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Election Sentimental Analysis using Swift

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Abstract: ***The process of identifying and distributing opinions and views which are expressed in a piece of text, especially in order to decide whether the attitude of the user toward particular idea, product is positive, negative, or neutral is known as sentiment analysis. During election days , it's really necessary to determine the mindset of the people towards particular tweets or sentiment. In this project we used twitter API to fetch the data using the unique key provided by the twitter. An user interface is constructed in iOS platform which can be used to search tweet related to the election . These tweets are later classified using a machine learning model(text classifier) provided by CoreML2 which calculates the points with respect to the number of tweets according to its sentiment (Positive, Negative or Neutral). These points are used to determine the actual sentiment of the people towards that particular search. Later , this classified points are displayed in user's screen. Users also can make multiple searches as per their requirement.***

Keywords: election sentiment in ios , CreateML , text classifier for election using swift.

I. INTRODUCTION

Sentiment Analysis is widely used to analyze the sentiments, attitudes, reactions, evaluation of the content of the text. Most of the time we will be analyzing the opinions, reactions ,sentiments, evaluations of the various entities which can be services, products, organizations, events , issues or other topics . Sentiment Analysis where we try to find the opinion of people or text provided is also known as Opinion Mining . Among the giant platform of social media Twitter is a microblogging media which in real time expresses the persuasion of a person or group about a particular topic which can appear in Timeline. All the messages displayed in the wall of the Twitter is known as Tweets . The user are connected to each other by various tweets and followers while their timeline are key components of Twitter. The timeline is chronologically sorted and are expressed in the form of text, image or links. Because of popularity of Twitter as an information source, it led to development of applications and research in many spheres. Twitter is used in predicting the happenings of earthquakes and identifying relevant users to follow to obtain disaster relevant information. In the various prediction we are interested in the sentiments to the people towards the election. By using these sentiments we are trying to predict the most possible result to the election in a mobile Platform.



Fig 1: This is an image of Swifter API which helps us to connect and retrieve tweets from twitter.

Swifter is a greater Framework which is written in Swift to provide a swiftly experience to parse the data from the twitter API . This Framework make the task easier by making it simpler and more developer friendly. As it has a great documentation it makes the developers a lot easier to use this framework.

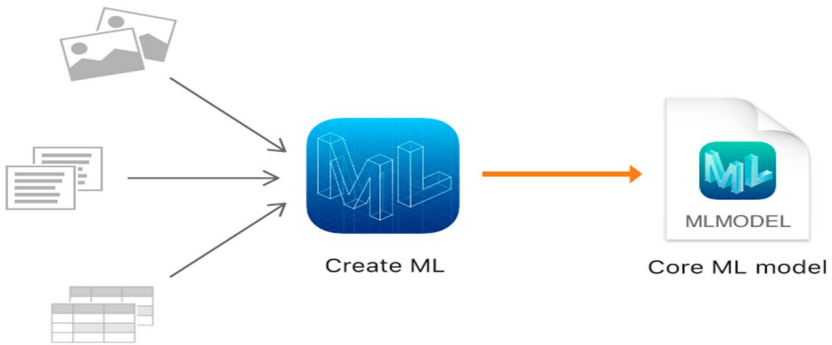


Fig 2: This is an image of CreateML module which is converting the raw data to the mlmodel .

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Machine Learning in a mobile device is a great wish but was not possible previously. Using the Playground in Xcode by using MacOS platform we can use CreateML to produce great machine learning models. Machine learning models can be produced very effectively and can be used in mobile application with the help of createML module. All the machine learning model created can be usable when it is in .mlmodel format. A model can process various data types like structure or semi structured datasets.

