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FINAL YEAR PROJECT REPORT ON
SOCIAL MIRROR
For the award of the
Degree of Bachelors in Technology
In Department of Computer Science and Engineering

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It's rightly said that there are hundreds of people working behind the curtain to make a Play successful. The final result of our project- Social Mirror required a lot of guidance and help from many people and we are extremely fortunate to have got this throughout the journey of our project. Whatever we are today is only due to such supervision and assistance and we would not forget to thank them from the bottom of our heart.

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Thank you.

DECLARATION

We, Group 6, hereby declare that our Project titled- “SOCIAL MIRROR” being submitted by us in the Department Of Computer Science and Engineering is a project work carried by us under the noble supervision of Dr. HK Verma and the project has not been copied from anywhere and has been made solely by us.

We will be solely responsible if some Plagiarism is found. Thank You All.

Date: 18th May, 2020

[Group 6]

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INTRODUCTION - Building Up The Foundation

1.1 Background

The idea of this project is to develop a website through which people can dig deep into social contents. As the name specifies, this website can dig deep into the social media content. For the sake of this project, we have considered only twitter data for analysis. This will help the individuals to find what impact does social media have on their minds. We have developed two tools, the first one is text emotion detection, where the user can detect the percentage of 12 emotions present in the content. We have given four options to the users, users can input text data directly, or can get twitter data based on user name, tweet id, or particular hashtags.

Then they can see the results.

The second tool can detect whether a tweet is fake or real. There are many online tools which are available on the internet which can generate fake tweets. The person has never tweeted that content, but the screenshots go on viral. With our tool, users can check whether a person has actually tweeted or not.

This can help people to get to know about the truth and this will reduce the flood of fake tweets on social media platforms.

1.2 Literature Survey

In an attempt to review existing literature on this innovation -text emotion classification and fake tweet detection, we went through various sources available on the internet. We also explored the existing system of a few other colleges. This Survey is mention below:-

There is software named Quick Search, developed by Talkwalker. This website takes the tweet data based on certain criteria, and classifies the emotion as positive, negative or neutral. Moreover it does not provide any service to check whether the tweet is real or fake.

Social media content is full of emotions and we need to get more out of it. Moreover it doesn't have a good data pre-processing technique, as it is not considering emojis while detecting emotions. We didn't find any website which can detect the fake tweet but many tools which are used to make fake tweets.

We thought that it's important to develop such tools and integrate them on the single platform for easy access.

1.3 Problem Statement and its Necessity

The major Problems that motivated the Solution are as follows:

1. Social media have impact on individuals mental health:

In the era of digitalization, people are more active on social media platforms. On an average a person spends 2-3 hours on their social media handles. They read so much content on social media, and make interpretations on what they read. Most of the people have stopped watching tv news channels, and keep themselves up to date through social media. People share a variety of things on social media, some use their handles to spread hatred, or fake news. This has a great impact on the users. They may not understand its effects immediately, but it does have a huge impact on their mental state.



2. People might use platforms to spread hatred:

It has been observed that many users are using social media handles to spread hatred against a particular topic, or person. People are using their handles to target a public figure and defame. People read these contents and make their opinions in the same way. It's very important for users to be vigilant and to know what kind of content they are consuming. What is the emotion being interpreted by the data they are reading on a regular basis?

3. Tools for generating fake tweet:

A lot of softwares has been reported which are used to develop fake tweets. People can generate fake tweets within a minute and viral them like fire. Most of the social media users are youngsters who don't bother to get into the details of the tweet, and believe them, and start spreading the same. It is one of the biggest problems.

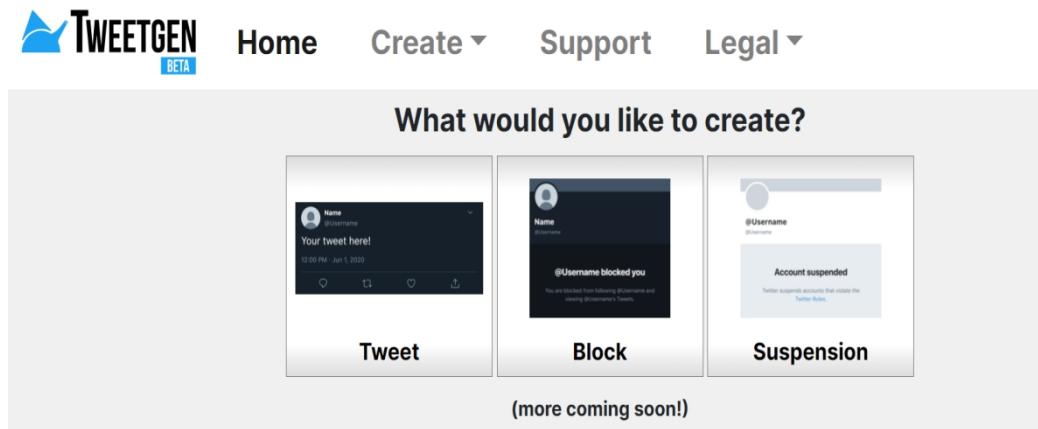


Fig: fake tweet generator home page

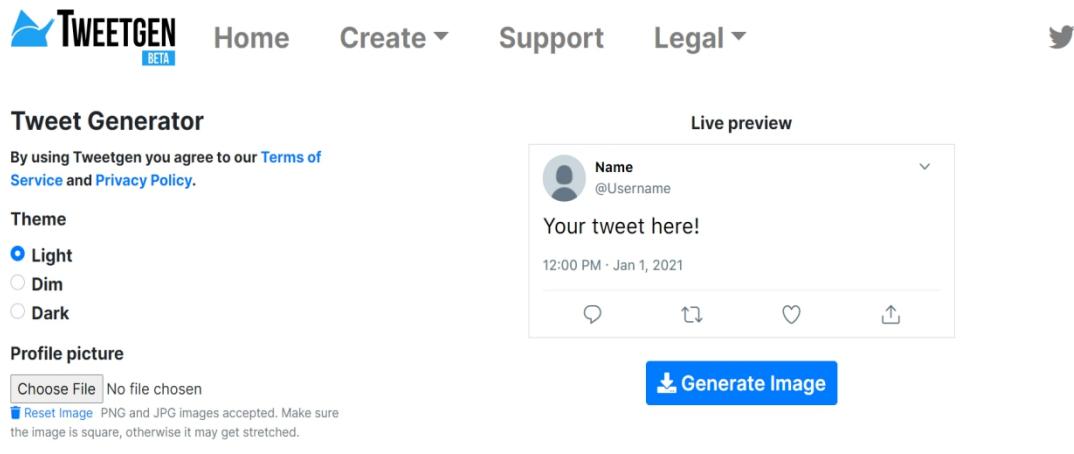
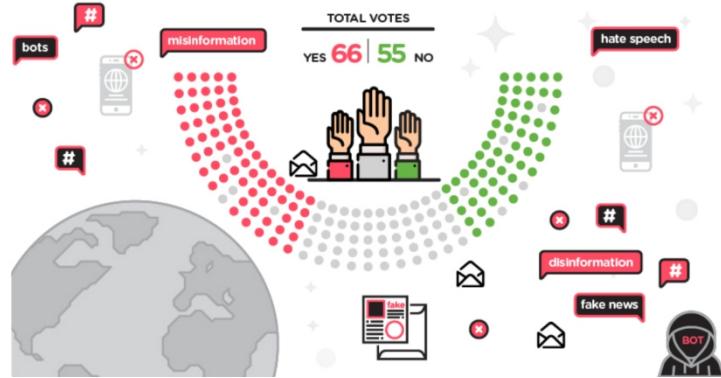


Fig. Demonstration of Fake tweet generation

4. Unaware people, sharing fake tweets like fire:

People don't bother to check the authenticity of the tweet, but they keep on sharing the content, which spreads misinformation and hatred.



5. We need a single platform for digging into social content:

There is no such platform where people can get two things together, i.e detecting the emotions and checking the authenticity of the news.

This wraps up the Problem statement and our aims and objectives.

1.4 Feasibility- Technical and Non - Technical

Before starting a project, it's crucial to have a know-how of its feasibility. The Various Kinds of Feasibilities can be summed up as follows:-

❖ TECHNICAL :-

- Html, css, js and python website supporting devices as mobile, laptops, tablets etc.
- Internet connectivity is a must.

❖ SOCIAL :-

- There is no such website which can detect 12 emotions in the text
- There is no such website which can check the authenticity of the tweet
- People will get, both the tools on a single platform with easy accessibility.

❖ ECONOMICAL FEASIBILITY :-

- This project doesn't require much cost in development.
- Only cost will be to host it on the server, and future maintenance.

❖ SCOPE :-

- People will keep on sharing their thoughts on social media platforms and people will keep on reading it
- So the scope of this project is till the time we have social media platforms.

PROPOSED SOLUTION - ICE BREAKING

“Identifying a Problem is an easy task, finding a solution and making your way toward it - is the Real Challenge.”

2.1. Identifying Stakeholders

1. The users of the social media platform, specifically tweeter are the stakeholders
2. Any organization who is willing to verify the effect of their steps, new policies or new products can use this website.

2.2.Detailed Solution

Hereby, we present our solution in a detailed way, presenting the various things for our stakeholders:-

1. Text Emotion Classification

Users can navigate through the emotion classification tab and get the results. The website is highly flexible and allows users to get the data through any means. It provides them open choice to choose among three options. Given below is the process of navigation.

