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International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VI **Month of publication:** June 2020

DOI: http://doi.org/10.22214/ijraset.2020.6193

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

Social Media based Emergency Response System

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Abstract: ***News is useful in a situation of disaster for communication, announcement, and request for rescue and so on. Alsoit causes a negative by-product which is spreading rumors. This paper describes how rumors has spread after natural or manmade disasters and emergency situations, and discusses how we can deal with them. We first investigated actual in-stances of rumors after the disaster. And then we attempted to disclose characteristics of that rumors. Based on the investigation we developed a system which detects candidates of rumors from news and then evaluated it. The result of experiment shows the proposed algorithm can and rumors with acceptable accuracy. Sentiment analysis deals with identifying and classifying opinions &sentiments expressed in thesource text. Social media generates vast amount of sentiment rich data in the form of tweets, status updates, blog posts etc. Sentiment analysis of this user generated useful data is very useful in knowing the opinion of the crowd. Twitter sentiment analysis is difficult as compared to general sentiment analysis due to presence of slang words and misspellings. Knowledge based approach and Machine learning approach are the two strategies used for analyzing sentiments from the text. Public and private opinion about a wide variety of subjects are expressed and spread continually through numerous social media. Twitter is one of the social mediaplatforms that is gaining popularity. Twitter offers various organizations a fast and effective way to analyze customers perspectives toward the critical to success in the market place. Developing program for sentiment analysis is an approach to be used to computationally measure customers perceptions. This project uses knowledge base including various patterns for tweets along with the multiple strategies to detect the sentiment expressed in a tweet and if a tweet is genuine or not. Various machine learning and knowledge based approaches are used to compare patterns and apply strategies and NLP for sentiment analysis.***

Keywords: Rumors, Data Processing, Twitter Data, NLP, Pattern Recognition, Sentiment analysis

I. INTRODUCTION

Twitter is a famous micro-blogging website, having over 100 million users generating over 500 million tweets every day. Twitter has consistently attracted users to convey their opinions and perspective about any issue, brand, company or any other topic of interest. Twitter is used as an informative source by many organizations, institutions and companies and users are allowed to share their opinions in the form of tweets, using only 140 characters. This leads to people compacting their statements by using slang, abbreviations, emoticons and short forms. Along with this, people convey their opinions by using sarcasm and polysemy. Hence it is justified to term the Twitter language as unstructured. To extract sentiment from tweets, sentiment analysis is used. The results from this can be used in many areas like analysing and monitoring changes of sentiment with an event, sentiments regarding a particular brand or release of particular product and analysing public view of government policies. In this project we aim to predict the sentiments from tweets by checking the polarity of tweets as positive, negative or irrelevant. Sentiment analysis is a process of deriving sentiment of a particular sentence. It is a classification technique derives opinion from tweets and formulates a sentiment and on the basis of which, sentiment classification is performed. Sentiments are subjective to the topic of interest. In the programming model, sentiment were for to, is class of entities tha the person performing sentiment analysis wants to find in the tweets. The dimension of sentiment class is critical factor in deciding the efficiency of the model. For example, we can have two-class tweet sentiment classification (positive and negative) or three class tweet sentiment classification (positive, negative and irrelevant). Sentiment analysis approaches can be broadly categorized in two classes – lexicon based and machine learning based. Lexicon based approach is unsupervised and it proposes to perform analysis using lexicons and a scoring method to evaluate opinions. The basic steps for performing sentiment analysis includes data collection, pre- processing data, feature extraction, selection of baseline features, sentiment detection and performing classification using simple computation or else machine learning approaches. For the accuracy purpose of polarity will be detecting sentiments along with various knowledge base patterns and multiple machine learning strategies to evaluate the sentiments. Alongside we will be checking if the tweet is genuine or not or if has influenced by other tweets which can be very useful in rumors mitigation on social medias. This approach will produce the higher accuracy for polarity by considering POS factor and genuineness as well as can be used in various sectors such as analyzing product reviews or government policies, etc. where it can be found if negative influence is spread and if it affects people.Emergency events

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such as natural or manmade disasters bring challenges. During crises, people post updates regarding their statuses, ask for help on social media platforms like Twitter. Humanitarian organizations can use this citizen-generated information to provide relief.Then the emergency tweets are classified and found. According to this an SMS sent to respective stakeholders.