II. LITERATURE SURVEY

S l No.	Title of the Paper	Authors	Month & Year	Observations
1	Twitter Sentiment Analysis	Aliza Sarlan , Chayanit Nadam, Shuib Basri	November 18 – 20, 2014	Application Programming Interface(API) , Natural Language Processing (NLP)
2	Sentiment Analysis on Twitter	Akshi Kumar and Teeja Mary Sebastian	July 2012	Tweet Sentiment Scoring , Scoring Module
3	A Study on Sentiment Analysis Techniques of Twitter Data	Abdullah Alsaeedi1 , Mohammad Zubair Khan2	2019	Document-Level Sentiment Analysis Approaches
4	Sentiment Analysis of Twitter Data	Apoorv Agarwal Boyi Xie Ilia Vovsha Owen Rambow Rebecca Passonneau		Prior polarity scoring, Feature Analysis
5	Sentiment Analysis of Twitter Data	Kiruthika M.,Sanjana Woonna, Priyanka Giri		Data Collection using Twitter API
6	Social Network and Sentiment Analysis on Twitter: Towards a Combined Approach	Paolo Fornacciari, Monica Mordonini , Michele Tomauiolo		Social Network Analysis: data selection, sequence of cleaning the tweet
7	Twitter Sentiment Analysis of Movie Reviews using Machine Learning Techniques.	Akshay Amolik, Niketan Jivane, Mahavir Bhandari, Dr.M.Venkatesan	January 2016	Modelling of Feature Vector , Naïve Bayes Classifier , Support Vector Machine
8	Sentiment Analysis on Twitter Data	Varsha Sahayak Vijaya Shete Apashabi Pathan	January 2015	Filtering, Tokenization, Removal of Stop words
9	Semi Supervised and Active Learning in video Scene Classification from Statistical Features	Tomas Sabata, Petr Pulc, Martin Holena		Video data, scene classification, semi- supervised learning , color statistics, feedforward neural networks
10	Sentiment Analysis On Twitter Data	Onam Bharti Mrs. Monika Malhotra	June 2016	Naive Bayes (NB), Modified approach K-mean algorithm.
11	Implementation Of Sentiment Analysis On Twitter Data	Thirupathi Rao Komati, Sai Balakrishna Allamsetty , Chaitanya Varma Pinnamaraju	2017	Search twitter feeds, Load Twitter API
12	Review Paper on Sentiment Analysis of Twitter Data Using Text Mining and Hybrid Classification Approach	Shubham Goyal	2017	binary task of classifying sentiment
13	Twitter Data Analysis on Natural Disaster Management System	Pichao wang, wanqing Li,Philip Ogunbona,Jun Wan,Sergio Escalera	2017	Human motion recognition , RGB-D data, Deep learning
14	Empirical Study of Twitter and Tumblr for Sentiment Analysis using Soft Computing Techniques	Akshi Kumar	October, 2017	Multilayer Perceptron (MLP) , Decision Tree (DT)
15	Sentiment Analysis Based On Twitter Data On Violence	Nihal Jumhare, Raja Rajeswari G, Balaji Jayakrishnan	February 2017	Maximum Entropy
16	Stress Detection And Sentiment Prediction: A Survey	Dr. G V Garje , Apoorva Inamdar, Harsha Mahajan, Apeksha Bhansali, Saif Ali Khan	January 2016	
17	Sentiment Analysis of Twitter Data through Big Data	Anusha.N , Divya.G, Ramya.B	June - 2017	Opinions for a data

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1) *Problem Statement:* The main objective of the research is to provide effective prediction of election by studying the sentiments of people by applying the machine learning algorithm provided by the Swift's CoreML. In this project we are majorly focused to construct the ML model that provides an effective and accurate data to the user. The ultimate goal is to ascertain data that are fetched properly from twitter successfully to classify the tweets according to sentiments to provide promising accuracy.

III. METHODOLOGY

1) *API Call:* Swifter can be used with the 3 different kinds of authentication protocols Twitter allows. You can specify which protocol to use as shown below. By studying the Twitter Authentication Protocol (OAuth) we can access the twitter API in following ways

A. *Application-Only Authentication: Oauth2 (Bearer Token)*

1) Application-only authentication is a form of authentication where an application makes API requests on its own behalf, without the user context. This method is for developers that just need read-only to access public information.

