A

Mini Project

On

EMOTION DETECTION USING TWITTER DATASETS AND SPACY ALGORITHM

(Submitted in partial fulfillment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

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CMR TECHNICAL CAMPUS

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2021-25

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project entitled "**EMOTION DETECTION USING TWITTER DATASETS AND SPACY ALGORITHM**" being submitted by **CH.NIHARIKA(217R1A0516),P.NIKITHA(227R5A0502) & A.SHIVANI(217R1A0501)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide work carried out by him/her under our guidance and supervision during the year 2024-2025

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

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Submitted for viva voice Examination held on _____

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ABSTRACT

People show emotions for everyday communication. Emotions are identified by facial expressions, behavior, writing, speaking, gestures and physical actions. Emotion plays a vital role in the interaction between two people. The detection of emotions through text is a challenge for researchers. Emotion detection from the text can be useful for real-world application. Automatic emotion detection in the original text aims to recognize emotions in any digital medium by using natural language processing techniques and different approaches. Enabling machines with the ability to recognize emotions in a particular kind of text such as twitter's tweet has important applications in sentiment analysis and affective computing. We have worked on the newly published gold dataset (AIT-2018) and propose a model consisting of lexicalbased using WordNet-Affect and EmoSenticNet with supervised classifiers for detecting emotions in a tweet text**.**

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1. INTRODUCTION

1.INTRODUCTION

1.1 PROJECT SCOPE

This project is titled as “EMOTION DETECTION USING TWITTER DATASETS AND SPACY ALGORITHM”. This software provides facility to upload the text and get to know weather it is positive ,neutral or negative. This project uses machine-learning methods and computer vision to identify emotions from the text. First, we use spacy algorithm to classify the text from the twitter data sets . Then we upload the data set in algorithm and find the emotion is neutral ,positive or negative.

1.2 PROJECT PURPOSE

purpose of the Emotion Detection project using Twitter datasets and the SpaCy algorithm is to analyze and classify emotions expressed in tweets. By leveraging natural language processing (NLP), the project aims to uncover sentiments related to various topics, events, and trends. It seeks to enhance understanding of public opinion and emotional responses in real-time social media interactions. the project intends to develop an accurate and efficient emotion classification system. Ultimately, this tool can provide valuable insights for businesses, researchers, and policymakers. The project also aims to address challenges like sarcasm and informal language in tweets. Through iterative model training and evaluation, it seeks to improve emotion detection accuracy. Additionally, the project aims to contribute to advancements in sentiment analysis methodologies.

1.3 PROJECT FEATURES

The Emotion Detection project using Twitter datasets and the SpaCy algorithm features real-time analysis, allowing for immediate insights into public sentiment as tweets are posted. It supports multi-emotion classification, enabling the identification of various emotions—such as joy, sadness, anger, and surprise—within a single tweet. A user-friendly interface makes it easy for users to input tweets and receive emotional analysis results. Additionally, data visualization tools provide a clear representation of emotion trends over time or across different topics. Users can customize the emotion detection model based on specific keywords, hashtags, or events, while seamless integration with the Twitter API facilitates direct data collection and analysis. The project also incorporates continuous learning mechanisms that enhance the model’s accuracy over time based on user feedback and new data.

2.SYSTEM ANALYSIS

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SYSTEM ANALYSIS

System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, "what must be done to solve the problem?" The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

2.1 PROBLEM DEFINITION

A detailed study of the process must be made by various techniques like Image processing, feature recognition etc. The data collected by these sources must be scrutinized to arrive to a conclusion. The conclusion is an understanding of how the system functions. This system is called the existing system. Now the existing system is subjected to close study and problem areas are identified. The designer now functions as a problem solver and tries to sort out the difficulties that the enterprise faces. The solutions are given as proposals. The proposal is then weighed with the existing system analytically and the best one is selected. The proposal is presented to the user for an endorsement by the user. The proposal is reviewed on user request and suitable changes are made. This is loop that ends as soon as the user is satisfied with proposal.

2.2 EXISTING SYSTEM

Twitter plays an important role in providing raw data to be used in sentiment and emotion analysis. In literature, there are many studies about sentiment [14]–[17] and emotion analysis [18]–[20] on Twitter data in many languages including Turkish [6]. However, most studies in Turkish text deals with sentiment analysis rather than emotion analysis. So, in this section, we provide the state-of-the-art in sentiment and emo- tion analysis of Twitter data in both English and Turkish. In the literature, some studies dealing with sentiment analysis of Twitter data in Turkish. Çoban et al., [21] focused on analyzing sentiment extraction from social media sources. So, they first collected a dataset composed of 14,777 tweets.

EMOTION DETECTION FROM TWEET :

For emotion detection, there are four kinds of text-based techniques as follows keyword spotting method, lexical affinity method, learning based method and hybrid methods [13]. For detecting emotions from tweets, we have used the lexical affinity method combined with learning-based methods to automatically classify multi-class emotions from our dataset. We have used WordNet-Affect [14] and EmoSenticNet [15] emotion lexicon to extract the emotion containing words as features from the tweet separately. WordNet-Affect returns the emotion representing words from the tweets which is then considered as features but in most cases, it is unable to take the words which may not be an emotion word but do represent an emotion. For a small set of words WordNetAffect can determine if the word represents one of the six basic emotions. The main drawback of WordNet-Affect is that it can not give an intensity for the words as some words though they are a synonym of each other may represent different type of emotion with respect to text. On the other hand EmoSenticNet is an extension of WordNet-Affect which also apply the SenticNet [16] rules. It then also finds the features which are not contained in WordNet-Affect.

Then we have used term frequency and inverse document frequency on the features to give the emotion features a better score, after that, we have used some different supervised algorithm for emotion classification. We have used Naïve Bayesian, Decision Tree and Support Vector Machine for emotion classification, all of these are supervised machine learning algorithm.

We have tried to experiment ourselves with detecting the emotion from a text document. Below we are presenting our proposed methodology in figure 1. The following sections describe each process in details.

DATASET :

For our dataset we have taken SemEval-2018 Affect in Tweets Distant Supervision Corpus (AIT-2018 Dataset). Using twitter API these tweets are crawled from twitter from tweets that included emotion relationship as '#angry','#annoyed', '#panic', '#happy', '#love', '#surprised', etc. To create a dataset of tweets rich in a particular emotion, they have used the following methodology. For each emotion X, they selected 50 to 100 terms that were associated with that emotion at different intensity levels. For example, the angry dataset used these terms as follows mad, frustrated, annoyed, peeved, irritated, miffed, fury, antagonism, and so on. This dataset consists of 4 emotion class anger, fear, joy and sadness, they have represented anger and disgust as anger and happiness and sadness as joy.