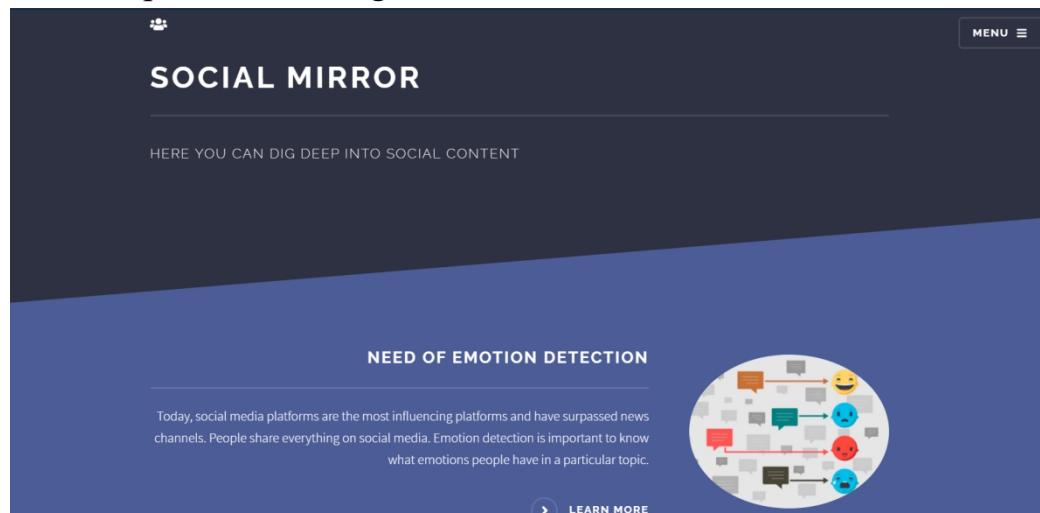


Fig. Home page of the website

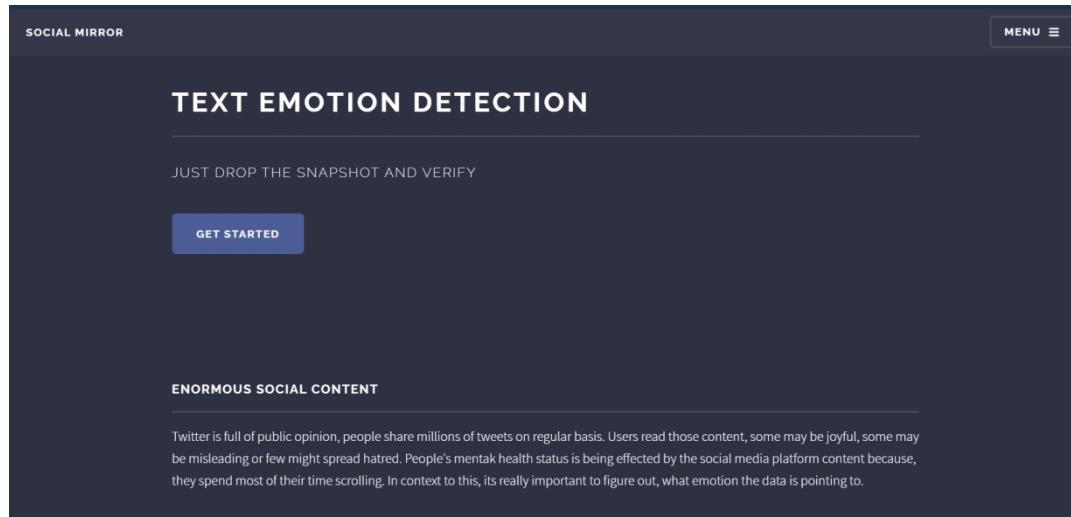


Fig. Web page for Text emotion detection

-Direct text input

This is the first option our website is providing to the user, which is the most dynamic one. User can directly type in the text in which he wants to detect the emotion. Our tool is capable of handling emojis as well. This direct text input feature makes it flexible for the users to input text from anywhere. Users can also check what emotions their text is conveying to the public before posting content on their social media handles.

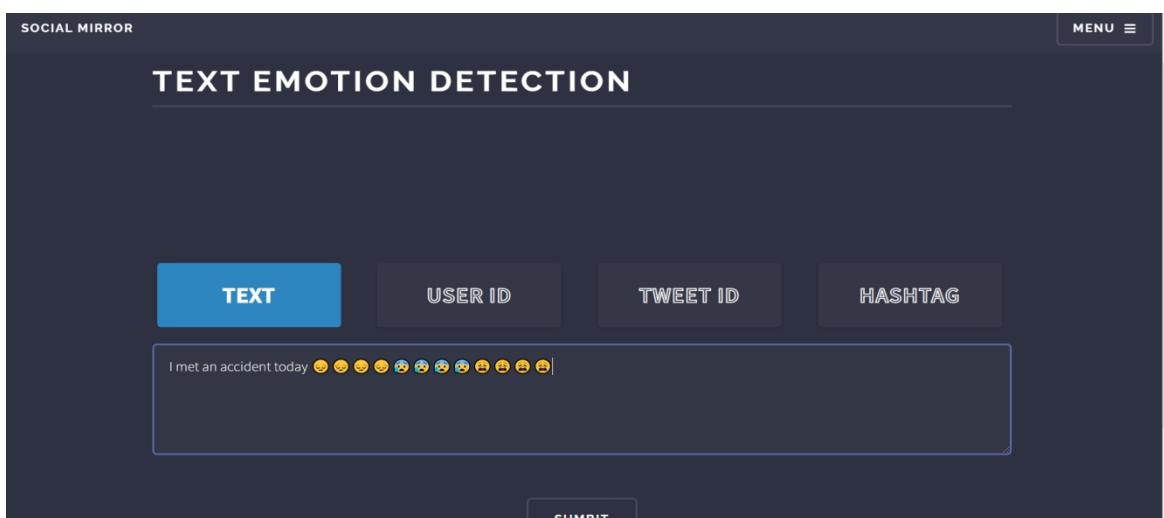


Fig. Web page demonstrating user inputting text directly

We are demonstrating results, emotions detected in the text, in the following manner which is dynamic, and easy to understand.

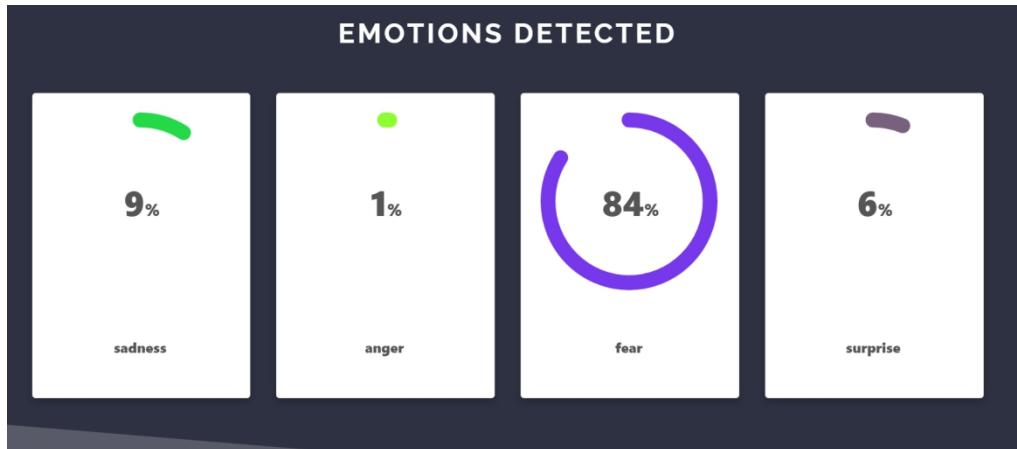


Fig. Emotions detected from the text

-Tweet by certain hashtags

Users have another option to extract tweets from twitter based on certain hashtags. Our website will extract hundreds of tweets which contain those keywords using **tweepy**, twitter api for developers.

The extracted text is preprocessed and then emotions are detected.

TEXT USER ID TWEET ID HASHTAG

#coronavirus

SUBMIT

Fig. Web Page for user to input hash tags

The result of the emotions detected are shown below, in a dynamic way and easy to understand.

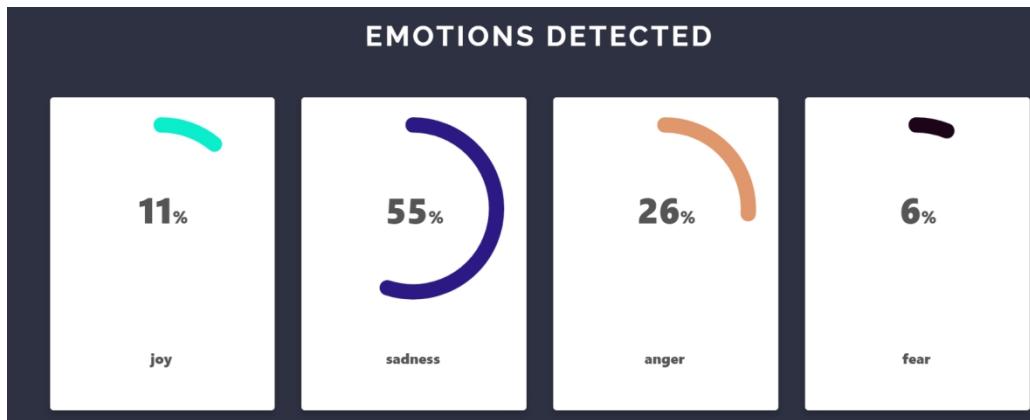


Fig. Emotions detected from the text

-Tweets by tweet ID

Here, users can directly input the ID of the specific tweet. This can be used when a user doesn't want to copy the entire text of the tweet in the text box, rather wants to detect emotions by using the ID of the Tweet.

For example, below is the tweet of Mr. Narendra Modi. The ID of the tweet is **139361700376133634**.

Narendra Modi  @narendramodi

You left us too soon, Sunil Jain. I will miss reading your columns and hearing your frank as well as insightful views on diverse matters. You leave behind an inspiring range of work. Journalism is poorer today, with your sad demise. Condolences to family and friends. Om Shanti.

10:49 PM · May 15, 2021 · Twitter for iPhone

8,037 Retweets 410 Quote Tweets 73.1K Likes

Fig. Tweet by Mr. Narendra modi

The user can navigate into the Tweet ID section, and type in the tweet ID, of the desired tweet.

Fig. User inputting Tweet ID

Here is the result which the user received. In the tweet, Mr. Narendra Modi is feeling sad on the death of Sunil Jain. You can see the results, emotions detected, which is 80% sadness.