B. *Application-User Authentication: Oauth 1a (Access Token For User Context)*

1) The user authentication method of authentication allows an authorized app to act on behalf of the user, as the user.

C. *Classification Using Ml Model: Steps Required For Classifying The Twitter Data Are Given Below*

Converting JSON/CSV to a MLDataTable

1) First and foremost, we'll need to tell Create ML where it can find our JSON file.

D. *Splitting the Data*

1) 80% of your dataset should be used for training, and you should save the other 20% to make sure everything is working as it should.

E. *Training and Testing*

1) Now that your data is all set up and ready, it's time to finally train it and test your resulting model.

F. *Code*

Code For creating the model

```
import Cocoa
import CreateML
//can be converted either from JSON or CSV data format
let data = try   MLDataTable(contentsOf: URL(fileURLWithPath: "/Users/sudip/Desktop/8TH-SEM/FYP/TWITTER-CSV/twitterf.csv"))
let(trainingData, testingData) = data.randomSplit(by: 0.8, seed: 5)
let sentimentClassifier = try MLTextClassifier(trainingData: trainingData, textColumn: "text", labelColumn: "class")
let evaluationMetrics = sentimentClassifier.evaluation(on: testingData)
let evaluationAccuracy = (1.0 - evaluationMetrics.classificationError) * 100
let metadata = MLModelMetadata(author: "Sudip Kandel", shortDescription: "A set of data used to classify sentiments", version: "1.0")
try sentimentClassifier.write(to: URL(fileURLWithPath: "/Users/sudip/Desktop/8TH-SEM/FYP/TWITTER-CSV/twitterSentiment.mlmodel"))
try sentimentClassifier.prediction(from: "he is really good person")
try sentimentClassifier.prediction(from: "he is bad person")
try sentimentClassifier.prediction(from: "bjp")
```

Code for fetching the tweet using Swifter Framework

```
func fetchTweet(){
    if let searchText = textField.text
    {
```