The dataset of the task was divided into 3 languages as follows English, Arabic and Spanish. In each language there are 5 sub-task datasets. We only work with EI-oc subtask dataset. In which for each tweet there is an emotion alongside the corresponding intensity of that tweet [3]. An initial distribution of the dataset's task EI-oc can be found in figure 2.

2.2.1 LIMITATIONS OF EXISTING SYSTEM

1.LESS ACCURACY
2**.** LOW EFFICIENCY

2.3 PROPOSED SYSTEM

The aim of proposed system is to develop a system of improved facilities. The proposed system can overcome all the limitations of the existing system. The system provides higher accuracy and reduces the classification work. The existing system has several disadvantages and many more difficulties to work well. The proposed system tries to eliminate or reduce these difficulties up to some extent. The proposed system helps the user to work user friendly and he can easily do his jobs without time lagging.

2.3.1 ADVANTAGES OF THE PROPOSED SYSTEM

The system is very simple in design and to implement. The system requires very low system resources and the system will work in almost all configurations. It has got following features

- Ensure data accuracy's.
- Minimum time needed for the various processing.
- Greater efficiency.
- Better service.
- User friendliness and interactive.
- Minimum time required.

2.2 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. Three key considerations involved in the feasibility analysis are

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.2.1 ECONOMIC FEASIBILITY

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also all the resources are already available, it give an indication of the system is economically possible for development.

2.2.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.2.3 BEHAVIORAL FEASIBILITY

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?

The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

2.3 HARDWARE & SOFTWARE REQUIREMENTS

2.3.1 HARDWARE REQUIREMENTS:

Hardware interfaces specifies the logical characteristics of each interface between the software product and the hardware components of the system. Thefollowing are some hardware requirements.

- Processor : Intel Core i5.
- Hard disk : 1TB
- RAM : 6GB
- Monitor : 5 inches

2.3.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements,

- Operating system : Windows 11,12
- Languages : Python(version 3.7.0)
- Backend : Machine Learning

3.ARCHITECTURE

ARCHITECTURE

3.1 PROJECT ARCHITECTURE

This project architecture shows the procedure followed for emotion detection using machine learning, starting from input to final prediction

.

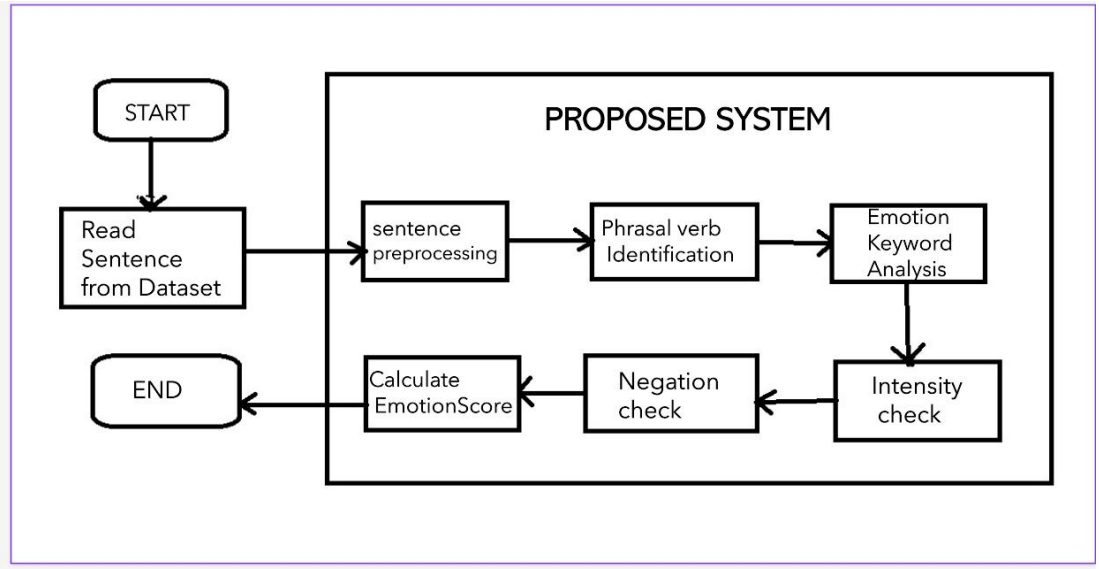


Figure 3.1

3.2 DESCRIPTION

The diagram you provided shows a flowchart for a Proposed System that processes sentences, possibly for emotion analysis or sentiment detection. Here's a detailed explanation of the steps involved in the system:

1. Start: The system starts its process.
2. Read Sentences from Dataset: The first step is to read or input sentences from a predefined dataset. This dataset contains the text that needs to be analyzed.
3. Proposed System (Core Processing):

Sentence Preprocessing: The sentences go through preprocessing, which likely includes

removing noise, tokenizing words, normalizing the text (such as converting to lowercase), and handling punctuation. This step ensures the input text is cleaned and ready for further analysis.

Phrasal Verb Identification: After preprocessing, the system identifies any phrasal verbs present in

the sentences. Phrasal verbs (e.g., "give up," "take off") are important because they often change the meaning of the verb, which could affect emotion detection.

Emotion Keyword Analysis: This module scans the sentence for specific keywords that indicate emotions (e.g., happy, sad, angry). It identifies words directly associated with different emotional states, which helps in categorizing the emotional tone of the sentence.

Negation Check: In this step, the system checks for any negations in the sentence (e.g., "not happy" instead of "happy"). Negations can reverse or alter the meaning of emotions and need to be handled properly to avoid incorrect sentiment analysis.

Intensity Check: This module checks the intensity of the emotions expressed. For example, "very happy" versus "happy" indicates a stronger emotion. Intensifiers or diminishers (e.g., "slightly" or "extremely") modify the intensity of the emotion and are detected here.

Calculate Emotion Score: Based on the keywords, negation handling, and intensity checks, the system calculates an overall emotion score for the sentence. This score quantifies the emotion being conveyed, which could be used for further classification or understanding of the sentence's sentiment.

4. End: The system completes its process after calculating the emotion score.

ın summary, the system appears to be designed to analyze and quantify the emotional content of sentences through various processing steps, including preprocessing, phrasal verb detection, emotion keyword extraction, negation and intensity checks, and finally computing an emotion score.