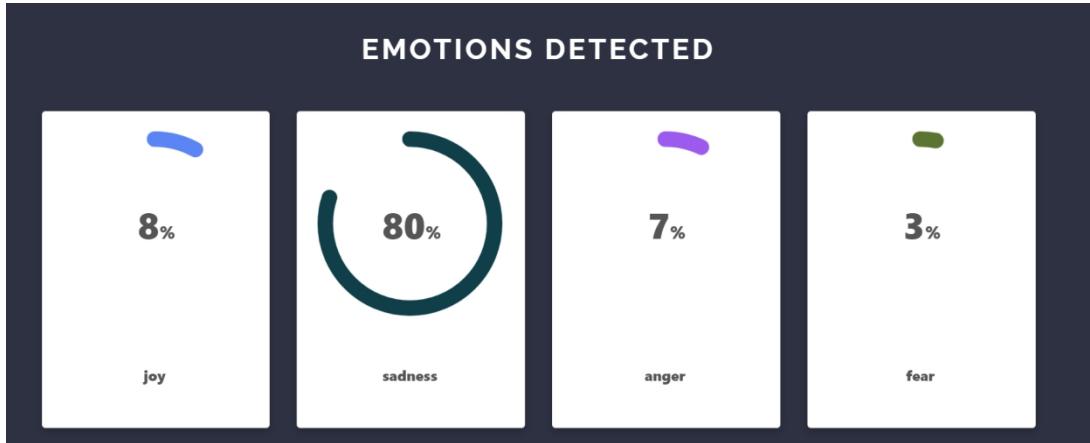


Fig. Web page representing the result

-Tweets by UserID

If a user wants to know the behaviour of the person, whom he is following on twitter. What content he shares, and what is its impact on the user's mind. We have provided users an option to directly input the Twitter ID of the user, and detect the emotions conveyed by him as a whole.

For examples, here user has input, user id of Elon Musk, **@elonmusk**

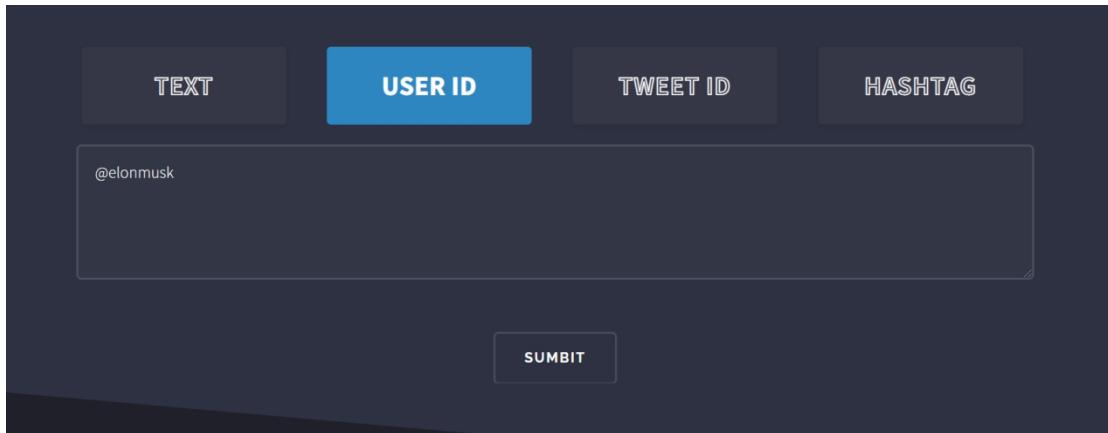


Fig. Web page demonstrating the user navigating to User Id section

We are demonstrating results, emotions detected in the text, in the following manner which is dynamic, and easy to understand.

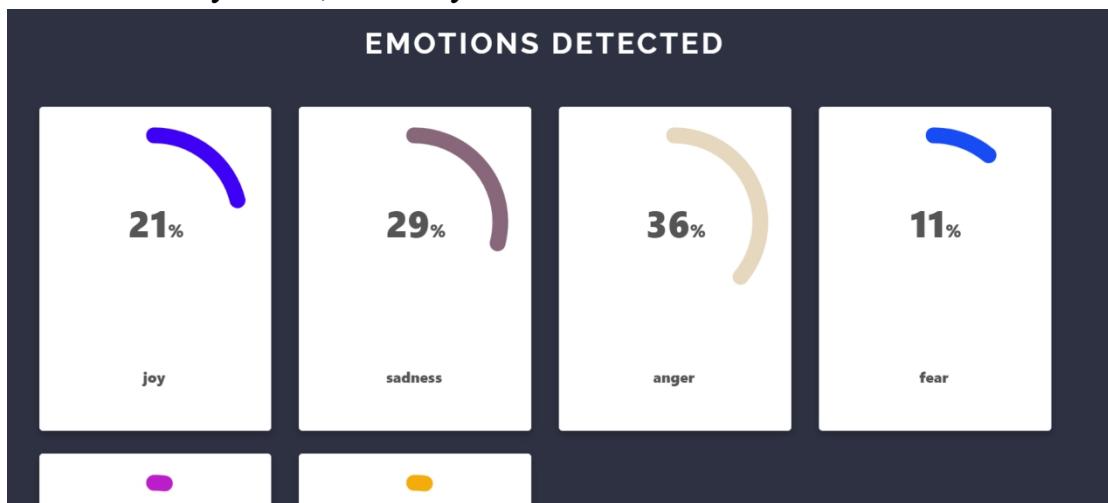


Fig. Web page representing the result

2. Fake Tweet Classification

This tool will provide user facility to detect whether a tweet is fake or real. That is, the user has actually tweeted the content or it's manipulated.

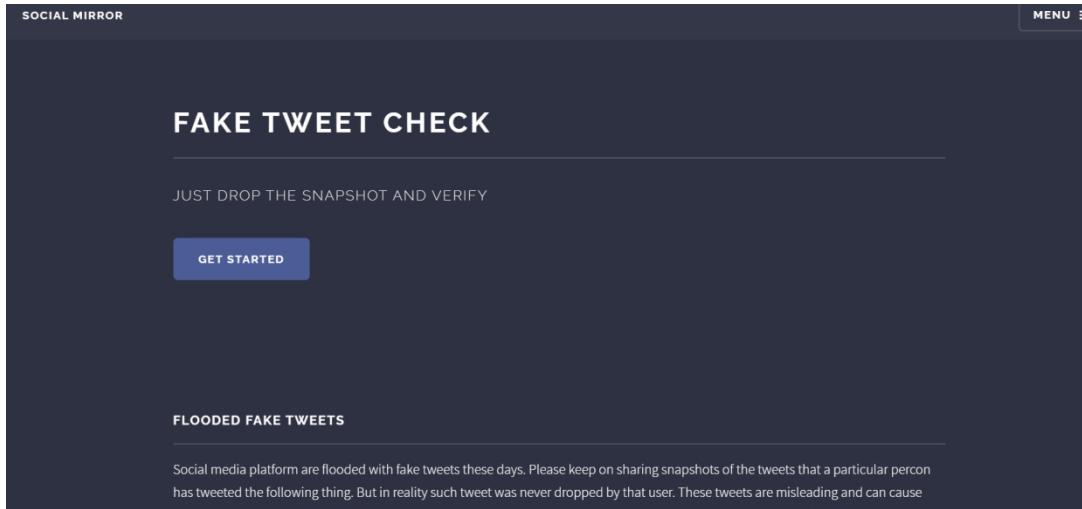


Fig. Web page for Fake tweet check

User can input the path of the tweet image he wants to fact check. We are using the **tweepy api**, api by twitter for developers to extract the tweets. ML model is converting Image to text, and with the help of this, our backend is extracting user name, and the tweet content by the user. Then finding the similarity index of the content extracted and the tweet submitted.

A screenshot of a web page titled "INSTRUCTIONS". It contains a text input field with the placeholder "Paste the path of the fake tweet image you have stored in your local drive. Press submit button for results." Below this is a "DROP HERE!!" placeholder. A "PATH" label is followed by a text input field containing the path "C:\Users\umang sharma\Desktop\udh.jpg". At the bottom is a "SUBMIT" button.

Fig. Web page to input the path

Here is the result. If the tweet is real, the result will be displayed like this, along with the percentage of similarity found. Along with the link to the tweet which is most similar. If the tweet is fake, it will simply display the result as, tweet is fake.

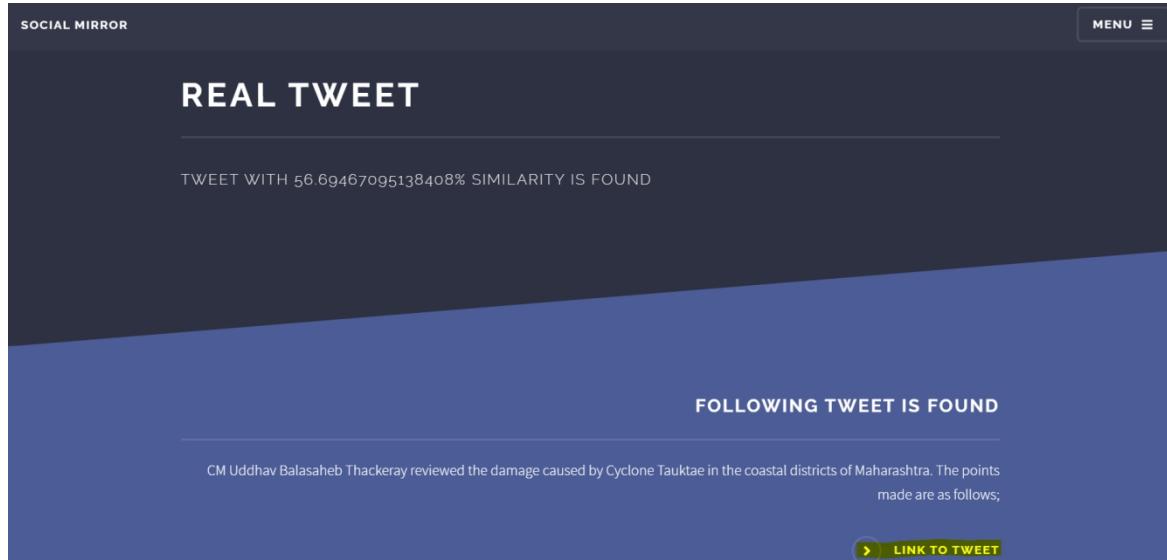


Fig. Web Page demonstrating result

When the user navigates through a link to tweet, the actual tweet will be displayed.



Fig. Link to the authentic tweet opened

3. Feedbacks

If the user reports any issue or has any suggestions, can contact admin by dropping a message, along with email and name.