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```
//      let prediction = try! sentimentClassifier.prediction(text : "@BJP is great and best")
//      print(prediction.label)
swifter.searchTweet(using: searchText, lang : "en" , count: tweetCount ,tweetMode : .extended ,success: { (results, metadata) in
    //tweets is a object of the twitterSentimentInput.mlmodel which is kept inside a array which holds the input value from the twitter ie each tweet which is stored inside the array.
    var tweets = [twitterSentimentInput]()
    //a for loop that iterates from 0 to 100 so total 100 tweet
    for i in 0..<self.tweetCount{
      //"full_text" is the json value from the twitter which is converted into string
      //tweetForClassification classifies each tweet
      if let tweet = results[i]["full_text"].string{
        let tweetForClassification = twitterSentimentInput(text: tweet)
        //those hundred tweets are stored inside the tweets array object
        //and append each tweet inside it
        tweets.append(tweetForClassification)
      }
    }
    //if successfully tweets are fetched and inserted inside the array of strings inside the variable called tweets send the tweets to makePrediction function
    self.makePrediction(with: tweets)
    //if error produce error
  }) { (error) in
    print("There was an error with Twitter API request , \(error)")
    self.sentimentLabel.text = "Sorry we are not able to fetch the tweets. Try Again"
    self.errorToRecieve()
  }
 }
}
```

G. Structure and Data Flow Diagram

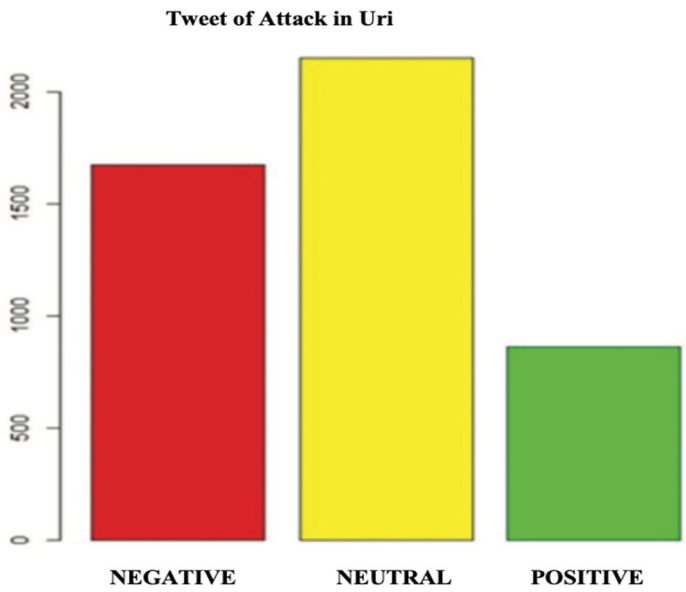


Fig 3: Graph View of Result

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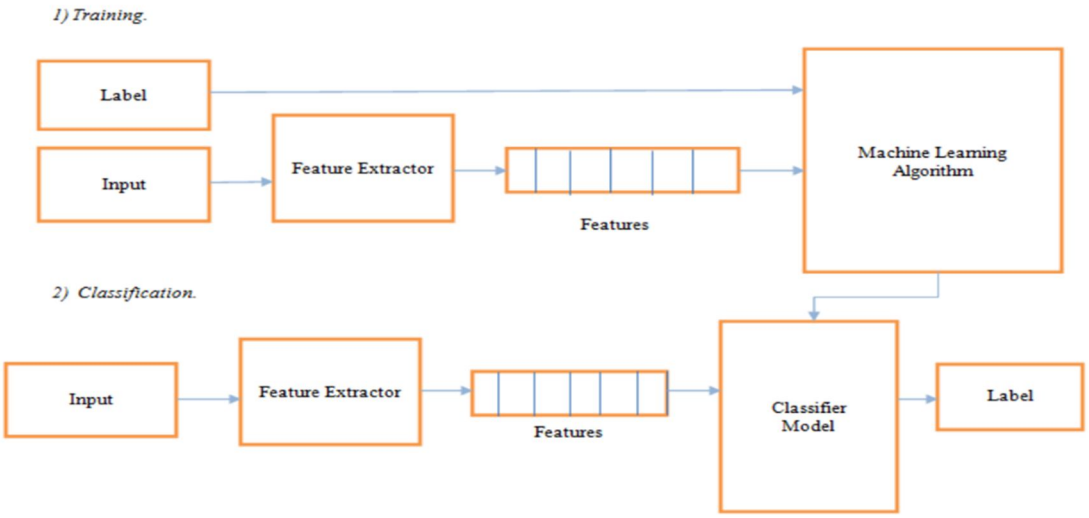