II. PROBLEM STATEMENT

The aim while performing sentiment analysis on news is basically to classify the news in different sentiment classes accurately. In research areas, various approaches have evolved, which propose methods to train a model and then test it to check its efficiency. Performing sentiment analysis is challenging on News data, as we mentioned earlier.
Here we define the reasons for this:

1) *Limited News Size:* with just 140 characters in hand, compact statements are generated, which results sparse set offeatures
2) Use of slang: these words are different from English words and it can make an approach outdated because of the evolutionary use ofslangs.
3) *News Features:* it allows the use of hash tags, user reference and URLs. These require different processing than other words.
4) *User Variety:* the users express their opinions in a variety of ways, some using different language in between, while others using repeated words or symbols to convey an emotion.
5) *Genuine or Influenced News:* the users many times are under influence of various fake news that can be spread with social media

Twitter is highly used social media and our system is take twitter as input. System will process all tweets using Natural Language Processing. All tweets are preprocessedand such news will get reposted many times to influence more. Tokenization is done in which all sentences are separated into words. The words which are not important they are removed from it. After that sentiment analysis is done in which polarity of every word is calculated. Every word having polarity in between 1 to -1. Usingtext blob algorithm system will find out emergency situation. After sentiment analysis rumor detection is done in which TF-IDF algorithm and patternmatching is used. If emergency situation is real then help assistance is provide to the needy people.

III. LITERATURE REVIEW

Even in these eras of the Internet, we still deal with many paper documents and files. There's a flurry of data pouring in from all directions that we need to process and store to retrieve later. We want to be able to find the information we need at the right moment, when we need it, so it can be used for further analysis or report writing, or perhaps for creating a presentation.In this study, we conducted comprehensive measurements to understand the characteristics, including similarities and differences, of data from the news and SNSs.
The observed differences are as follows: It is challenging to find the same topic in the news and SNS. The news responds to official events whereas SNSs respond to personal interests. The news mentions a specific topic continually, whereas the transition from one topic to another in SNSs is fast.
The issues discussed on SNSs are different every day. The news can identify specific events with a single keyword, but many keywords are required to find the required data in SNSs. A new method for the calculation of polarities and strengths of Chinese sentiment phrases is proposed in this study, which could be used to analyze semantic fuzziness of Chinese. It uses a probability value, rather than, x-ed value for the polarity strengths of sentiment phrases, compared with the conventional methods. In this project, we have proposed a new approach for sentiment analysis, where a set of tweets is to be classified into 7 different classes. The obtained results show some potential: the accuracy obtained for multi-class sentiment analysis in the data set used was 60.2%. However, we believe that a more optimized training set would present better performances. This project proposed a sentiment analysis method for news based on a linear regression model. The method employs natural language processing analysis on a collected corpus and determines negative sentiments within a specific context. The objective is to predict the response of specific groups involved in hacking activism when the sentiment is negative enough among different News users. A hybrid news sentiment classification model incorporating domain oriented lexicons, unigrams and news specific features using machine learning techniques has been developed and the classification accuracies have been found to improve by an average of around 2 points across different domains. The effectiveness of incorporating concepts of domain specificity in the polarity lexicon and the capacities of explicit news features to extract sentiment has been validated. Pruning the unigrams based on their significant presence in a class has simplified the model to a large extent.

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IV. METHODOLOGY

The raw Twitter data is typically used as a starting point of the data mining approach. Here, the Twitter data is provided for both training data in order to learn the system, make a model of features, as well as testing data for real-world usage designed model and make the result. This approach is suggested as a general flow for both supervised and unsupervised data mining solutions in order to provide any kind of data mining task as result. The main steps of the data mining approach consist (1) data pre-processing; (2) feature extraction and selection; and (3) modeling data learning the input features (considering expert knowledge and metadata) to perform the tasks such as detection, prediction, and decision-making description.