3.3 USE CASE DIAGRAM

In the use case diagram we have basically two actors who are the user and the administrator. The user has the rights to login, access to resources and to view thecrime details. Whereas the administrator has the login, access to resources of the users and also the right to update and remove the crime details, and he can also view the user file

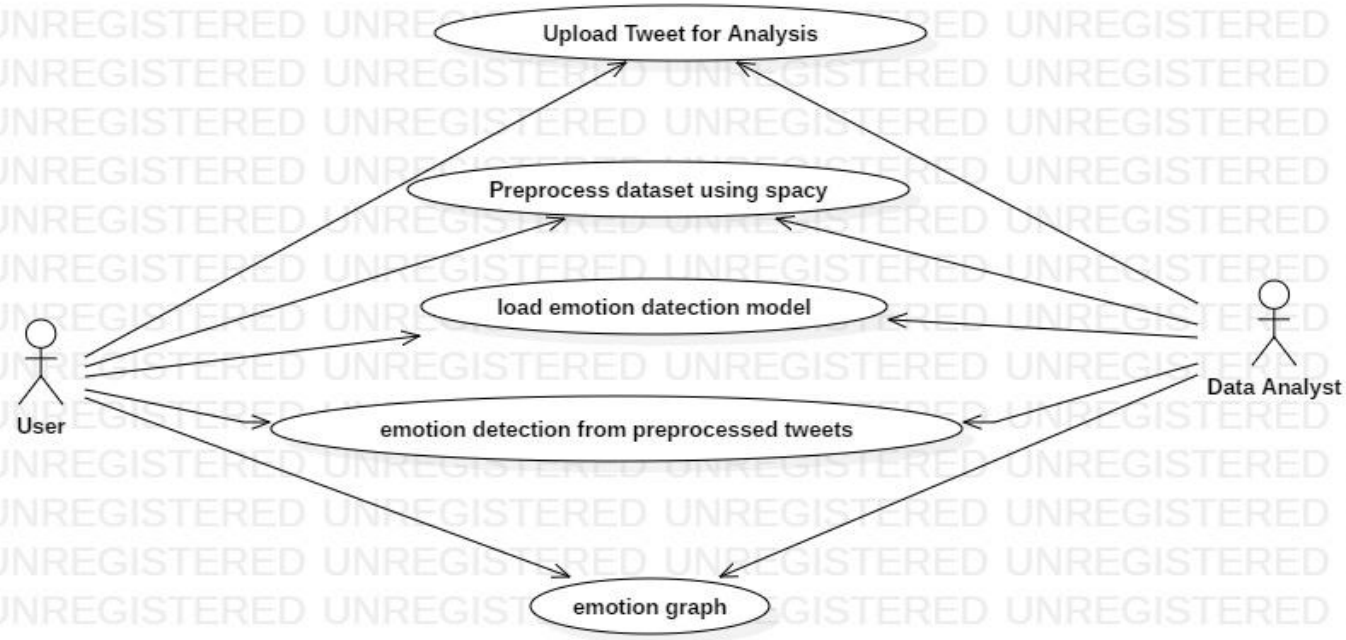


Figure 3.2: Use Case Diagram

3.3 CLASS DIAGRAM

Class Diagram is a collection of classes and objects.

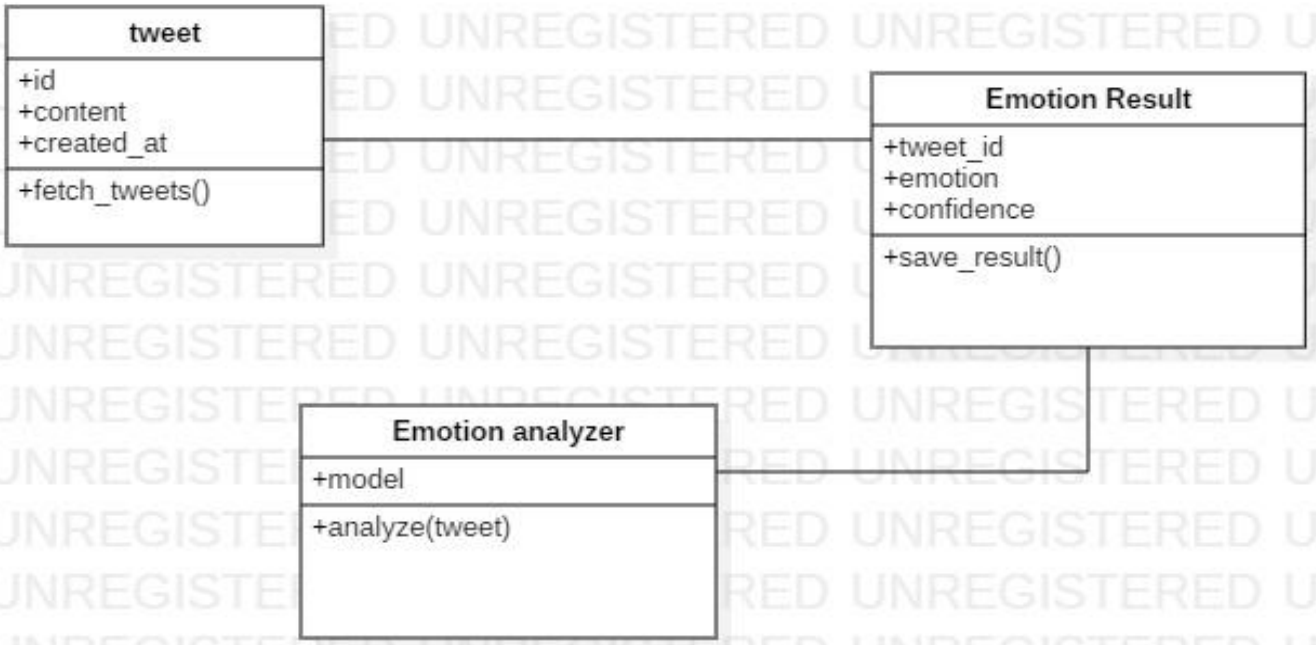


Figure 3.3: Class Diagram

3.4 SEQUENCE DIAGRAM

Figure 3.4: Sequence Diagram

3.5 ACTIVITY DIAGRAM

It describes about flow of activity states.