GET IN TOUCH

If reported any issue, drop us a mail. Genuine feedbacks are welcomed 😊

NAME

EMAIL

MESSAGE

SEND MESSAGE



Fig. Web page demonstrating contact us

TECHNICAL ANALYSIS

3.1 UML Diagrams

❖ INTRODUCTION

These diagrams show an interaction between the various objects used in our project. In addition, these diagrams show the various messages that can be passed from one phase of the system to the other. UML diagrams are indispensable with regards to the Software Development Life Cycle and hence they are part of each Developer's life.

- The major aim is modeling the objects and checking the message passing between these objects.
- Model various mechanisms with regards to the logical purview of the application
- Correspond to the various interactions that showcase the message passing amidst objects & roles in the domain of collaboration
- Modelling of alternates in use cases or functions that involve the collaborating various objects and the operations concerning them
- Supporting the recognition of objects and their parameters that are useful in conveying the messages

1. Class Diagram:

It is used to model the systematics of the application, and this further leads to Code Generation. It can be used for data representation and modeling. The classes present in a class diagram depicts the main elements, the various interactions in the application, and the inherent classes which are to be programmed. This can further be used to generate code and hence gives a clear view to the developer of how the problem is to be tackled.

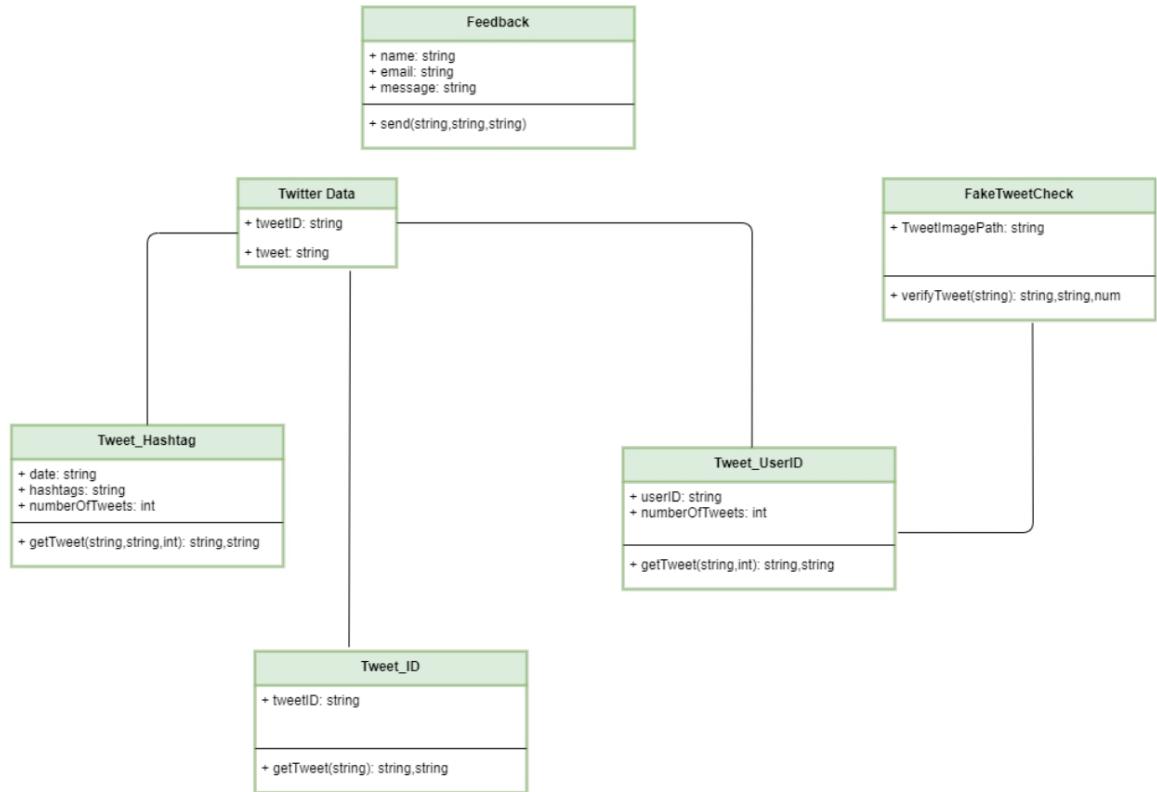


Fig. Class diagram

Description:

In our project, we have several classes as shown in the diagram which interacts with each other. **Twitter Data** class is the most important class which has attributes tweetID and Tweet. This class stores the data of the tweets which are extracted from the various other classes. **Tweet_HashTag** class is responsible for extracting data from twitter based on certain hashtags and keywords. It has attributes date, which takes the date since the tweets are required, numberOfTweets if the number of tweets required and the function getTweet() which interacts with twitter, with the help of tweepy api and sends it to **twitter data** class. Similarly we have classes like **Tweet_ID** which extracts tweets based on tweet_id, **Tweet_UserID** which extracts data based on userId. The **FakeTweetCheck** class is used to check the authenticity of the tweet. It contains a string object which stores the path to the image, and a function **verifyTweet()** which interacts with the class **Tweet_UserID**, to extract tweets and compare. **Feedback** class stores the details of the responses by the users.

2. Use Case:

A Use case Diagram represents the various usage of the application for the various Stakeholders available with us. It is usually represented by circles or ellipses and stick models(For actors). The actors are linked to the various functionalities provided by the application. Hence, it is a very basic level of software development model, which is easy to understand and portray.

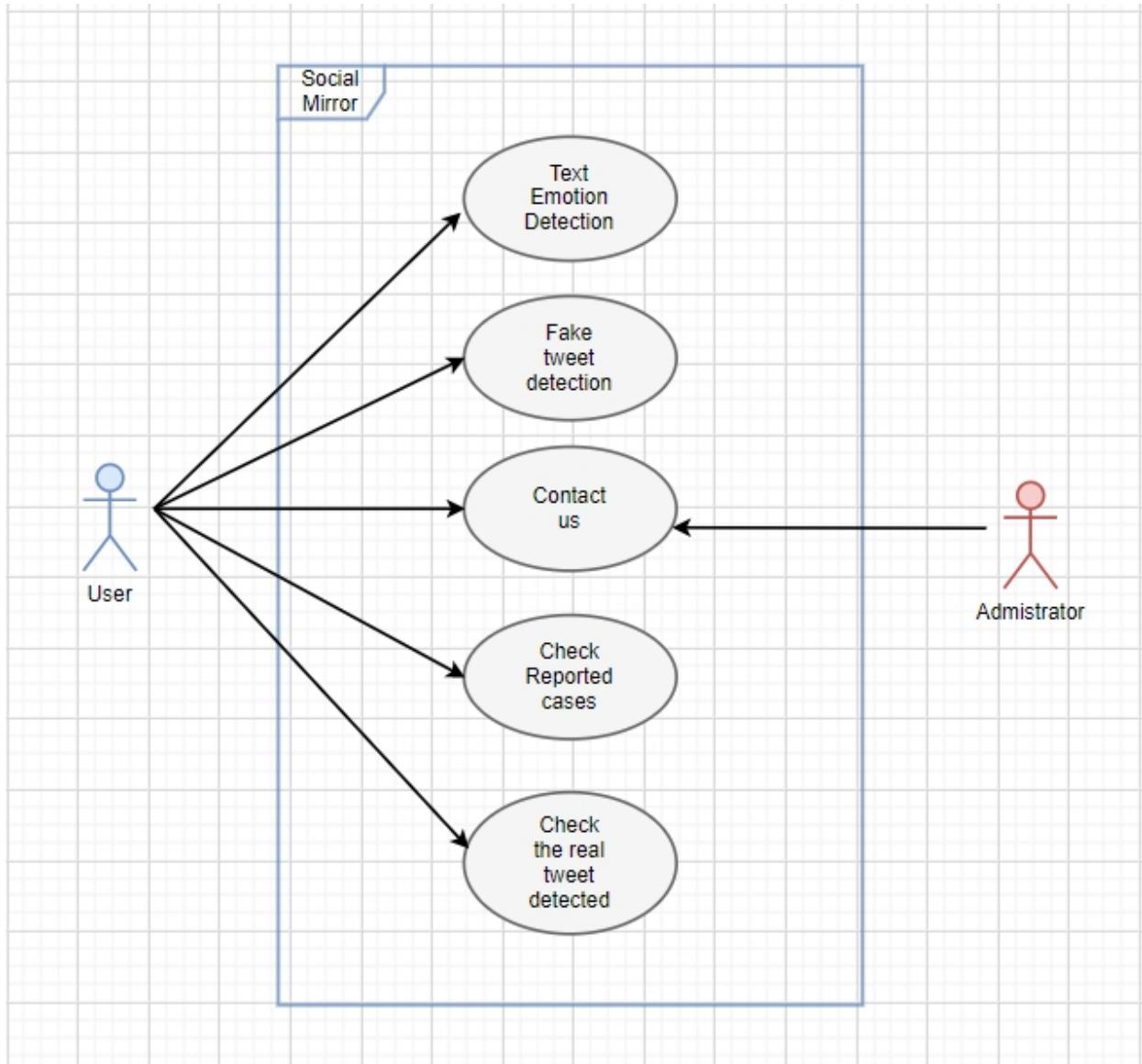


Fig. Use case diagram

Description:

Name: Social Mirror

Actors: User, Administrator

Pre-condition: User must be connected to the internet

Goal: A Use case Diagram represents the various usage of the application for the various Stakeholders available with us. It is usually represented by circles or ellipses and stick models(For actors). The actors are linked to the various functionalities provided by the application. Hence, it is a very basic level of software development model, which is easy to understand and portray.

Summary: Users are having the following functionalities: TextEmotionDetection, FakeTweetDetection, Contact us, Check reported cases and check the real tweet detected. The administrator has only one function to access the feedback sent by the users.

3. Activity Diagram:

Activity diagrams portray workflow of activities that are done step by step. It also includes the actions which lead to choices. While designing UML Model Activity diagrams are used for modeling of the various phases of an Application and how one transcends from one phase to the other. It's like the flow of control that keeps on flowing from one phase of the application to the other phases and then ultimately comes to STOP or END. The Activity diagram, hence enlists the various activities that are performed in the Application/Software.