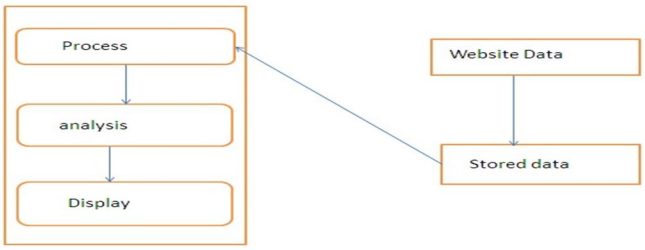


Fig1:Data Flow Diagram

V. SYSTEM ARCHITECTURE

In the proposed system, we will retrieve news from News using Twitter API based on the query. The collected news will be subjected to preprocessing. We will then apply the various patterns and strategic algorithms including some of machine learning algorithms for NLP to supervise the data. The results of the algorithms i.e. the sentiment and influence will be represented in graphical manner (pie charts/bar charts). The proposed system is more effective than the existing one. This is because we will be able to know how the statistics determined from the representation of the result can have an impact in a particular field as well as influence of negativity spread by rumor.

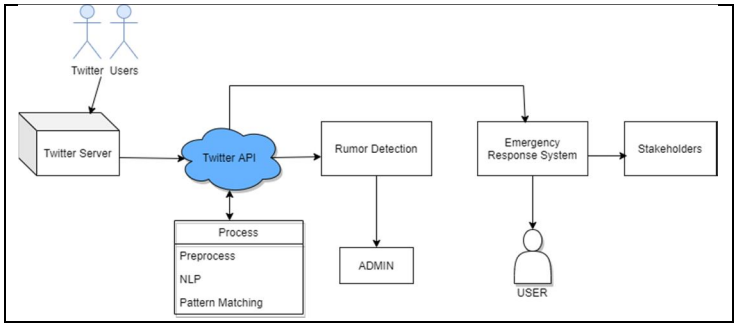


Fig2:Working flow of rumor detection and emergency response system

Our system is divided into three modules:

1) GUI and MySQL connectivity
2) Sentiment Analysis.
3) Rumor detection and Help assistance.
a) A user-friendly GUI is created for all functionalities.
b) MySQL is used for database connectivity using MySQL Query Browser.
c) For sentiment analysis we are using textblob algorithm
d) and natural language processing.
e) Polarity and Subjectivity these two properties are used for performing sentiment analysis on tweets.
f) Word ranking is classified using text blob algorithm.
g) Pattern matching is done and rumors are detected.
h) Necessary help assistance is provided by sending a message to the respective stakeholders.

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VI. MATHEMATICAL MODEL

A. *System Description*

To understand issues and problems during the system fail.

Let 'S' be the system

Where,

S= {I, O, P, Fs, Ss}

Where,

I = Set of input

O = Set of output

P = Set of technical processes

Fs = Set of Failure state

Ss = Set of Success state

Identify the input data I1, I2, In

I = {(Twitter Data)}

Identify the output applications as O1, O2,,On

O = {(Rumors Detection, Fake News Detection, Sentiment Detection)}

Identify the Process as P

P = {(Data Processing, Natural Language Processing, Sentiment Analysis, Pattern Recognition)}

Identify the Failure state as Fs

Fs = {(If fake news not predicted}

Identify the Success state as Ss

P = {(Fake news detected successfully)}

B. *Algorithm Steps*

1) Tokenization.

2) Noun phrase extraction.

3) Part of speech tagging.

4) Word inflection and lemmatization.

5) Sentiment analysis.

VII. SOLUTION STRATEGY

In the proposed system, we will retrieve news from News using Twitter API based on the query. The collected news will be subjected to preprocessing. We will then apply the various patterns and strategic algorithms including some of machine learning algorithms for NLP to supervise the data. The results of the algorithms i.e. the sentiment and influence will be represented in graphical manner (pie charts/bar charts). The proposed system is more effective than existing system. This is because we will be able to know how the statistics determined from the representation of the result can have an impact in a particular field as well as influence of negativity spread by rumors.

