchical VQA, Image Question answering.

1. Introduction

Answering an Image - question (VQA) is a much-known vision-language task in which the machine has to answer the question asked from an image [1]. Humans can easily reason over the content of an image, analyze the question, relate the question with the image content and, answer the given question; but for a machine, this entire task is challenging as the task involves two different modalities – vision and language. It involves vision analysis as image content needs to be interpreted and learned. It also involves language analysis as questions need to be analyzed and meaningful semantic features need to be extracted. Thus, VQA is a blend of NLP and Computer vision. Examples of Image question answering are shown in Fig 1.



Fig.. 1. Examples of Image-question answering

Once image features and question features are extracted, they need to be combined together in order to understand the relation between them. VQA is challenging because it involves different vision-related tasks such as object detection, scene detection, object counting, color detection, Object segmentation, and much more. With the rapid developments in deep learning models, this task has become easy. Also, for language modeling various deep learning models such as RNN and LSTM are available. Any VQA task basically involves four stages shown in Fig. 2. 1) Extraction of Image Features 2) Extraction of Question Features 3) Joint comprehension of question and image features 4) Generation of answer.

The first stage involves extracting image features using various CNN models. Most of the literature extracts the image features using pre-trained VGGNet [1-4], ResNet [5-7], googleNet [8-11] CNN models. These models

¹ Department of Computer Science and Engineering, Sir Padampat Singhania University, Rajasthan, India.

dipali.koshti@spsu.ac.in

² Department of Computer Science and Engineering, Sir Padampat Singhania University, Rajasthan, India.

ashu.gupta@spsu.ac.in

³ Department of Computer Science and Engineering, Sir Padampat Singhania University, Rajasthan, India.
mukesh.kalla@spsu.ac.in

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Review

Review on learning framework for facial expression recognition

Rohan Appasaheb Borgalli   & Sunil Surve

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ABSTRACT

The facial expressions recognition (FER) is crucial to many applications. As technology advances and our needs evolve, compound emotion recognition is becoming increasingly important, along with basic emotion recognition. In the literature, Although, FER can be conducted primarily using multiple sensors. However, research shows that using facial images/videos to recognize facial expressions is better because visual presentation can convey more efficiently. Among state-of-the-art methods for FER systems, to improve the accuracy of the basic and compound FER systems, detection of facial action units (AUs) must be combined to detect basic and compound facial expressions. State-of-the-art results show that machine learning and deep learning-based approaches are more potent than conventional FER approaches. This paper surveys various learning frameworks for facial emotion recognition systems for detecting basic and compound emotions using the diverse database and summarizing state-of-the-art results to give good understanding of impact of each learning framework used in FER systems.

Q KEYWORDS: Facial expression facial action unit action unit intensity convolution neural network machine learning deep learning

Disclosure statement

A Chat-bot as a First Responder for Panic Attack

Sangeeta Parshionikar^{1*}, Archana Lopes², Trupti Shah³

^{1,2}Fr. Conceicao Rodrigues College of Engineering, Mumbai

³Vidyaavardhini College of Engineering and Technology, Mumbai

Abstract: Mental Health continues to be a neglected aspect of modern society. The stressful and hectic lifestyles we lead today barely account for the physical and mental repercussions. Issues such as Generalized Anxiety Disorder (GAD) and panic disorder are highly common in India today, and often go undiagnosed and untreated. This is an extremely dangerous and unhealthy result of the fast-paced lifestyle young Indians lead. Panic attacks are one such example of a mental health emergency that is not often talked about. People tend to experience symptoms like chest pain, shortness of breath, and, back pains; all of which can be very frightening and easily associated in the mind with some serious health issues like cardiac arrest. Further, it is difficult for people around the user to even understand what they are going through, let alone help them.

A Chatbot can be described as an interface that uses machine learning to simulate human-like conversations. Its purpose is to replicate human conversation as closely as possible. We aim to distinguish the symptoms of a panic attack from a more serious problem using our bot. Making use of Grounding and other basic CBT Techniques, we intend to demonstrate how a chatbot can guide a person experiencing a panic attack out of a state of spiraling. We designed a chatbot that acts as a first responder for panic attacks among other mental health-related emergencies. Our system can identify symptoms of a panic attack and provide first-aid like guidance and assistance to alleviate symptoms. Provided further assistance and responses necessary to ensure that the user had a satisfactory experience.