Fig 4: Data Flow Daigram

The above diagram shows us how the Features are taken extracted and managed by the CoreML where data are classified accordingly and later fed to the model with respect to the tweet searched.

IV. RESULT AND CONCLUSION

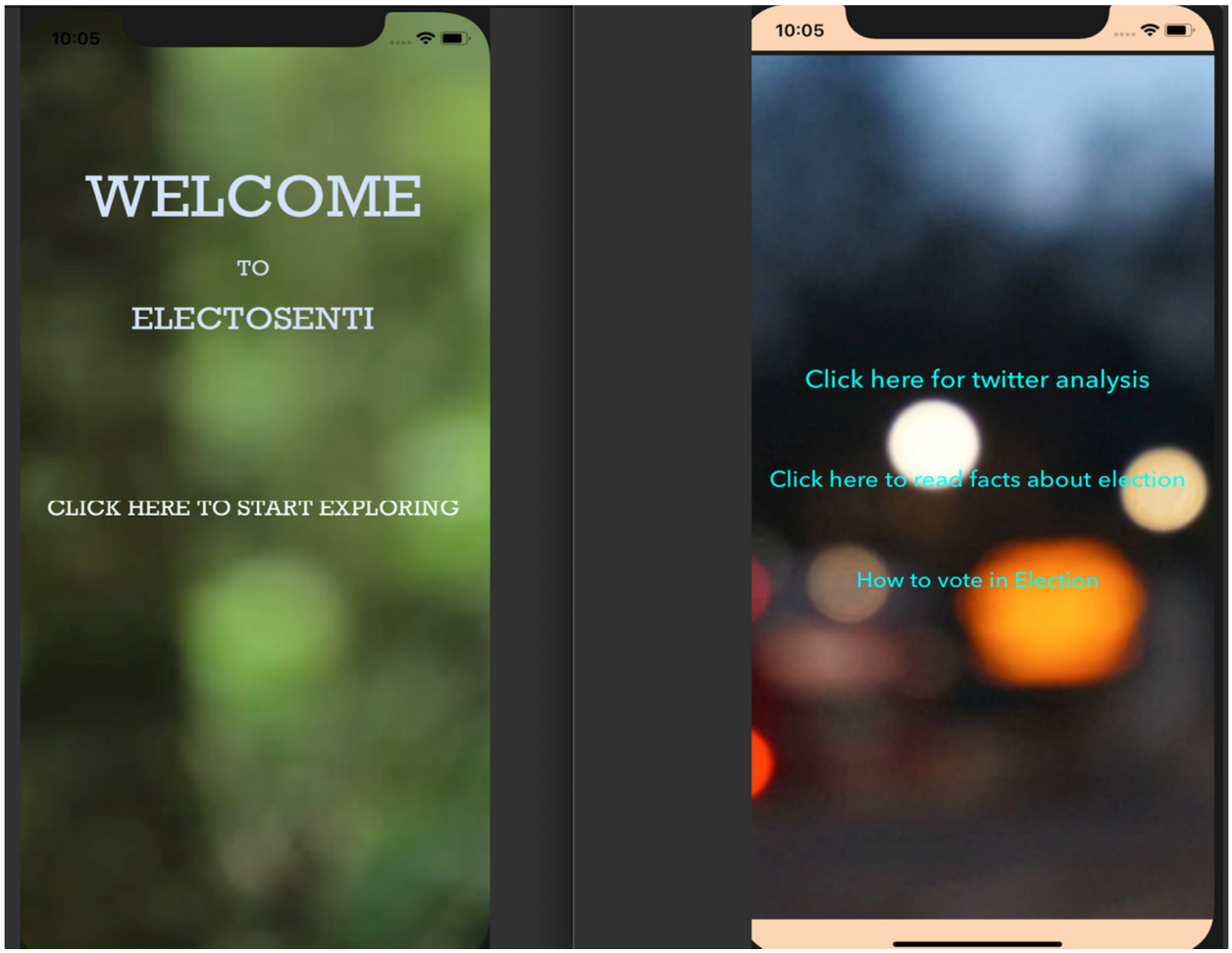


Fig 5 : Representation of Welcome Page and Functionality Page in iOS Simulator (iPhone XS).

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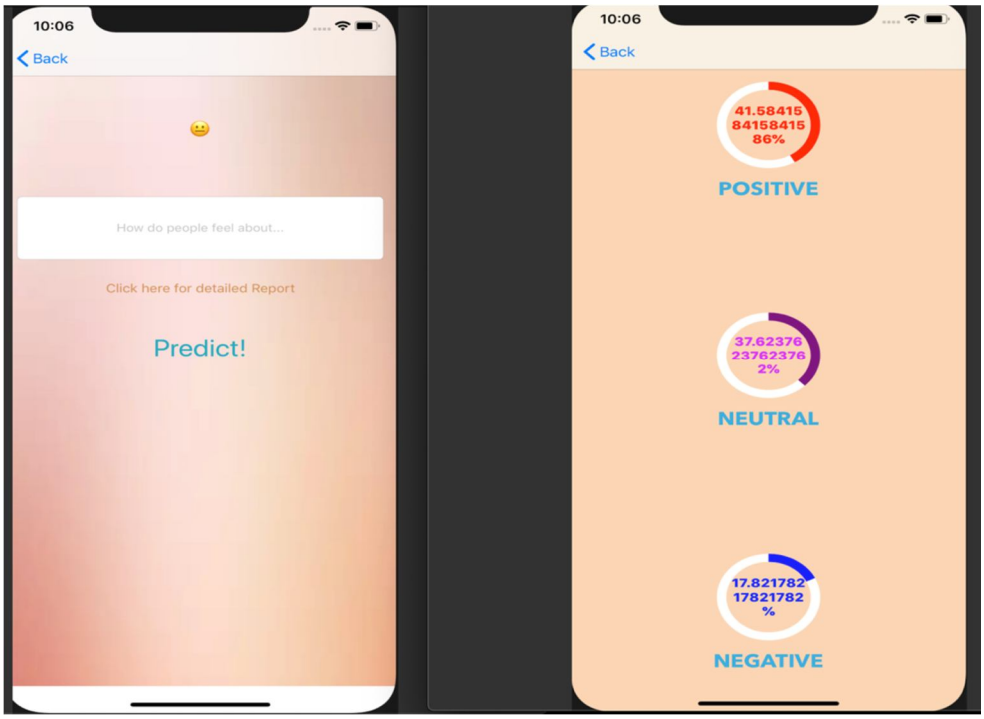


Fig 6 : Representation of Prediction Page and Result Page which shows a result of sample tweet searched in iOS Simulator (iPhone XS).

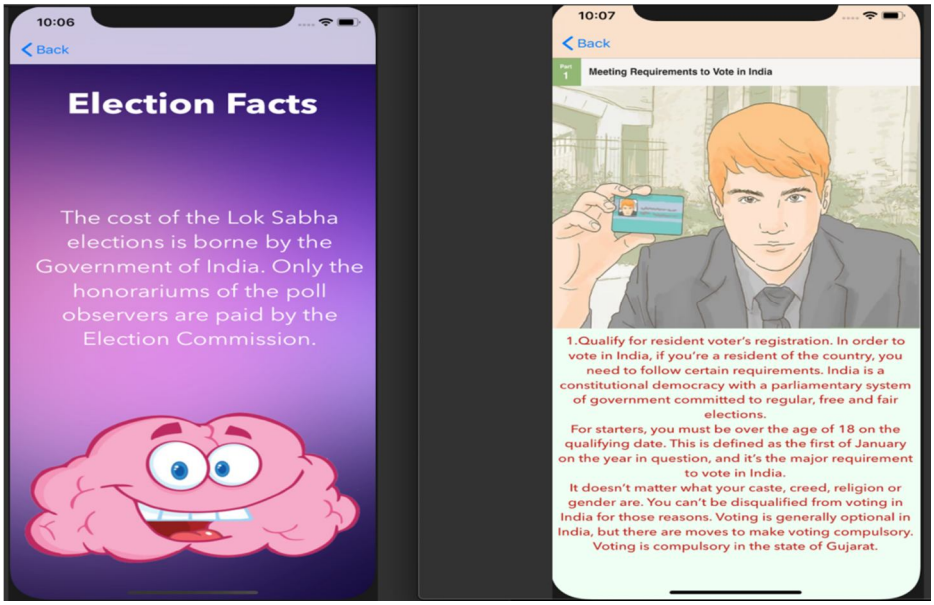


Fig 7 : Representation of Election Fact Page and Voting Instruction Page in iOS Simulator (iPhone XS).

V. CONCLUSIONS