VIII. RESULTS

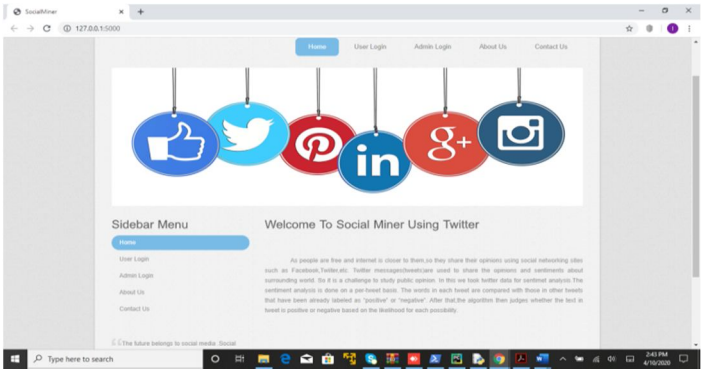


Fig3: HomePage

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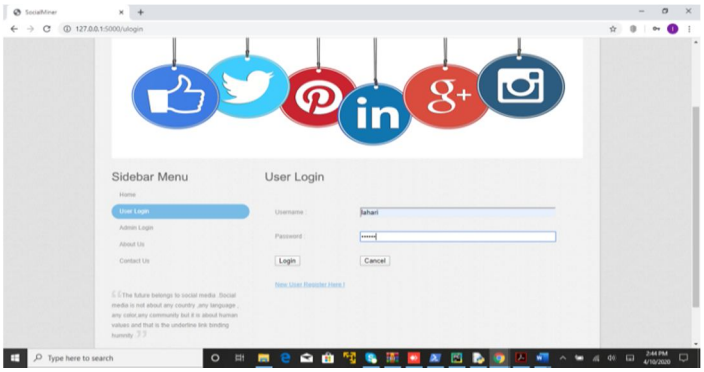