Keywords: ChatBot, Panic attack, Mental Health, Deep Learning, Convolutional Neural Network

1. INTRODUCTION

The way we react to situations, the way we think of them, and the way we feel, directly or indirectly depends on our mental health. Our emotional and psychological behavior represents our mental health. Good mental health helps us to handle stress and bad situations with ease. It also helps us to make healthy choices. This way mental health is extremely important throughout our life. There have been researching and developments happened on mental health issues such as panic attacks. Studies show that there is a thin line between a panic attack and coronary heart disease. Many times, symptoms of a panic attack overlap the symptoms of heart disease and this makes it difficult to recognize whether it is a panic attack or a heart attack [1].

In recent years, it is very important for companies to keep a track of the mental health of employees. Invention of smartphones proposes a new version such as a chatbot, through which employees are able to keep their mental wellness on their own. This kind of chatbot motivates a user to use it on daily basis or repeated use.

Factors contributing to the problems related to mental health are:

- Biological elements, such as genes or brain chemicals
- Life experiences, such as distress, suffering, or grief
- Family history of mental health issues

Mental health problems are common but need to handle with care. People with mental health problems can get better and many recover for the most part, and even completely.

The machine has embedded knowledge to identify the sentences and make a decision itself as a response to answer a question. The use of chatbots in the general field of mental health is abundant. Examples can be seen where they are experimentally used to treat depression and similar issues. However, this still remains a relatively new field where research is continuously done. Studies have systematically shown that while they cannot be used as replacements for medical intervention, chatbots can certainly act as a quick and efficient tool in providing mental healthcare assistance [2] [3].

2. Proposed Work

2.1 Overview of Proposed Work and Module Description

This chatbot acts as a first responder to mental health-related emergencies. Patients often experience physical symptoms as a result of issues like panic attacks or anxiety attacks which can feel very

Mechanical modeling, numerical investigation and design of cantilever beam for low pull-in MEMS switch

Original Paper Published: 28 August 2022 (2022)



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Abstract

The pull-in voltage of an electrostatically actuated cantilever-based series type MEMS switch suitable as a switching device in several applications can be lowered by reducing its cantilever beam stiffness constant (k). However, it is a challenging task to lower the pull-in voltage without adversely affecting its mechanical performance parameters like stiffness constant (k), resonance frequency (f_0), and stress (σ) while meeting manufacturing constraints. Therefore, the design objective of this study is to address by appropriately selecting the cantilever beam profile and its geometric dimensions. cantilever beam profile and its geometric dimensions appropriately. These design objectives are further identified as highly interdisciplinary, involving identifying design variables and advanced modeling of design and manufacturing issues. This work focuses on developing a mechanical (analytical) model of the performance parameters of the cantilever beam based on its profile, properties of materials used for its manufacturing, and dimensions of the geometric variables. The investigation is done through design optimization methodology, which comprises preliminary approximating geometrical dimensions using mechanical modeling, and subsequently



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Research Article

Analytical modeling and numerical investigation of a variable width piezoresistive multilayer polymer micro-cantilever air flow sensor

P. V. Kasambe , Kiran S. Bhole , A. A. Bage, N. R. Raykar & D. V. Bhoir

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ABSTRACT

Measurement of air flow is a vital concern in diverse domains. Piezoresistive micro-cantilever-based air flow sensing is a promising research domain within MEMS technology due to its several advantages.