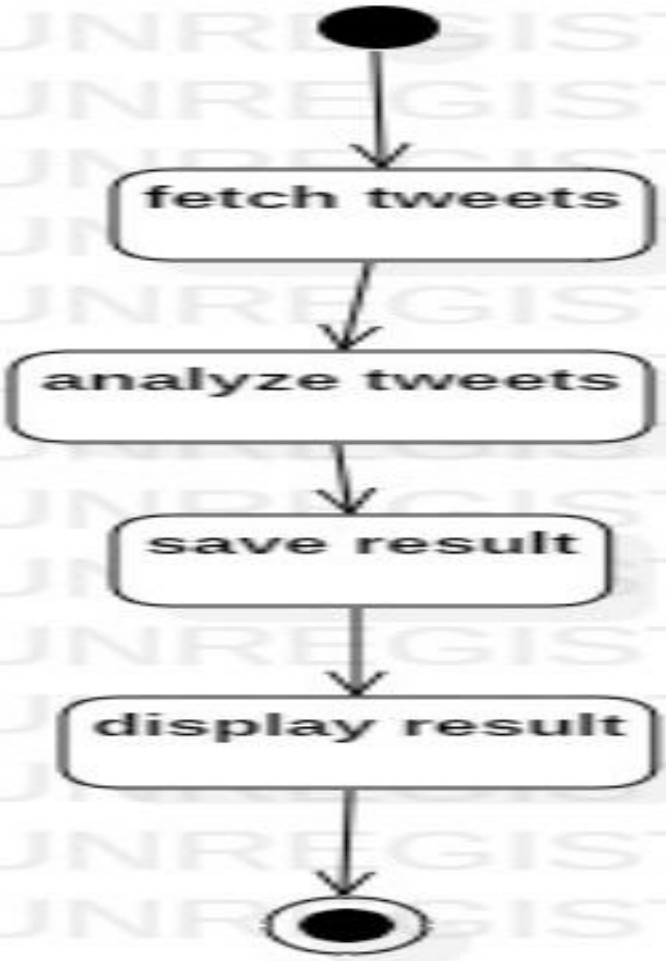


Figure 3.5: Activity Diagram

4.IMPLEMENTATION

4.IMPLEMENTATION

SOURCE CODE

```
 from tkinter import messagebox
from tkinter import *
from tkinter import simpledialog
import tkinter
from tkinter import filedialog
import matplotlib.pyplot as plt

from tkinter.filedialog import askopenfilename
from tkinter.filedialog import askdirectory
import numpy as np
import os
import pandas as pd

import spacy #importing SPACY text processing tool
from vaderSentiment.vaderSentiment import SentimentIntensityAnalyzer
import matplotlib.pyplot as plt
main = tkinter.Tk()
main.title("Emotion Detection using Twitter Datasets and Spacy Algorithm") #designing
main screen
main.geometry("1300x1200")
spacy_model = spacy.load('en_core_web_sm') #loading SPACY with english language
model and dictionary
global emotion_model, dataset, tweets
global neutral, positive, negative

def uploadDataset():
 global dataset
 filename = filedialog.askopenfilename(initialdir="TweetsDataset")
    dataset = pd.read_csv(filename, encoding='utf-8',nrows=200)
    text.delete('1.0', END)
```

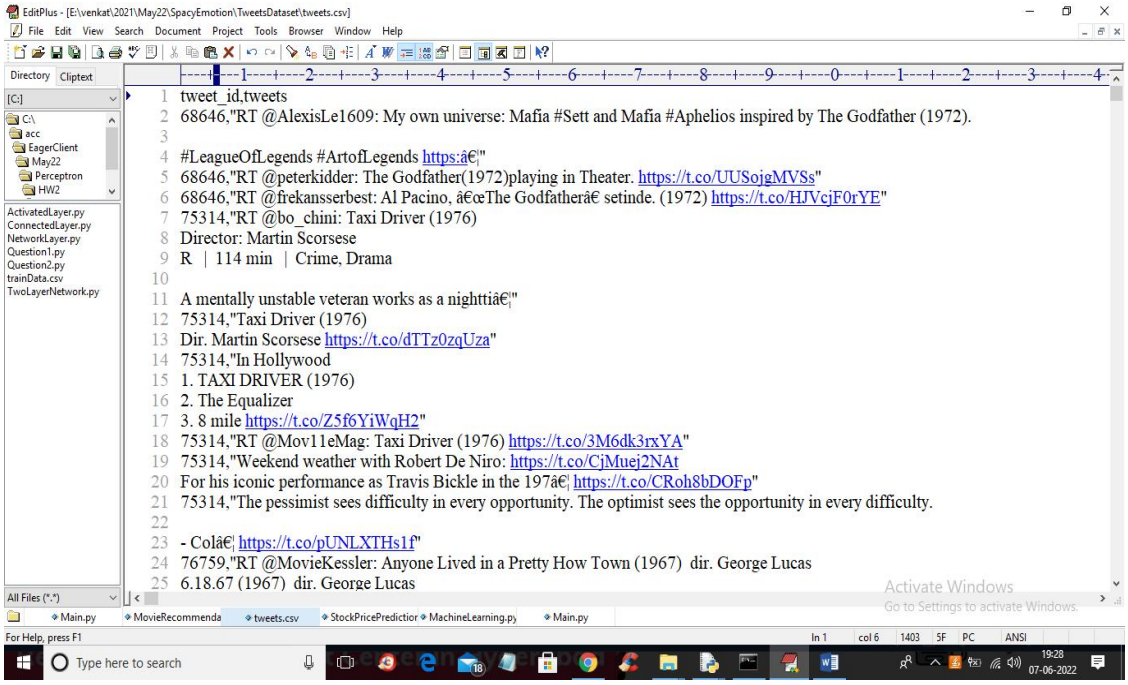
```
    text.insert(END,filename+" loaded\n\n")
    text.insert(END,str(dataset.head()))

    def Preprocessing():
    text.delete('1.0', END)
    global tweets, dataset
     tweets = []
    dataset = dataset.values
    for i in range(len(dataset)):
        msg = dataset[i,1]
        msg = re.sub('[^A-Za-z]+', ' ', msg)
        msg = msg.strip("\n").strip()
        msg = spacy_model(msg)
        msg = msg.text
        tweets.append(msg)



        text.insert(END,msg+"\n\n")
        text.update_idletasks()
    messagebox.showinfo("Preprocessing Task Completed", "Preprocessing Task
    Completed")

def loadModel():
    global emotion_model
    text.delete('1.0', END)
    emotion_model = SentimentIntensityAnalyzer()
    text.insert(END,"Emotion Detection Model Loaded")

def detectEmotion():
    text.delete('1.0', END)
    global neutral, positive, negative, tweets, emotion_model
    neutral = 0
    positive = 0
```

```
    negative = 0
    for i in range(len(tweets)):
        sentiment_dict = emotion_model.polarity_scores(tweets[i].strip())

        compound = sentiment_dict['compound']
        if compound >= 0.05 :
            result = 'Positive'
            positive = positive + 1
        elif compound <= - 0.05 :
            result = 'Negative'
            negative = negative + 1
        else :
            result = 'Neutral'
            neutral = neutral + 1
        text.insert(END,str(tweets[i])+" ====> EMOTION DETECTED AS : "+result+"\n\n")

def emotionGraph():
    global neutral, positive, negative
    text.delete('1.0', END)

    plt.pie([positive, negative, neutral],labels=['Positive Tweets','Negative Tweets',
    'Neutral Tweets'],autopct='%1.1f%%')
    plt.title('Tweets Emotion Graph')
    plt.axis('equal')
    plt.show()

def close():
    main.destroy()
font = ('times', 16, 'bold')
title = Label(main, text='Emotion Detection using Twitter Datasets and Spacy Algorithm')
title.config(bg='deep sky blue', fg='white')
```

```
title.config(font=font)
title.config(height=3, width=120)
title.place(x=0,y=5)

font1 = ('times', 12, 'bold')
text=Text(main,height=20,width=150)
scroll=Scrollbar(text)

text.configure(yscrollcommand=scroll.set)
text.place(x=50,y=120)
text.config(font=font1)
font1 = ('times', 13, 'bold')
uploadButton = Button(main, text="Upload Tweets Dataset", command=uploadDataset)
uploadButton.place(x=50,y=550)
uploadButton.config(font=font1)

processButton = Button(main, text="Preprocess Dataset using Spacy",
command=Preprocessing)
processButton.place(x=400,y=550)
processButton.config(font=font1)

emotionModelButton = Button(main, text="Load Emotion Detection Model",
command=loadModel)
emotionModelButton.place(x=750,y=550)
emotionModelButton.config(font=font1)

emotionDetectionButton = Button(main, text="Emotion Detection from Processed Tweets",
command=detectEmotion)
emotionDetectionButton.place(x=50,y=600)
emotionDetectionButton.config(font=font1)
```

```
graphButton = Button(main, text="Emotion Graph", command=emotionGraph)
graphButton.place(x=400,y=600)
graphButton.config(font=font1)

exitButton = Button(main, text="Exit", command=close)
exitButton.place(x=750,y=600)
exitButton.config(font=font1)
main.config(bg='LightSteelBlue3')
main.mainloop()
```