We have two types of activity diagrams:

- a) Text emotion detection activity diagram
- b) Tweet image verification activity diagram

A) Text emotion detection activity diagram:

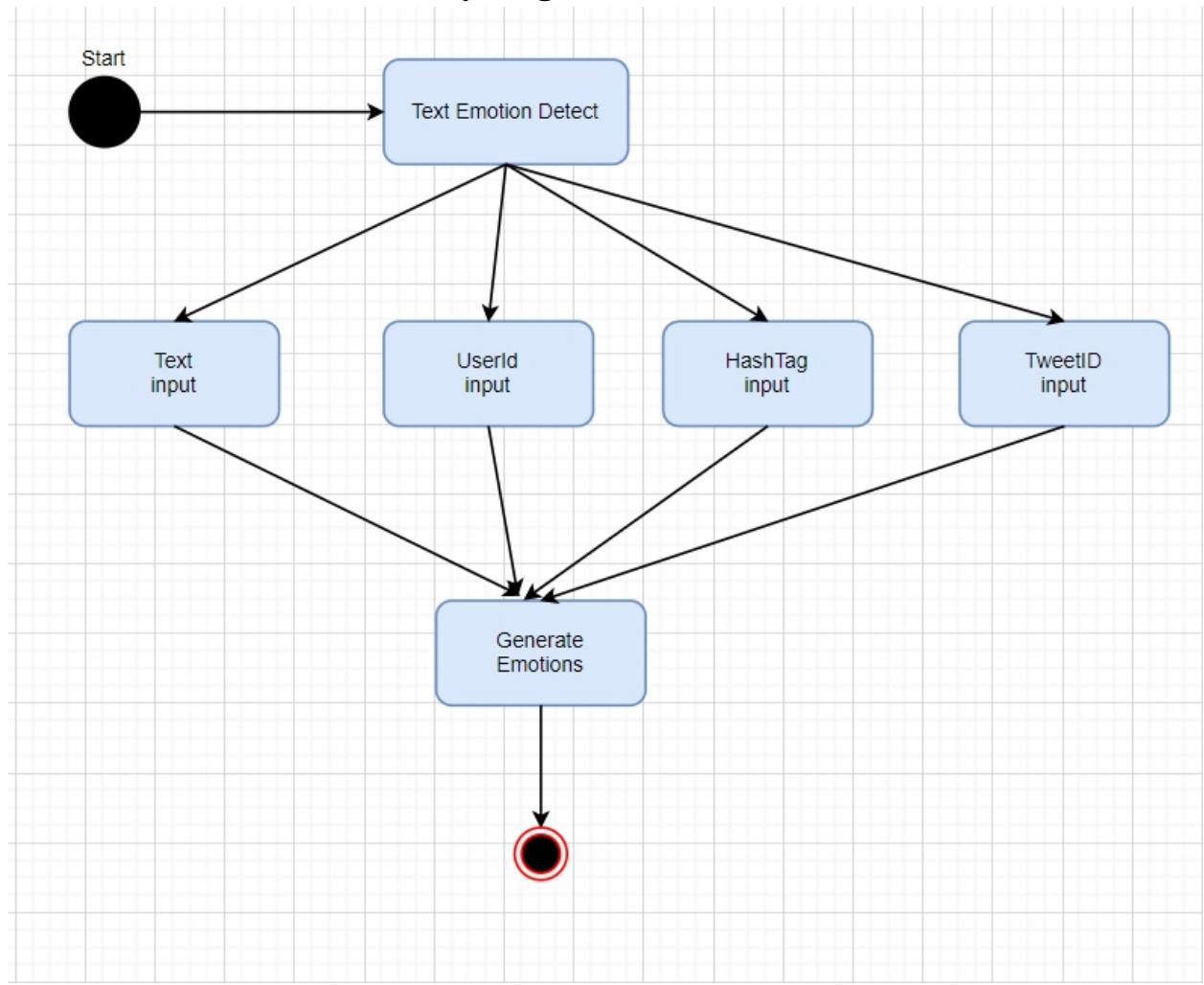


Fig. Activity diagram (a)

Description:

Activity Diagram is a graphical representation of workflow and in every next step there are choice, iteration and concurrency. First the user will go to the tab for text emotion detection. Then the user will have four options to choose. Detect emotions for the text, tweet by user id, tweet by hashtag and tweet by tweetID. The text is then stored in a csv file. Which then sends data to the ML model for emotion detection. The output from the model generates the emotions and sends them to the frontend.

B) Tweet image verification activity:

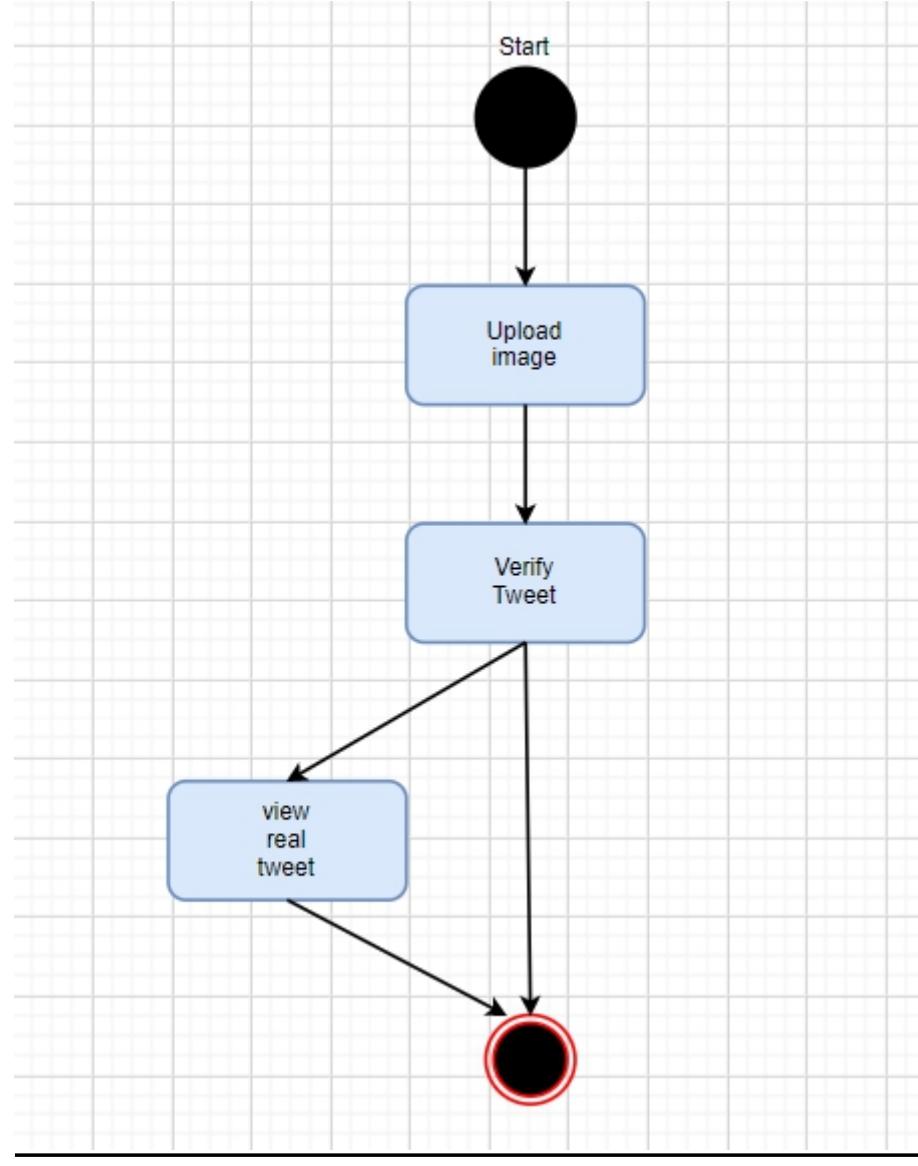


Fig. Activity diagram (b)

Description:

Activity Diagram is a graphical representation of workflow and in every next step there are choice, iteration and concurrency. First the user will navigate to the tweet verification tab. The user can then upload an image, and click the submit button for verification, going into the verify tweet activity. If the tweet is fake, the activity ends, and if the tweet is real, the user can view the real tweet which is most similar to it.

4. Sequence Diagram:

It is a representation of object interactions arranged in a timely manner. It denotes the objects and the classes that are being used in the application and along-with it the flow of messages exchanged between the objects in order to accomplish the functionalities. They are associated with use case realizations in the View (Logically) of the system that is being developed. They are also called event diagrams. It shows, as parallel vertical lines which are called lifelines and the horizontally aligned arrow-like representation represent the messages exchanged between the various objects, in the order in which they occur. This allows simple runtime in a graphically oriented manner.