Displacement, bending stress, sensitivity, resolution and stability are significant challenges in the design of this sensor. These parameters are also affected by the cantilever profile and its materials. Hence, the purpose of this study is to investigate the performance of a piezoresistive multilayer polymer variable width profile micro-cantilever structure and propose its materials, fabrication process flow, optimisation of geometric dimensions, piezoresistors placement and piezoresistors circuit connections to address challenges in the design. Methodical steps towards design optimisation of the proposed sensor under the applied pressure due to its interaction with air flow comprise preliminary approximation of geometrical dimensions through analytical models developed using Conjugate Beam and Rayleigh methods, subsequently, 3D modelling numerical simulation using the COMSOL Multiphysics FEM tool. It is observed that numerical simulation results agree with the results of analytical modelling. It is concluded that the proposed study contributes to the development of accurate analytical models and design optimisation of a low-cost and stable micro-cantilever-based air flow sensor that performs yet equally well compared to previously published designs in terms of sensitivity.

Q KEYWORDS: Bending stress cantilever deflection optimisation variable width

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Study on Approaches for Geospatial Data Security**Prof. Prajakta Bhangale¹, Dr. Shubhangi Vaikole²**¹ Research Scholar,Computer Engineering Department, Datta Meghe college of Engineering,
Mumbai.bprajakta11511@gmail.com²Associate ProfessorComputer Engineering Department, Datta Meghe college of Engineering,
Mumbai.slv.cm.dmce@gmail.com**ABSTRACT**

Geospatial data is very sensitive data. The GIS data model should provide make sensitive dataset available to authorized users only and preserve the access for insensitive data from same database to general users. To secure sensitive data from any unauthorized modifications and maintain its confidentiality, a strong encryption method with limited resources should be developed. Available encryption techniques for GIS data security are dealing with encryption technologies like watermarking, GIS data based on watermarking, symmetric key cryptography techniques, and chaotic maps etc. which are useful for copyright protections. Geospatial data is used widely for many data sensitive applications like defence management, power grids, business decision making, tracking of events and activities using IoT devices etc. These systems are all vulnerable to various cyber-attacks, intrusions. It leads to incorrect information and affects business decisions

Keywords: Cryptography, Security, Geospatial data, vector data, raster data, Lightweight Cryptography.

I. INTRODUCTION

A GEOGRAPHIC INFORMATION SYSTEM (GIS) IS A COMPUTER PROGRAMME THAT SAVES AND DISPLAYS INFORMATION ABOUT THE EARTH'S SURFACE. THE GEOGRAPHIC INFORMATION SYSTEM (GIS) DEPICTS STREETS, BUILDINGS, VEGETATION. THIS ALLOWS PEOPLE TO IDENTIFY, EVALUATE, AND COMPREHEND PATTERNS AND CORRELATIONS QUICKLY.

There are mainly two categories in geospatial data vector data and raster data. Vector data uses X and y coordinates to represent lines, polylines, polygons which represents map features. Raster data consist of pixels. They are stored in the form of image file. Like digital satellite images, digital aerial photographs etc.

The GIS data has two key characteristics.

- We must ban illicit duplication and distribution of GIS data since it is too expensive.
- GIS data contains a variety of confidential information that must be protected against unwanted access.

Encryption technologies for GIS data based on watermarking, symmetric key cryptography techniques, and chaotic maps for vector and raster data are all available encryption strategies for GIS data security. All of the techniques outlined above do not meet all of the requirements for reliable security with low resources.

II. ISSUES AND REQUIREMENT OF GIS DATA SECURITY

Existing systems explored for Raster Data encryption have most of the research done for maintaining copyright protection in the geospatial domain, more research can be done for achieving robust security for data. Also execution time and query performance for existing cryptographic algorithms could be improved for GIS data security. Vector data encryptions are very complex due to data sensitivity and undetermined in resources.



ChSO-DNFNet: Spam detection in Twitter using feature fusion and optimized Deep Neuro Fuzzy Network

Merly Thomas ^a  , B.B. Meshram ^b

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Abstract

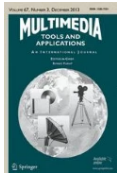
The usage of social networking platforms for interaction and meeting has grown significantly. However, as social networks continue to expand, Twitter has emerged as a vital social media for real life and has become a major source of spam. To address the aforementioned problems, spam identification on social media becomes an increasingly crucial task. The features that are present in the high dimension data of social networks cannot be used effectively by the existing approaches. In order to filter the spam information in social media, a Chimp Sailfish Optimization-based Deep Neuro Fuzzy Network (ChSO-based DNFN) is proposed. The proposed method effectively performs well under high dimensional data in real platform environment using deep learning classifier. It is more robust and generates optimal result and also reduces the computational complexity problems. Additionally, the proposed approach demonstrated improved performance in terms of metrics like precision, recall, and F-measure, which were measured using a 5k continuous dataset and yielded values of 0.894, 0.903, and 0.898, respectively.