IMPLEMENTATION



To implement this project we have designed following modules

1) Upload Tweets Data set: using this module we will upload tweets messages to application
2) Preprocess Data set using Spacy: using this module we will read each tweets and then apply spacy algorithm to clean and processed tweets
3) Load Emotion Detection Model: using this module we will load emotion detection machine learning algorithm
4) Emotion Detection from Processed Tweets: using this module we will apply each processed tweet on machine learning model which will predict emotion from given tweet
5) Emotion Graph: using this module we will plot emotion graph from all tweets

5.SCREENSHOTS

To run project double click on 'run.bat' file to get below screen

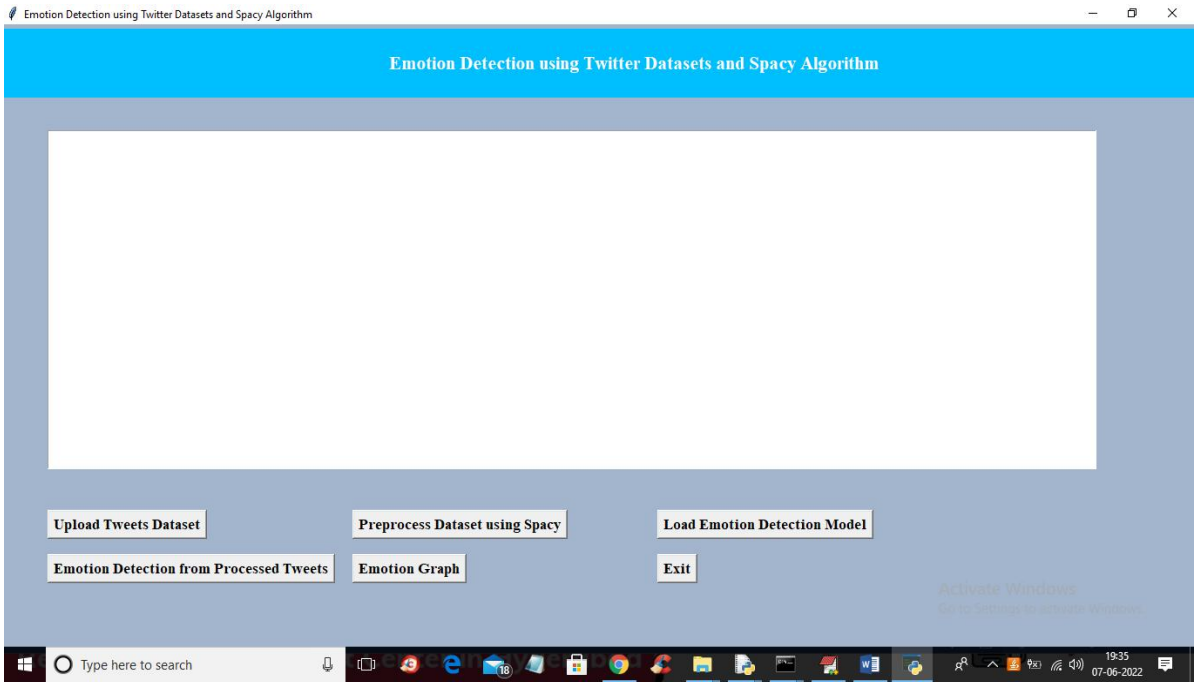


Fig 5.1 :Upload Tweets Dataset