From the survey we have carried out on election sentimental analysis through apple's CreateML framework people are actively showing their interest in election and many tweets are observed and a thorough study gives us an idea that sentiments can be used for classifying the data which can have a approximate match to the actual sentiments. Also, the machine learning framework provided by Apple is highly accurate with 79.345% accuracy to the data we are feeding and can be improved by providing more appropriate ratio of test to training data. Further we can use other classifying algorithms like SVM(Support Vector Machine) to classify the data and fed it through a API to provide more satisfying results.

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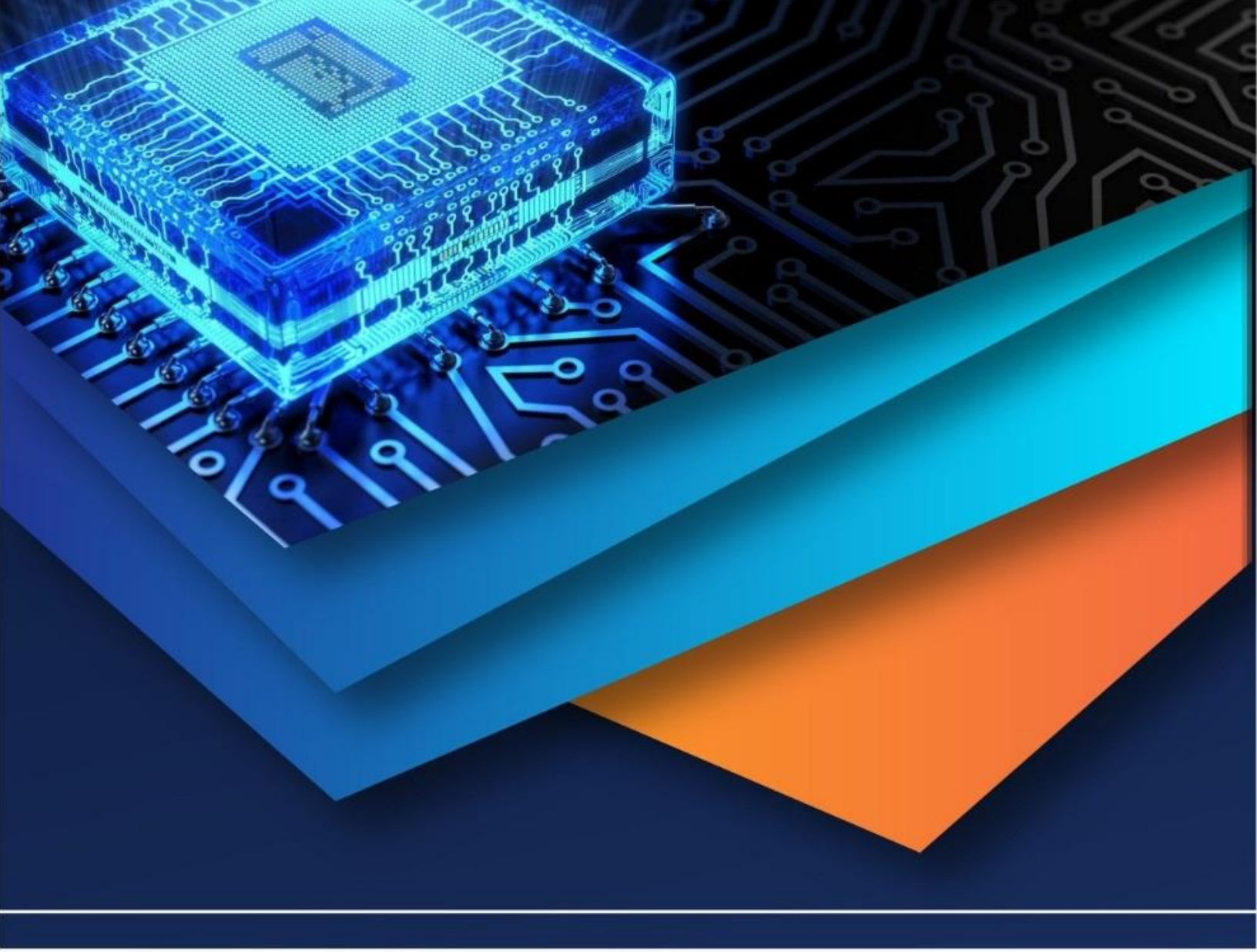
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