Introduction

In communication world, social network is considered as an important platform for production as well as sharing of concepts and also it becomes a major factor in social and personal development [1,2]. The social network helps to make social capital by offering communication facility among every capital. Accordingly, internet has generated a new social networking and communication platform that forms the world parallel into real world. The media outlet has large and different audience such that it offers them with fresh concept of place and time [3,4]. The development of such a network effectively eliminates time and space distances, allowing for the rapid and efficient large-scale transfer of capital, data, and information. A new idea for actual social networks has emerged due to virtual networks, and there is now a chance for social instantaneous communication with people all over the world [35]. Social media is considered as the new generation websites and it gained more attention from internet users in recent decades [4,5]. Twitter is considered to be a large-scale social network where numerous text messages are created and transmitted daily and designated as

A detailed review of prevailing image captioning methods using deep learning techniques

Published: 29 September 2021 81, 1313–1336 (2022)



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Abstract

Image captioning is a challenging task of computer vision and natural language processing. The big challenge lies in obtaining semantic information from images and translating that into the human language using machines. The interaction of computer vision and natural language processing further increases the complexity of image captioning. Notably, research has been carried out in image captioning to narrow down the semantic gap using deep learning techniques effectively. Deep learning techniques are proficient in dealing with the complexities of image captioning. A detailed study is carried out to identify the various state-of-the-art techniques for image captioning. The working algorithm of technique, positive highlights, and weakness of every technique is discussed in this paper. We also discussed the quantitative evaluation measures used for deep learning techniques and available datasets.

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Engineering Applications of Artificial Intelligence

Volume 123, Part A, August 2023, 106112

Image caption generation using a dual attention mechanism

[Roshni Padate](#)^a  , [Amit Jain](#)^a, [Mukesh Kalla](#)^a, [Arvind Sharma](#)^b

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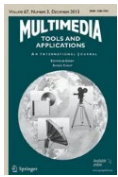
Abstract

In order to create a statement that accurately captures the main idea of an ambiguous visual, which is said to be a significant and demanding task? Conventional image captioning schemes are categorized into 2 classes: retrieval-oriented schemes and generation-oriented schemes. The image caption generating system should provide precise, fluid, natural, and informative phrases as well as accurately identify the content of the image, such as scene, object, relationship, and properties of the object in the image. However, it can be challenging to accurately express the image's content when creating image captions because not all visual information can be used. In this article, a new image captioning model is introduced that includes 3 main phases like (1) Extraction of Inception V3 features (2) Dual (Visual and Textual) attention generation and (3) generation of image caption. Convolutional Neural Network (CNN) is used to generate visual attention after first deriving initial V3 features. The input texts for the associated images, on the other hand, are analyzed and given to LSTM for the creation of textual attention. To create image captions, Bidirectional LSTM (BI-LSTM) is used to combine textual and visual attention. The Self Improved Electric Fish Optimization (SI-EFO) algorithm is used in particular to optimize the weights of the BI-LSTM. In the end, several measures confirm that the implemented system has improved. The adopted model is 35.21%, 33.76%, 39.52%, 29.69%, 30.12%, 21.49%, and 31.71% better than GAN-RL, LSTM, GRU, EC + GOA, EC + CMBO, EC + DA, EC + EFO models.