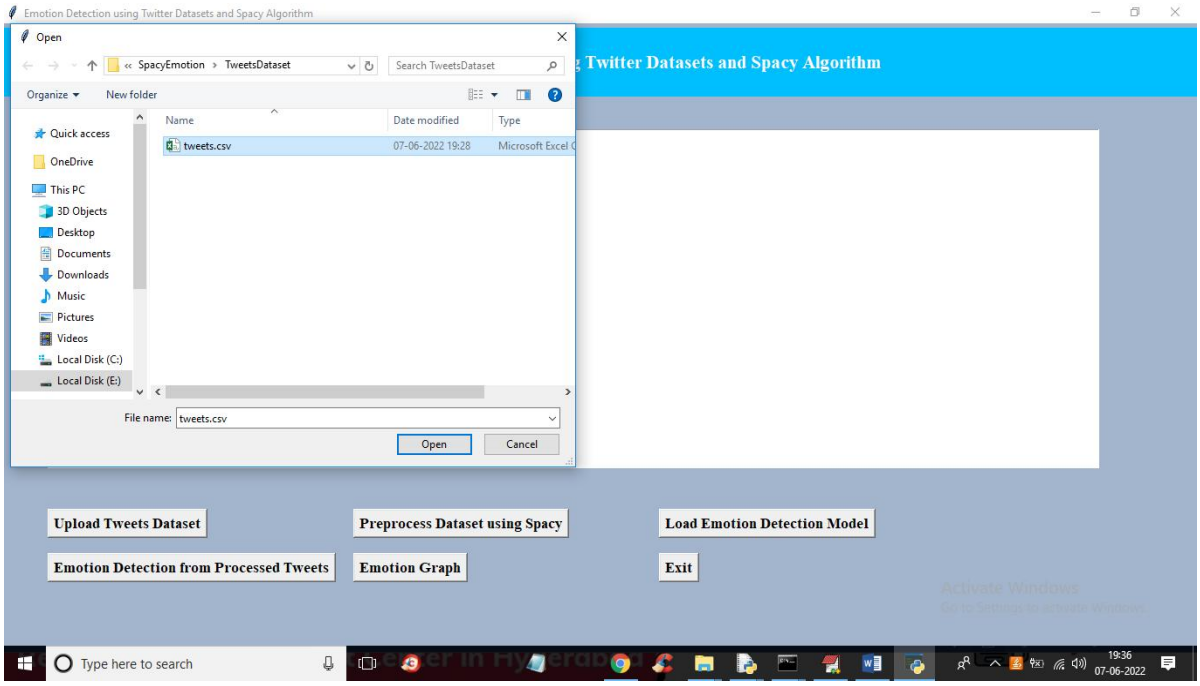


Fig 5.2:click on 'Open'

In above screen selecting and uploading tweets dataset and then click on 'Open' button to get below output

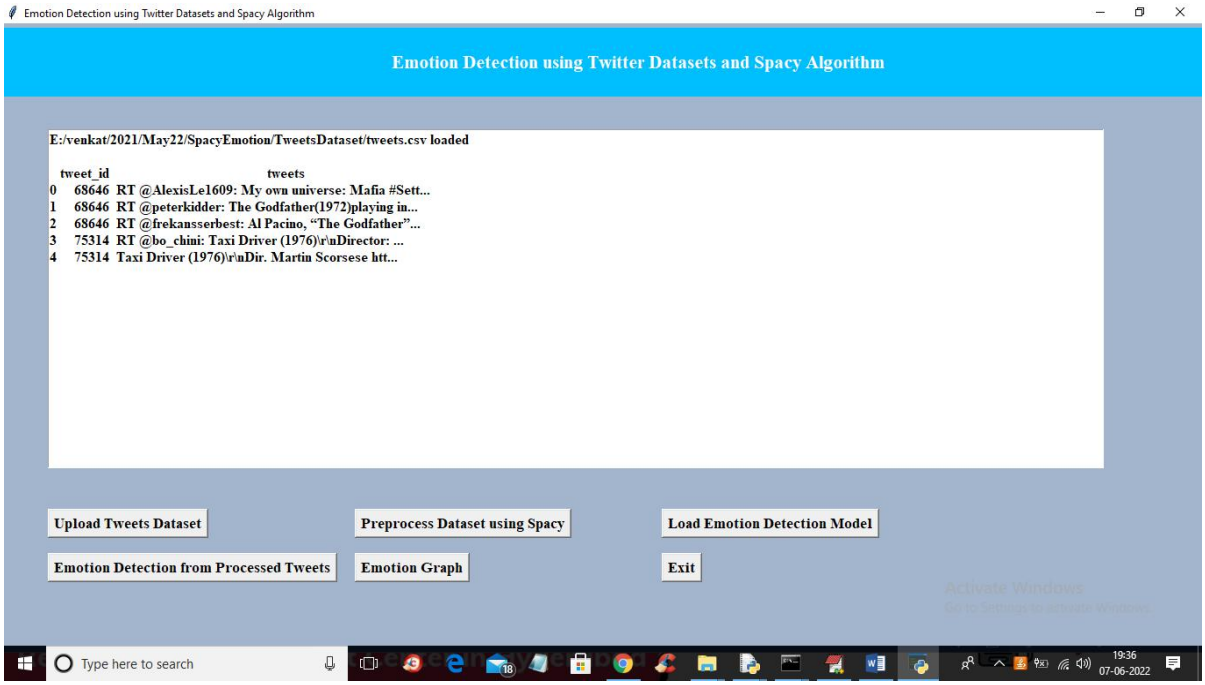


Fig 5.3:Preprocess Dataset using Spacy

In above screen we can see dataset loaded and tweets contains total unstructured text with stop words and special symbols and now click on 'Preprocess Dataset using Spacy' to clean tweets and get below output

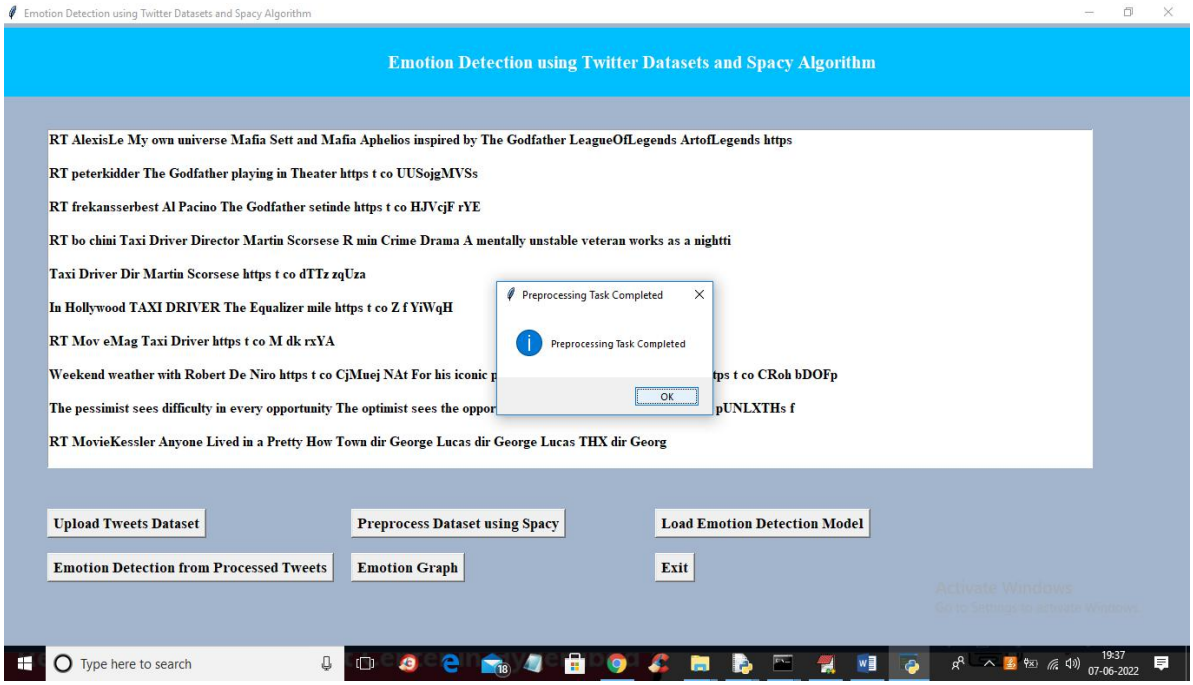


Fig 5.4:Load Emotion Detection Model

In above screen Preprocessing completed and we can see all tweets contains only text with clean words and now click ‘Ok’ button and then click on ‘Load Emotion Detection Model’ button to load machine learning model for emotion detection and get below output