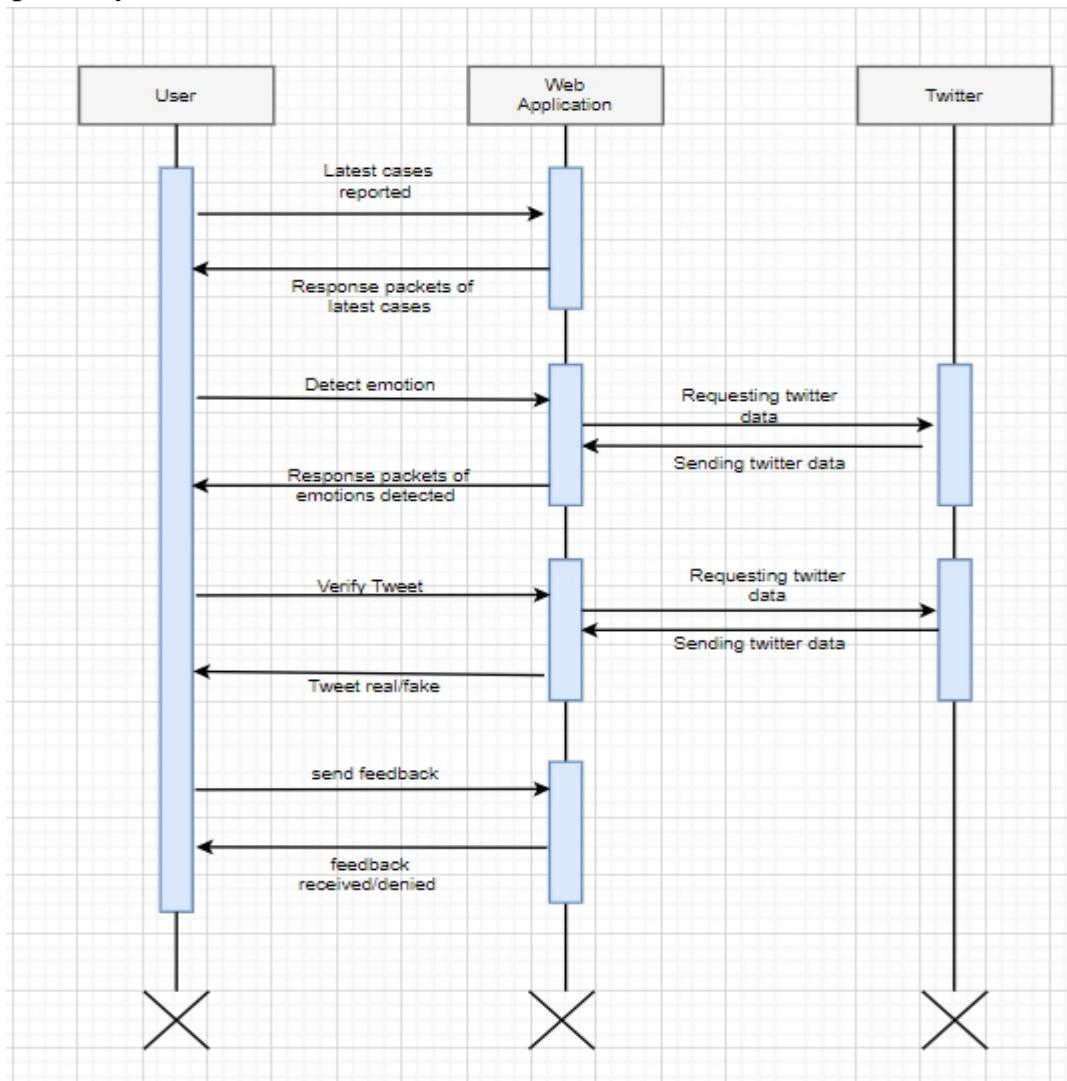


Fig. Sequence diagram

Description:

Here the user requests the server to get the latest cases reported, the server will respond with the latest cases reported. The user can send a request for text emotions detection. The server will request the twitter server to send the twitter data. After receiving, the server will detect emotions and send the result to the user.

Users can request a server for tweet verification by loading images. Server will find out the user name from the image, and will request twitter to send the tweets of a particular user name. After receiving data, the server will check the authenticity of the tweet and respond accordingly.

The user can send feedback to the server and the server will reply with acknowledgement.

3.2.Tech Stack Analysis

In order to achieve various solutions, we have used a variety of Tech Stacks. All these technologies have been chosen on the basis of the following few criteria:-

1. Ease of Usage and Ease of Learning
2. Time Required to build
3. Efficiency
4. Security

On the basis of the above mentioned criteria the Technologies used are:-

1. BACKEND: FLASK

Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions.



USAGE: We have used flask to develop the complete backend, for rendering ML models and HTML pages.

2. FRONTEND: HTML,CSS,JS

The HyperText Markup Language, or HTML is the standard markup language for documents designed to be displayed in a web browser.

Cascading Style Sheets is a style sheet language used for describing the presentation of a document written in a markup language such as HTML.

JavaScript is a programming language used primarily by Web browsers to create a dynamic and interactive experience for the user. Most of the functions and

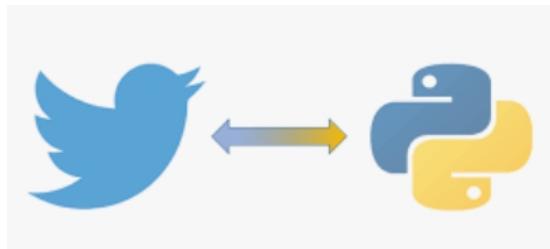
applications that make the Internet indispensable to modern life are coded in some form of **JavaScript**.



USAGE: We have developed the complete front end using HTML, styles the web pages using CSS, and given dynamic effects with the help of JavaScript.

3. DEVELOPER'S API: TWEEPY

Tweepy is an open source Python package that gives you a very convenient way to access the Twitter **API** with Python. **Tweepy** includes a set of classes and methods that represent Twitter's models and **API** endpoints, and it transparently handles various implementation details, such as: Data encoding and decoding.



USAGE: We have used Tweepy API, to extract twitter data based on, user id, hashtag and tweet id.

4. DATASET: EMOTION DATASET FOR NLP

We have used the Emotion dataset for NLP, present in the kaggle. This dataset consists of sentences and the emotions associated with it.

```

im feeling rather rotten so im not very ambitious right now;sadness
im updating my blog because i feel shitty;sadness
i never make her separate from me because i don t ever want her to feel like i m ashamed v
i left with my bouquet of red and yellow tulips under my arm feeling slightly more optimis:
i was feeling a little vain when i did this one;sadness
i cant walk into a shop anywhere where i do not feel uncomfortable;fear
i felt anger when at the end of a telephone call;anger
i explain why i clung to a relationship with a boy who was in many ways immature and uncor
i like to have the same breathless feeling as a reader eager to see what will happen next
i jest i feel grumpy tired and pre menstrual which i probably am but then again its only t
i don t feel particularly agitated;fear
i feel beautifully emotional knowing that these women of whom i knew just a handful were l
i pay attention it deepens into a feeling of being invaded and helpless;fear
i just feel extremely comfortable with the group of people that i dont even need to hide r
i find myself in the odd position of feeling supportive of;love
i was feeling as heartbroken as im sure katniss was;sadness
i feel a little mellow today;joy

```

Fig. Dataset

5. MACHINE LEARNING MODEL: LSTM Sequential Model

It is a special kind of recurrent neural network that is capable of learning long term dependencies in data. This is achieved because the recurring module of the **model** has a combination of four layers interacting with each other.

USAGE: We have used the LSTM sequential model for text emotion classification. It is trained on the dataset with 5 layers in the model. It detects 12 emotions present in the text.

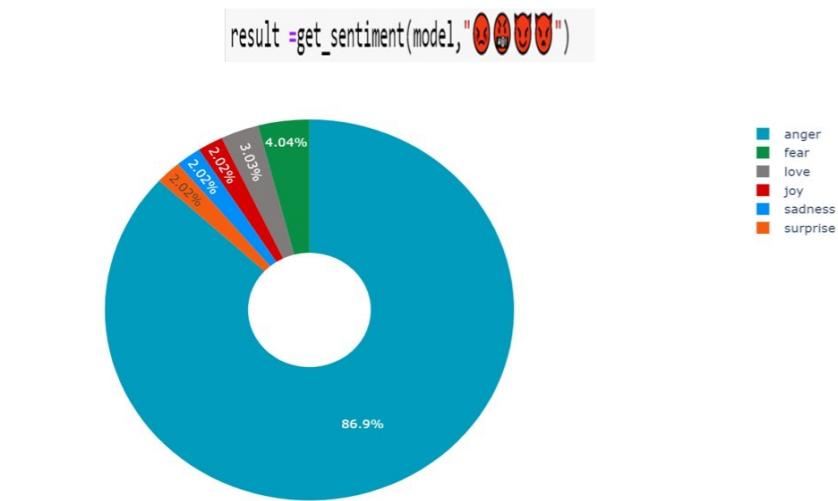


Fig. Result of our model

6. IMAGE TO TEXT: TESSERACT OCR

Tesseract is an optical character recognition engine for various operating systems. It is free software, released under the Apache License.

An **optical character recognition (OCR)** engine. **Tesseract** is an **OCR** engine with support for unicode and the ability to recognize more than 100 languages out of the box. It can be trained to recognize other languages.



USAGE: We have used Tesseract OCR to extract text from the tweet image uploaded by the user.

ECONOMIC ANALYSIS

We aim at providing a cost-effective yet easy to use and well equipped solution to the daily problems.

- ❖ With regards to the various development stacks used, are freely available & hence what we require is- an Internet connectivity and a laptop totaling up; to ZERO.
- ❖ All the APIs being used and dependencies (TIME) are also free-wares and hence just require support and willingness to change.
- ❖ With regard to the ML models, they are developed completely by the team and hence are free of cost.

Hence, we promise ZERO COST requirements for the Social Mirror application.



The only cost will be to host the website on the server for public use. The maintenance of the website may cost something as we may need to update datasets from time to time.

RESULT AND DISCUSSION

4.1 Website Usage Instructions

Dear User,

We, the developers of Social Mirror, take privilege in introducing our website to you all and it's functionalities. We will provide you the detailed instructions to use the website to avail its features completely. Your feedback is valuable to us for the improvement of the website.

1. Latest news reported on fake tweet:

In order to stay updated with the recent tweets which are reported to be fake and going viral on social media, spreading misinformation. You can navigate at the bottom of the home page to get yourself updated.

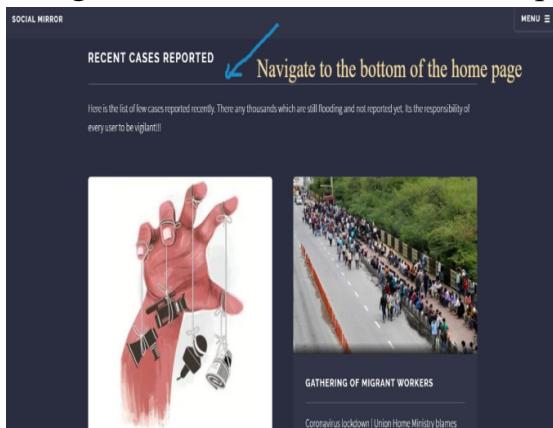


Fig. Step1



Fig. Step2

2. Text emotion detection based on Input Text:

We are providing you the feature to directly input the text from anywhere you want, and paste it to the section. Within a click, you will get to know the emotions present in the text. First, navigate to the text emotion detection section. And the next steps are described below.