Graphical abstract

Combining semi-supervised model and optimized LSTM for image caption generation based on pseudo labels


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Abstract

Artificial intelligence's crucial area of image captions. It's a very difficult situation until the advancement of DL is made. A lot of open challenges remain as robustness, generalization and accuracy, results are far from reasonable. As image captioning schemes are data avaricious, pre-training on larger scale datasets, even if not well-curated, is fetching a solid approach. In addition to precisely identifying the image includes the scene, object, connection, and qualities of the item in the image, the image caption generation method should produce natural, fluid, precise, and useful sentences. However, since not all visual information may be utilized, it might be difficult to effectively convey the image's content when writing image captions. Here, the image captioning is done under two models, i.e. NIC model and LSTM based model. At first, (Neural Image Caption) NIC process is done, where, CNN based caption generation is carried out for unlabelled and labeled dataset. Further, features namely, improved BOW and N-gram are derived that are used for training the CNN model. The final caption is generated by optimized LSTM, where the weights are optimally tuned by Harris Hawks with Sinusoidal Chaotic Map Assisted Exploitation (HH-SCME). Finally, BLEU score, rouge and CIDER scores are computed to prove the efficiency of HH-SCME. The proposed



Engineering Applications of Artificial Intelligence

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Effective Flood prediction model based on Twitter Text and Image analysis using BMLP and SDAE-HHNN

[Supriya Kamoji](#)  , [Mukesh Kalla](#) 

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Abstract

In recent years, social media platforms such as Twitter have garnered a lot of interest as a new source of text data for quick flood awareness and effective prediction. Hence various types of research were made on flood prediction using Twitter data but it only focuses on classifying the text data as relevant or irrelevant, thereby loss of semantic information from longer phrases while extracting important information from Twitter text data and resulting in low accuracy of text classification. Hence, a novel BMLP and SDAE-HHNN has been proposed. This approach comprises BMLP and SDAE-HHNN techniques has been developed for effective flood prediction based on Twitter text data and image analysis. To classify the text data into two/six different classes, BERT is used to preprocess the text data from Twitter. To achieve high levels of precision, the Rule-Based Matching technique extracts specific place entities from the Named Entity Recognition. To predict the high probability location affected by flood from the place entity, bi-directional MLP (BMLP) is used which is made up of a finite number of sequential layers in its most basic form. Then images are extracted from this particular location and these images are processed to predict flood level but existing techniques cannot provide sufficient information to map the flood area and object detection due to real field data collection. Hence, a novel SDAE with HHNN has been developed in which SDAE removes noise from the specified extracted location and HHNN is used to classify the image into flood or non-flood. Then plot this sufficient predicted information related to flood level in the google map. The proposed model is implemented in the Python platform and the result obtained shows that the proposed has a maximum recall of 96%, maximum precision of 95%, accuracy of 97%, and an F1 score of 96%.

Introduction

One of the most destructive natural disasters that endanger people's lives and property is flooding (Feng et al., 2020). In recent decades, there have been more severe floods than ever before due to an increase in the density of urban expansion and the amount of sealed land (Mård and DiBaldassarre, 2018). Floods cause landslides, ruin crops, destroy homes and infrastructure, uproot trees, and put people's lives in jeopardy. While



Compound Facial Expression Recognition and Pain Intensity Measurement Using Optimized Deep Neuro Fuzzy Network

Rohan Appasaheb Borgalli, Sunil Surve

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Abstract

The automatic measurement of pain intensity from facial expressions, mainly from face images describes the patient's health. Hence, a robust technique, named Water Cycle Henry Gas Solubility Optimization-based Deep Neuro Fuzzy Network (WCHGSO-DNFN) is designed for compound FER and pain intensity measurement. However, the proposed WCHGSO is the incorporation of Water Cycle Algorithm (WCA) with Henry Gas Solubility Optimization (HGSO). Here, Compound Facial Expressions of Emotion Database (dataset-2) is made to perform compound FER, whereas the input image from UNBC pain intensity dataset (dataset-1) is utilized to measure the pain intensity, and the processes are performed separately. The developed technique achieved better performance with respect to testing accuracy, sensitivity, and specificity with the highest values of 0.814, 0.819, and 0.806 using dataset-1, whereas maximum values of 0.815, 0.758 and 0.848 is achieved using dataset-2.

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A model to perform prediction based on feature extraction of histopathological images of the breast

[Sushma Nagdeote](#)  & [Sapna Prabhu](#)

[Multimedia Tools and Applications](#) (2023)

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Abstract

One of the most common and life-threatening cancers is that of the breast among women. The first step to successful treatment and better survival rates for breast cancer patients is prompt and precise assessment of cancer.