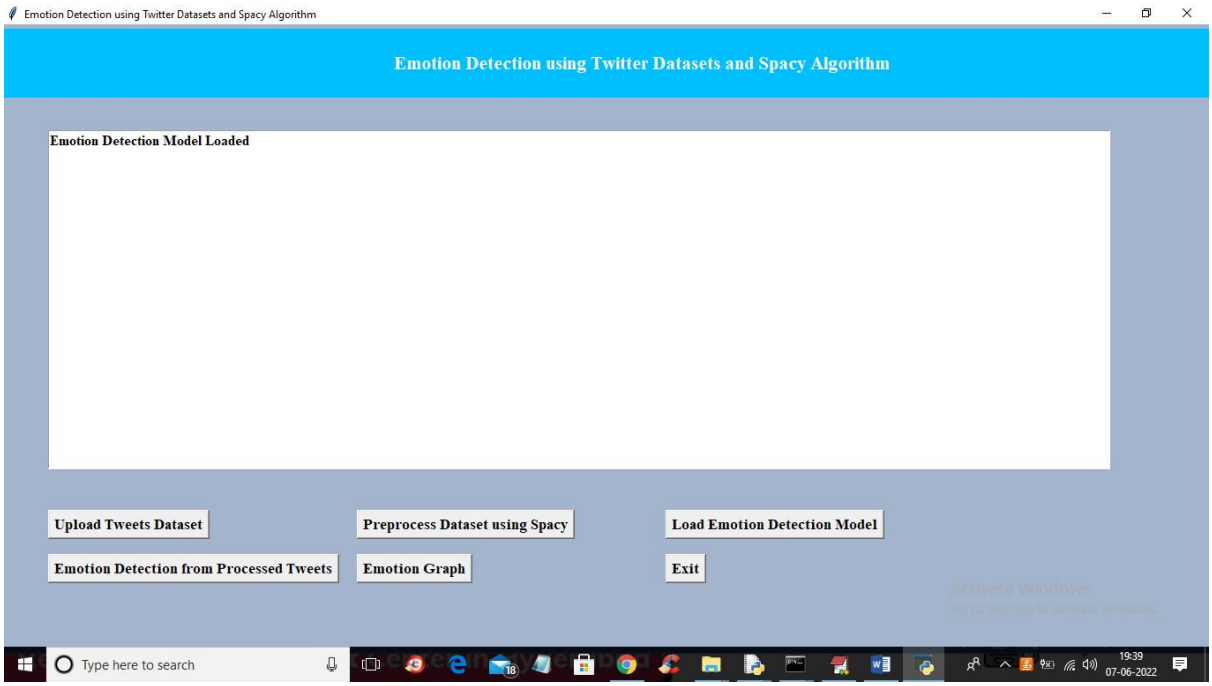


Fig 5.5:Emotion Detection from Processed Tweets

In above screen model is loaded and now click on ‘Emotion Detection from Processed Tweets’ button to detect emotion and get below output

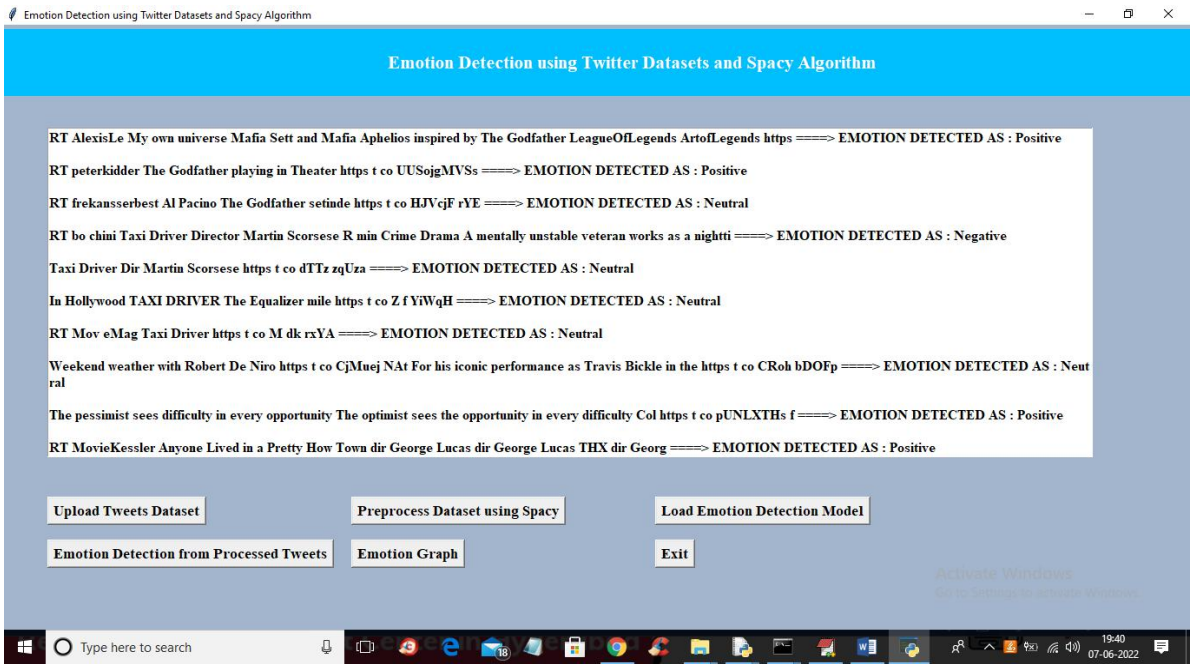


Fig 5.6:Positive, Negative or Neutral

In above screen before arrow symbol =➔ we can see clean tweet messages and after arrow symbol we can see predicted emotion as ‘Positive, Negative or Neutral’ and scroll down above screen to view all messages