Fig4: User Login

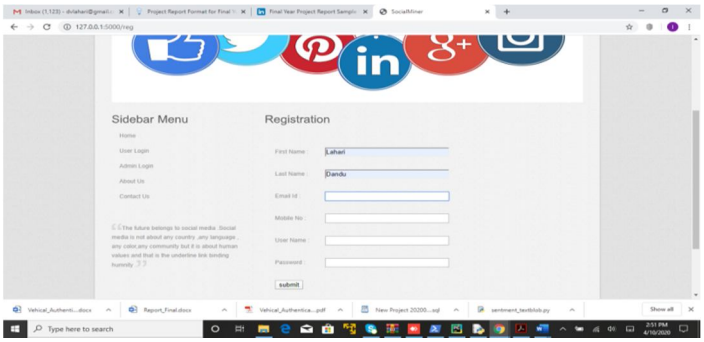


Fig5: AdminLogin

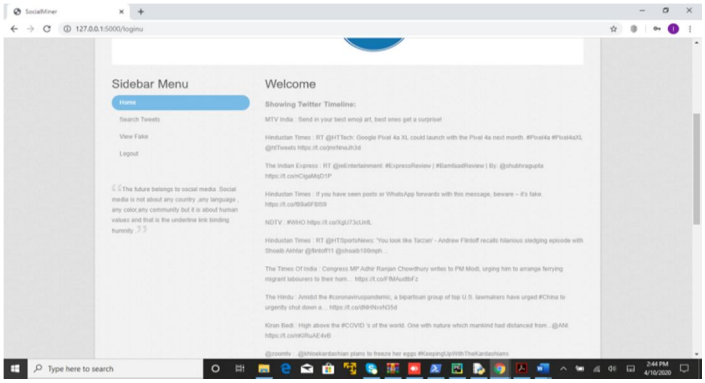


Fig6: Showing Twitter Timeline

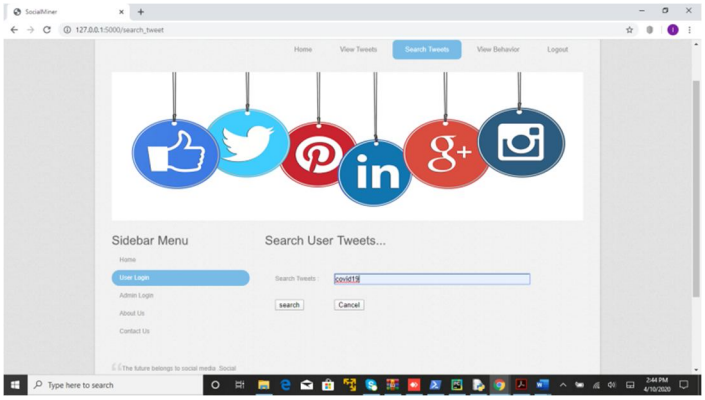


Fig7: Search Tweets

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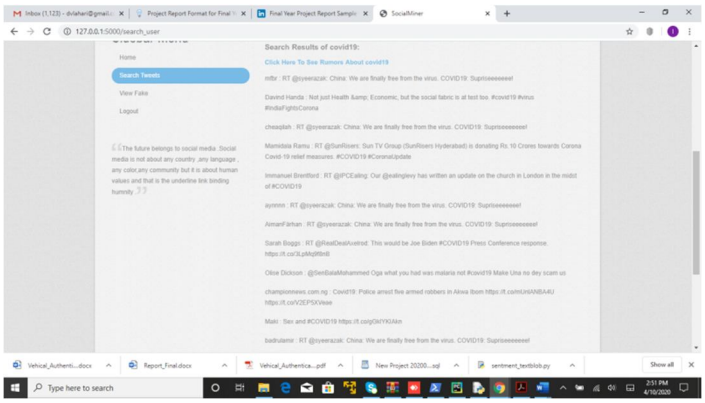


Fig8: Search Tweet Result

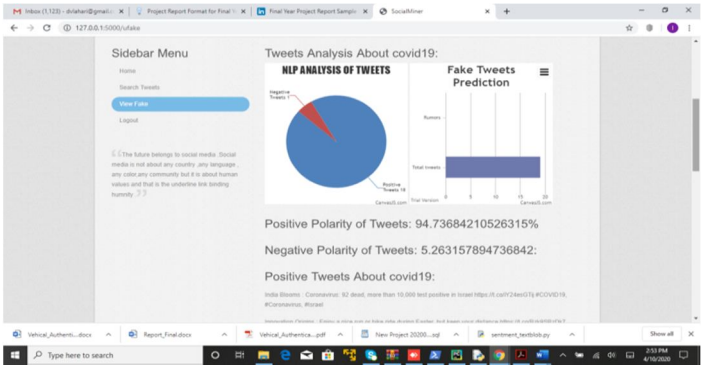


Fig9: Tweet Analysis

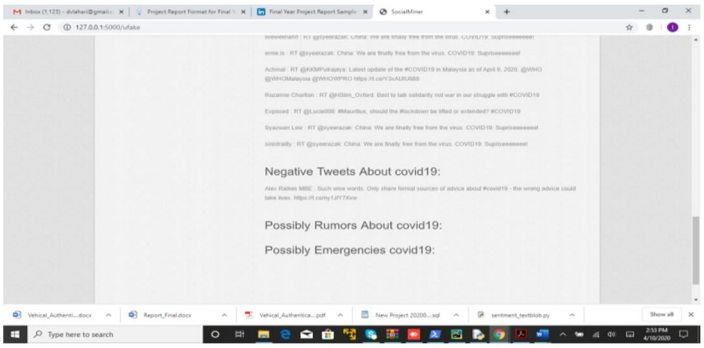


Fig10: Result of Possibly Rumors and Emergency Tweets



Fig11: Emergency message sent to the stakeholder

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IX. APPLICATION

Applications of this proposed system are:

1) *Fake News Analysis:* In these systems we will do the analysis of tweets and find out whether that specific news is fake or real using data preprocessing. Using that we clearly get idea of which news is true and which one is fake.
2) *Rumor Detection:* Our system will also detect rumors. Algorithm which we are using into our system like TF-IDF help us in rumor detection. Sometimes people spread rumors over social media to detect that our system will help. Using pattern matching we will do that in our system.
3) *Sentiment Analysis:* Main aim of our system is to find out emergency situation and that is done by sentiment analysis. Using text blobalgorithm, we will find out polarity of each word and sentence. Depending upon word ranking system will detect critical situation to provide help to needy one.
4) *Emergency Situation help Assistance:* System will do sentiment analysis, rumor detection using different algorithm and data processing to find out real emergency situation and provide help assistance to needy people who stuck in emergency situation.

X. CONCLUSION

The project set out to solve a practical problem of sentiment analysis and genuinelycheck of Twitter posts. We proposed a method using knowledge base patterns, strategies and machine learning approaches. These methods are proposed to increase the accuracy of sentiment check for tweets. Patterns can be used to evaluate if the tweets werea influenced rumor or a genuine post by any user. By using API of twitter it is possible to work on live tweets than to work on offline data. Querying and fetching of particular tweets from twitter is possible by using its API. Finding influence or negativity spread by users can be useful in various analytical tasks.