Predicting cancer from biopsy images is challenging task. In the past few years,

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Abstract

Automated generation of image captions is a demanding AI crisis as it necessitates the exploitation of numerous methods from diverse computer science fields. Deep learning (DL) approaches have revealed marvelous results in a lot of diverse appliances. On the other hand, data augmentation in DL that imitates the quantity and the variety of training data without the need of gathering additional data is a hopeful area in machine learning (ML). Producing textual descriptions for a specified image is a demanding task using the computer. This survey makes a critical analysis of about 65 papers regarding image captioning. More particularly, varied performance measures that are contributed in diverse articles are analyzed. In addition, a comprehensive study is made regarding the maximal performances and varied features deployed in each work. Moreover, chronological analysis and dataset analysis are done and finally, the survey extends with the determination of varied research challenges, which might be productive for the analysts to endorse enhanced upcoming works on image captioning.

Keywords: Image captioning - textual descriptions - LSTM - CNN-RNN - performances

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Resolving the Data Imbalance problem in Fraud Detection Using Sampling and Machine Learning Techniques

Ron George ^a, Prof. Swati Ringe^b, Clayton Almeida ^c, Akshay Naphade^d

^a BE Computer, Engineering Student, Fr. Conceicao Rodrigues College of Engineering, Mumbai, India, Mumbai University

^b Assistant Professor, Fr. Conceicao Rodrigues College of Engineering, Mumbai, India, Mumbai University
Email- swati@fragnel.edu.in

^c BE Computer, Engineering Student, Fr. Conceicao Rodrigues College of Engineering, Mumbai, India, Mumbai University

^d BE Computer, Engineering Student, Fr. Conceicao Rodrigues College of Engineering, Mumbai, India, Mumbai University

Abstract: "Class imbalance" alludes to categorizing the false and non-deceitful classes in a dataset. The quantity of events of the positive class (minority) in class awkwardness issues is considerably more modest than the quantity of cases of the negative class (larger part) (greater part). Because of the way that the non-deceitful class is more pervasive and the false class is unprecedented, the last option would be considered exceptions, bringing about misclassification of the minority class. Subsequently, the results of inconsistent classes are not right all the time. The proposed model expects to test the dataset utilizing arbitrary undersampling procedures like Near Miss and oversampling methods like SMOTE and ADASYN, after which the fair dataset will be given to the classifier and the outcomes will be analyzed, assessed utilizing execution assessment measurements considering various essential parameters to obtain high efficiency. The results show how SMOTE technique stands out from other sampling techniques in obtaining a model with high accuracy. By resolving class imbalance problem, we can overcome various constraints in Fraud Detection, inconsistency identification, oil slick observing, spam separating, network intrusion recognition, and also in clinical applications.

Keywords: Frauddetection, imbalanceddataset, randomundersampling, randomoversampling, syntheticminority oversampling, adaptive synthetic technique, logistic regression, randomforest.

1. INTRODUCTION

In imbalanced classes, results are not always accurate which is a very standard classification problem in machine learning. With an uneven ratio of occurrences in a class, there is always a variation in datasets. The Class Imbalance problem arises when the ratio of fraudulent activities (minority class) is very less in proportion to non-fraudulent activities (majority class). In datasets, an imbalanced class distribution occurs when one class, usually the one of more interest, the positive or minority class, is underrepresented.

- In imbalanced classes results are not always accurate which is a very standard classification problem in machine learning.

- With an unequal ratio of observations in a class, there is always a disparity in datasets.

Reports of clinical diagnosis, the fintech industry, and other applications with uneven data sets are only a few examples. For example, in a medical diagnosis of a rare disease, where it is essential to identify a rare medical condition among the general population, any diagnostic mistakes can cause patients anxiety and extra difficulties. The majority of real-world classification issues like spam filtering, network intrusion detection have some level of class imbalance, which means that each class does not make up an equal portion of your data set. So, it becomes very necessary to overcome such misclassifications to obtain desired results.

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