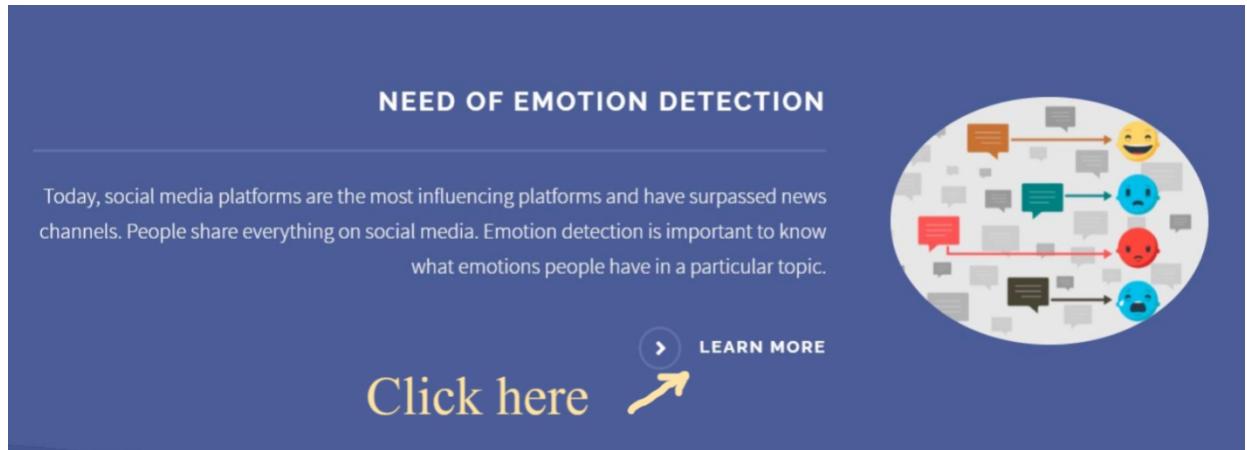


Fig. Step1

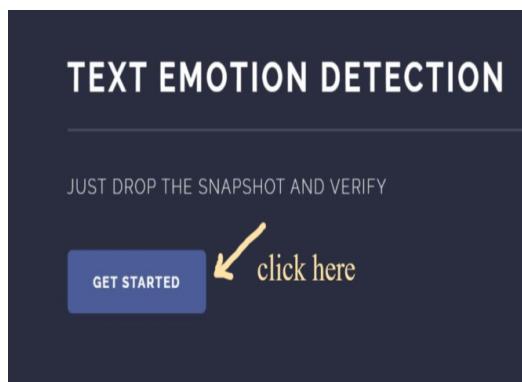


Fig. Step 2

TEXT	USER ID	TWEET ID	HASHTAG
<input type="text"/>			

Input text here

SUBMIT

Fig. Step3

3. **Text emotion based on Tweet ID:**

We are providing you the feature to extract the tweet data from twitter based on tweet id. Within a click, you will get to know the emotions present in the text. First, navigate to the text emotion detection section. And the next steps are described below.



Fig. Step 1

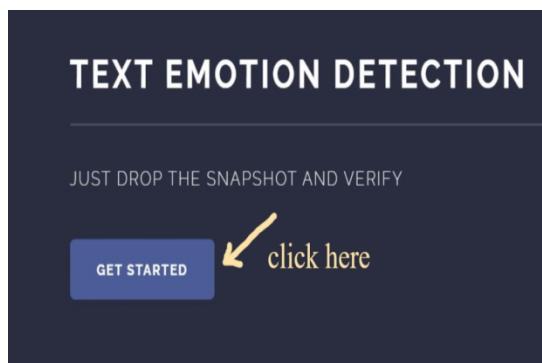


Fig. Step 2

TEXT	USER ID	TWEET ID	HASHTAG
Enter ID of the tweet here			
SUBMIT			

Fig. Step 3

4. **Text emotion based on User ID:**

We are providing you the feature to extract the tweet data from twitter based on user id. Within a click, you will get to know the emotions present in the text. First, navigate to the text emotion detection section. And the next steps are described below.

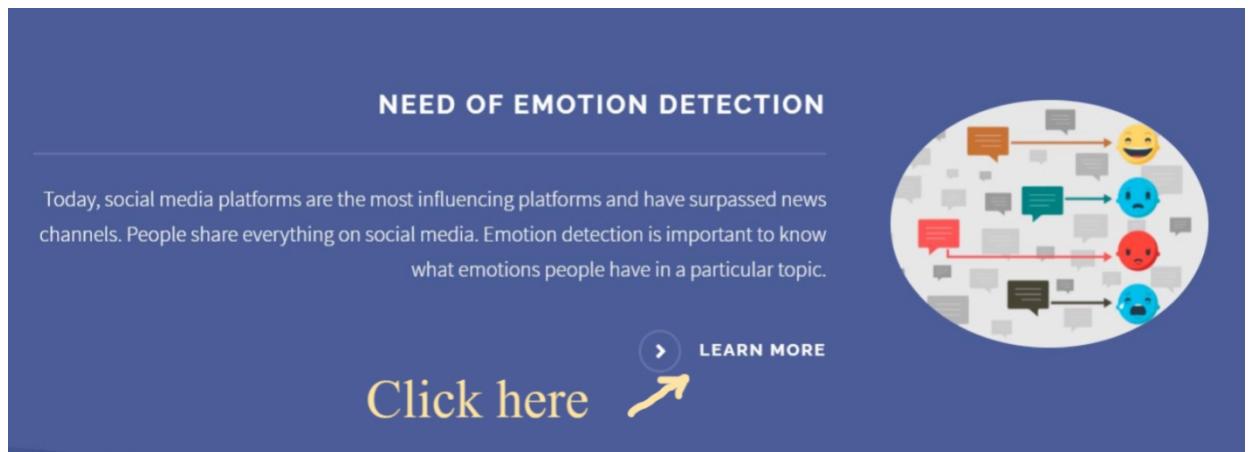


Fig. Step 1

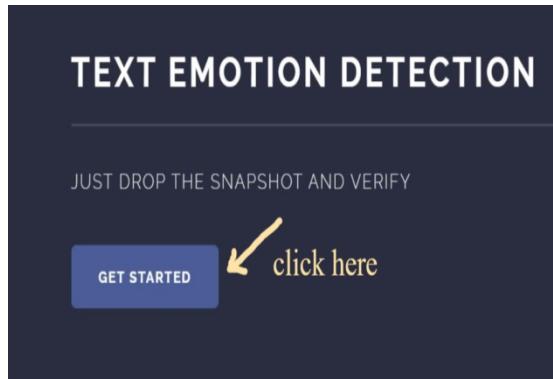


Fig. Step 2

A screenshot of the "USER ID" input field from the "TEXT EMOTION DETECTION" interface. The input field contains the placeholder text "Enter UserId of the user here".

Fig. Step 3

5. **Text emotion based on Hashtags:**

We are providing you the feature to extract the tweet data from twitter based on a hashtag. Within a click, you will get to know the emotions present in the text. First, navigate to the text emotion detection section. And the next steps are described below.

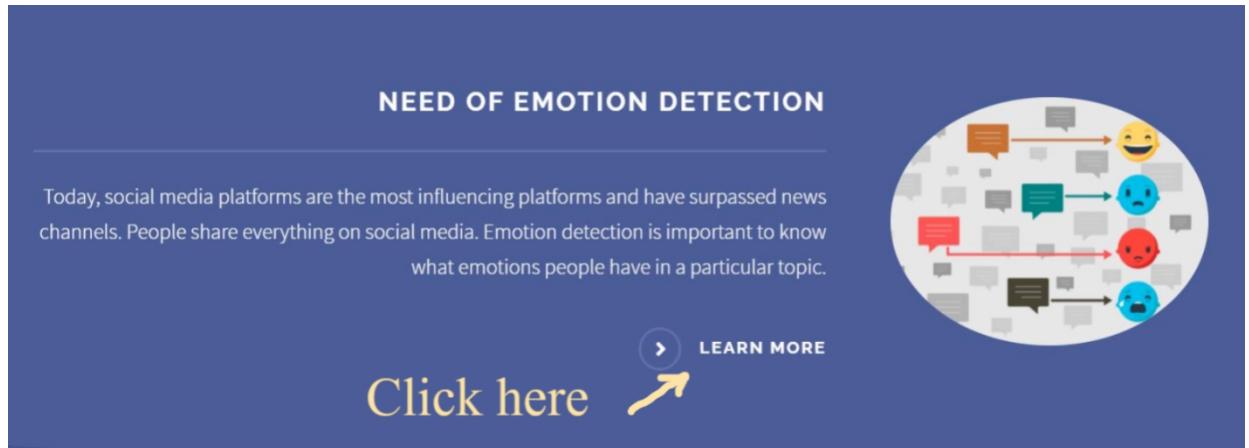


Fig. Step 1

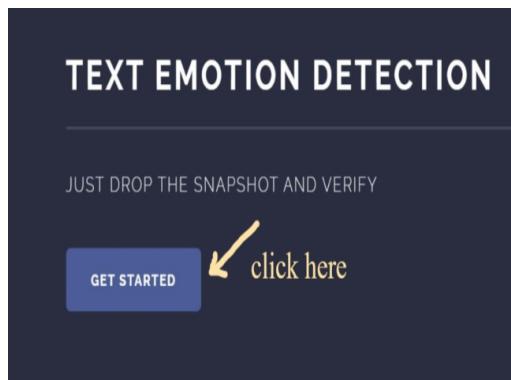


Fig. Step 2

A screenshot of the "HASHTAG" input field from the "TEXT EMOTION DETECTION" interface. The input field contains the placeholder text "Enter hashtags here".

Fig. Step 3

6. Tweet image verification:

You can verify the tweet image by pasting the link of the path of the image. Then press the submit button and see the result. The next web page will display whether the tweet is fake or real. If the tweet is real, you can see the similarity index and link to the tweet to which it matched.

Given below are the steps.