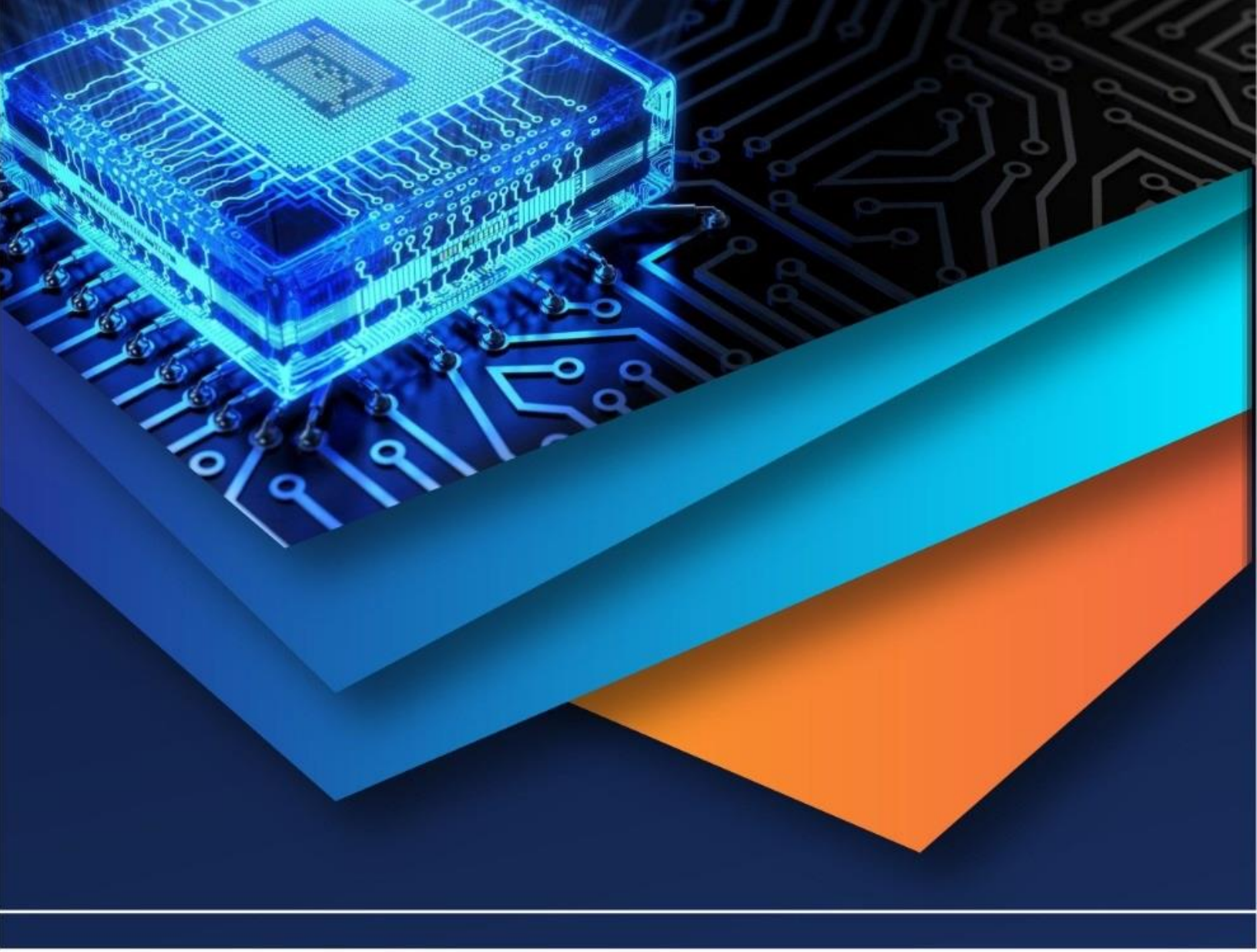
XI. ACKNOWLEDGMENT

I would like to thank Prof. Santosh Chobe, Head of Computer Engineering Department and the entire team of DIT for supporting us to carry out this activity. We also take this opportunity to thank Prof. Shital Sungare, from DIT for her valuable inputs to this paper and Dr. Pramod Patil for his support in the process.

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