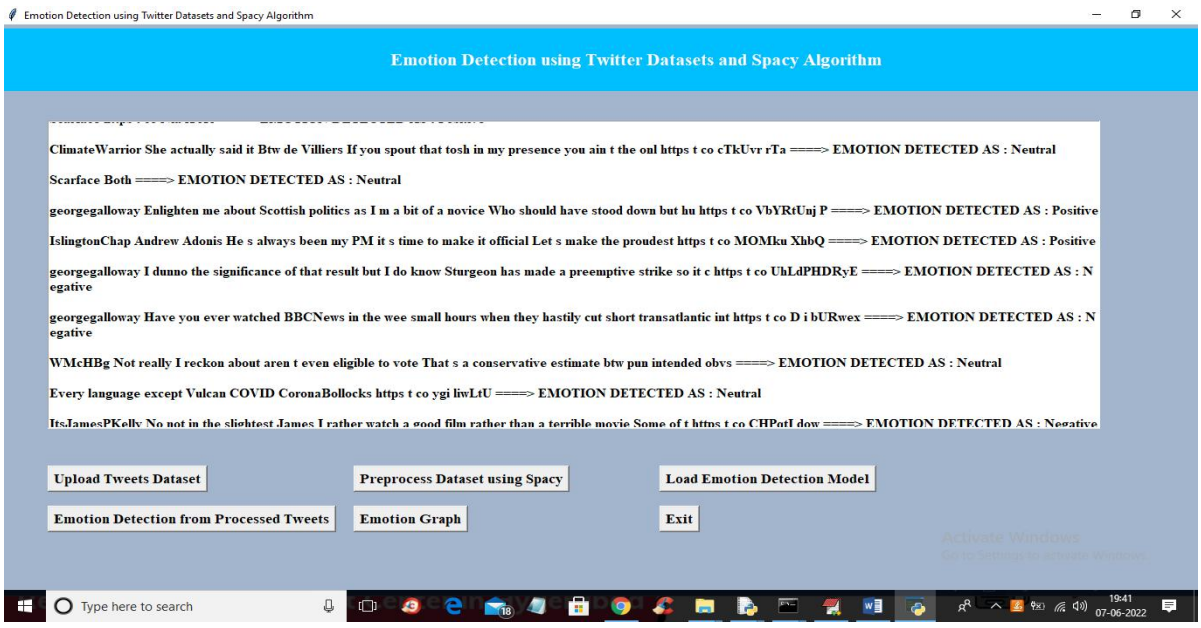


Fig 5.7 :click on ‘Emotion Graph’

In above screen we can see all tweets with emotion and now click on ‘Emotion Graph’ to know tweets percentage in each emotion

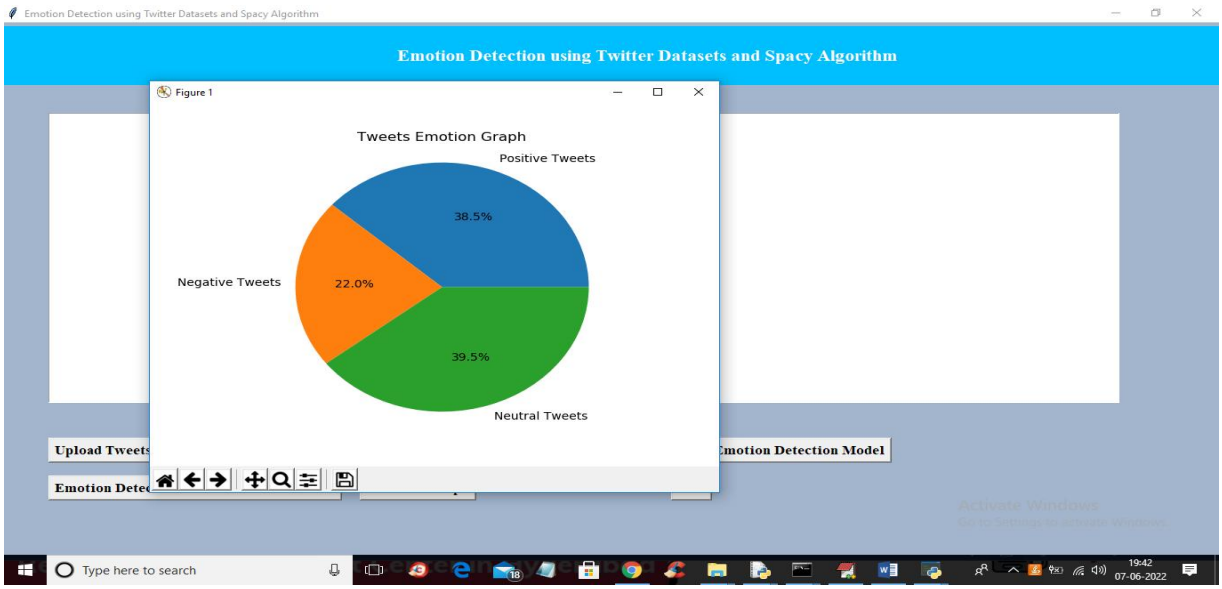


Fig 5.8:Tweets percentage in each emotion

In above graph 38.5% peoples are giving positive tweets and 22% gave negative tweets and 39.5% gave neutral tweets so by using this application we can easily extract useful knowledge from peoples reviews weather they are satisfy or not on any topics tweets

6.TESTING

6. TESTING

6.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discoverevery conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

6.2 TYPES OF TESTING

6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes.

6.3 TEST CASES

6.3.1 UPLOADING IMAGES

Test case ID	Test case name	Purpose	Test Case	Output
1	User uploads tweets	Use it for prediction	The user uploads tweets for different people	Uploaded successfully

6.3.2 CLASSIFICATION

Test case ID	Test case name	Purpose	Input	Output
1	Classification test 1	To check if the classifier performs its task	Twetter data set	positive
2	Classification test 2	To check if the classifier performs its task	Twetter data set	negative
3	Classification test 3	To check if the classifier performs its task	Twetter data set	neutral.

7.CONCLUSION

7.CONCLUSION & FUTURE SCOPE

7.1 PROJECT CONCLUSION

Emotion detection is one of the toughest problems to solve. Detecting emotion from text is a challenging work and most of the research works have some kind limitations most importantly, language ambiguity, multiple emotion bearing text, text which does not contain any emotion words etc. Yet we have tried several approaches to detect emotion from twitter. We can say after using EmoSenticNet lexicon, the model performs better than using only WordNet-Affect. It can be also said that our model has performed well but still better results are achievable. As for accuracy, the EmoSenticNet outperforms WordNet-Affect by a great margin. Our limitations are that we have used a small sample as our data set and there are still language ambiguity problems as we have not been able to address texts which represent multiple emotion at the same time.

TABLE VI
ACCURACY OF DIFFERENT CLASSIFIERS

Work	Feature Selection	Classifier	Result
[12]	Logistic Regression	Random Forest	90% on Anger Class
Our Model	EmoSenticNet	SVM	89.28% on Anger Class

7.2 FUTURE SCOPE

In the future, we will introduce Deep Learning techniques to identify emotion detection on this data set. The software can be developed further to include lot of modules because the proposed system is developed on the view of future. We can connect to other data bases by including them .

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