Fig. Step 1

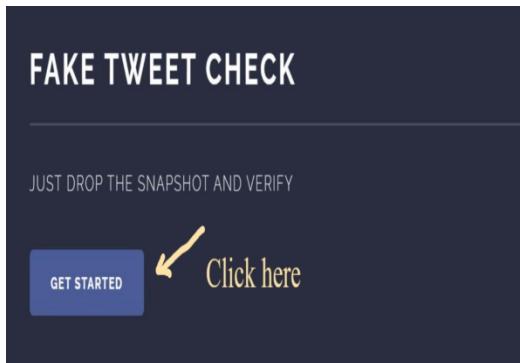


Fig. Step 2

A screenshot of a web page with a dark blue background. At the top, the text 'INSTRUCTIONS' is displayed in white capital letters. Below this, a horizontal line separates the title from the text 'Paste the path of the fake tweet image you have stored in your local drive. Press submit button for results.' Underneath this text is a blue rectangular field labeled 'DROP HERE!!'. Below this field is another horizontal line with the text 'PATH'. To the right of the 'PATH' label is a blue rectangular input field with the placeholder text 'enter path to image here'. At the bottom right of the input field is a small blue rectangular button labeled 'SUBMIT'.

Fig. Step 3

7. Contact us:

You can share your valuable feedback with us. The steps to follow are shown below.

GET IN TOUCH

If reported any issue, drop us a mail. Genuine feedbacks are welcomed.

NAME

EMAIL

MESSAGE

SEND MESSAGE

Fig. Step 1

4.2 Risk Analysis

Designing or developing anything cannot be risk free. Risks make the Project worth doing. Hereby, we highlight the various risks involved in our Project – Social Mirror.

1. The internet connectivity of the user might fail
2. The server might stop working due to various reasons
3. Twitter can close its tweepy api anytime, as our complete project is solely dependent on tweepy api.

Risk 1 can be minimized by giving pre-conditions to the users that the internet is a must. Risk 2 can be minimized by hosting our website on cloud, which gives us the facility of all time availability, and easy accessibility to the users. This might increase the cost of deployment but will reduce the risk and maintenance cost.

Encounter of risk 3 is very rare, that twitter will close its tweepy api. But in case it does, we can modify the code and use the latest twitter developers api.

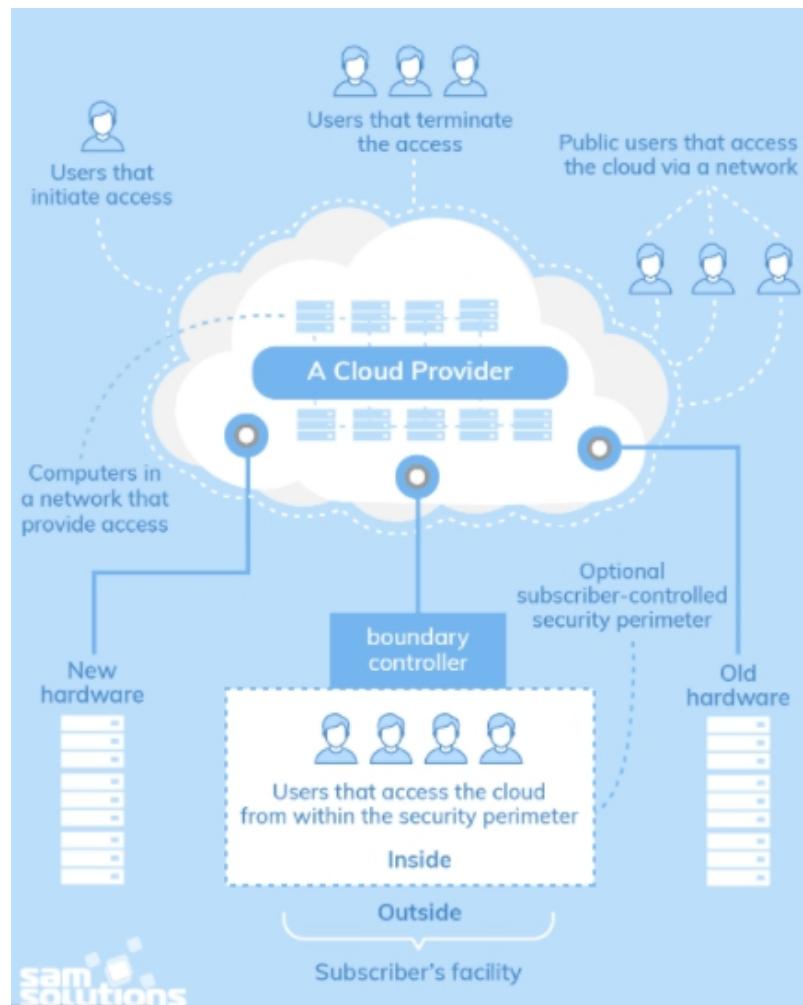
Hence, we have minimized the risk level by various discussions- with both the technical and non-technical Stakeholders and hence the website is ready for Deployment.

4.3 Deployment and Testing Status

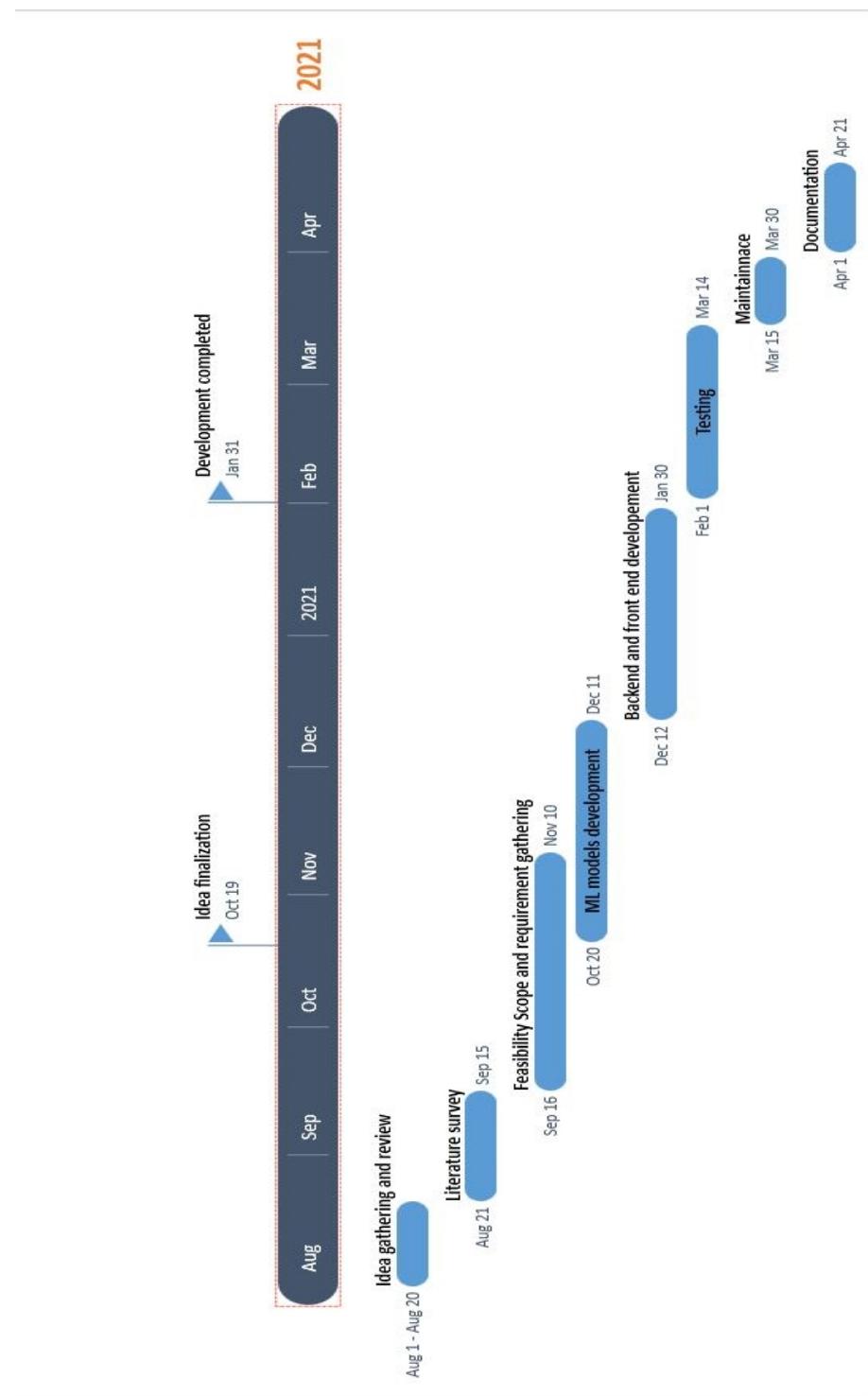
Our website, **Social Mirror**, is ready to deploy on the server. It's fully functional with all the functionalities working properly with high accuracy.

We have tested our models on a variety of inputs and validated their results. In 85-90% of the cases, results were up to the mark. But there are few exceptions which are not giving appropriate results because of some ambiguous words and limitations of tesseract-ocr.

We will soon deploy our website on a server so that maximum people can take advantage of it.



4.4 Gantt Chart



SOCIAL AND ENVIRONMENT IMPACT

- ❖ It will reduce the spread of fake tweets on social media
- ❖ It will make people more vigilant about the tweets spreading like fire on social media.
- ❖ With the help of emotion detection, people can improve their mental health by unfollowing the users who mostly spread hatred or bad news through their handles.
- ❖ People can check their content before posting it on social media, like what emotions they are spreading to the society. It has been observed that if a person gives a second thought to the negative thing, there is a rare chance that he will do the task.



CONCLUSION

Our project social mirror is completely functional and ready to deploy on the server. We are happy to share that the ML models used are giving high accuracy. In the world of digitalization, where everyone shares their views on social media platforms, many are misusing it.

It affects the mental health and manipulates the users to a great extent. This is an alarming problem and we need to tackle it. Our project, **social mirror**, will contribute to society in the era of digitalization.



REFERENCES

- ❖ Deep Learning, Ian Goodfellow, Yoshua Bengio, and Aaron Courville
- ❖ Web Development Tools: W3Schools, Tutorials Point
- ❖ Stack Overflow.
- ❖ Flask documentation
- ❖ Wikipedia For Basic Introduction of Technology and Diagrams
- ❖ Kaggle for dataset
- ❖ Geeks for Geeks

Thank You. Your suggestions are most welcome.

-----**End of Report**-----

