

Mood Detection using Sentiment Analysis

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ABSTRACT

Since this pandemic has taken place the world is not in a great condition physically and mentally. People are witnessing all kinds of unexpected circumstances. Under such circumstances, people tend to break down. Mental health is like a catalyst to physical health; it can either boost up or tank the entire recovery mechanism of a person. Everyone should have a healthy mindset toward life. Mood Trend is a system which aids users' mindset or mood with small amounts of positive reinforcements. In this way, we make a significant impact on users' lives in the long run. The website will detect the sentiment behind the user's words and provide content to enhance their mood. The user can view this content material to lighten his/her temper or to control stress. Mood Trend also has an option where the users can upload a picture of themselves and the system will detect sentiment.

Keywords

Sentiment Analysis

1. INTRODUCTION

The way you feel at a specific time is how mood is defined. Mood is a mixture of feelings and emotions as we go through our days. A mood is a semi-persistent mental + physical + emotional state. Sentiment is a thought, opinion, or idea based on a feeling about a situation, or a way of thinking about something. Analysis is a thorough investigation of a complex object in order to comprehend its nature or establish its key characteristics. To analyze a topic or concept, you must disassemble it into its constituent elements in order to inspect and comprehend it, and then reassemble those parts in a form that makes sense to you

Sentiment analysis is a natural language processing technique used to determine whether data is positive, negative or neutral. Sentiment analysis is commonly used on textual data to help businesses analyze brand and product sentiment in customer feedback and better understand customer needs. Businesses frequently use it to detect sentiment in social data, assess brand reputation, and comprehend customers. Sentiment analysis is critical since it allows firms to quickly assess their customers' overall opinions. By automatically sorting the sentiment behind reviews, social media conversations, and more, you'll make faster and more accurate decisions. 90 percent of the world's data is unstructured, or unorganized, according to estimates.

Mood Trend will basically detect the users' mood over a period of time. A person shares his/her thoughts via a medium, it can be a closed one or a diary. Similarly, the website provides an option for users to submit their ideas on a daily basis. The thoughts are stored inside the database and could be used for sentiment analysis. Basic sentiment analysis of text follows a straightforward process: 1. Break each text document down into its component parts like sentences, phrases, tokens and parts of speech. This is known as tokenization. 2. Then we Identify each sentiment-bearing phrase and component. 3. And finally we Assign a sentiment score to each phrase and component.

For identifying sentiments, there is something called a sentiment library. An efficient sentiment analysis system depends upon the right sentiment library to efficiently detect sentiments and scores in phrases or terms. Sentiment libraries are composed through a group of dictionaries along with adjectives and terms that have been manually scored beforehand. This scoring technique ought to be accomplished cautiously in order that the sentiment analysis system can differentiate among phrases like 'bad' and 'horrible', holding 'horrible' a more negative meaning. Aside from that, a multilingual sentiment evaluation engine will come with libraries for each language supported. Once those dictionaries are prepared, a sequence of policies must be written inside the software program so the system is capable of detecting the sentiment expressed closer to a selected topic, primarily based totally on its proximity to different tremendous and bad words.

2. LITERATURE REVIEW

Many research papers are published on sentiment analysis. There are many domains and fields where sentiment analysis is applied and implemented. A few of them are mentioned below:

1. MELD: A Multimodal Multi-Party Dataset for Emotion Recognition [1]

The authors of this study address the growing popularity of research on conversational emotion recognition. As well, they state there is a lack of emotional conversational databases in the field.

2. Large-Scale Sentiment Analysis for News and Blogs [2]

Newspapers and blogs express the opinion of news entities like people, places, things while reporting on recent events. This paper demonstrates a system that assigns positive or negative scores to each different entity in a text corpus.

3. Who cares about sarcastic tweets? Investigating the impact of sarcasm on sentiment analysis [3]

Sarcasm has a significant impact on sentiment, yet it is frequently overlooked in social media analysis because of its perceived difficulty in handling. While there are a few softwares or systems that can identify sarcasm, nearly no research has been done on the impact of sarcasm on sentiment in tweets and how to incorporate this into automated sentiment analysis tools.

4. Automatic Sentiment Analysis in On-line Text [4]

The idea of automatic sentiment analysis is considered important for marketing research, where companies want to find out what the customers or the world thinks of their product, for monitoring newsgroups and forums, for analysis of customer feedback, or as informative augmentation for the search engines.

5. Sentiment Analysis of Public Opinion on The Go-Jek Indonesia Through Twitter Using Algorithm Support Vector Machine [5]

The development of technology and information in Indonesia is very rapid and thus social media is the most popular communication tool used by the people of Indonesia today. Twitter is one of those tools. This also causes people to tend to give opinions and feedback in the form of tweets to service companies, one of which is Go-Jek Indonesia. The purpose of this study is to analyze the sentiment of public opinion on Go-jek Indonesia on twitter using the Support Vector Machine algorithm.

6. A Dataset and Benchmark for Large-scale Multi-modal Face Anti-spoofing [6]

Face anti-spoofing has an objective to determine whether the captured face of a face recognition system is real or fake. With the development of deep convolutional neural networks, face recognition has accomplished near perfect recognition performance and has already been applied in our daily life, such as phone unlock, access control.

7. A Survey of Music Recommendation Systems and Future Perspectives [7]

Along with the rapid expansion of digital music formats, organizing and searching for music has become significant. Though music information retrieval techniques have been made successfully in the last decade, the development of music recommender systems is still at a very early stage. Therefore, this paper discusses a general framework and approaches in recommending music.

8. Emotion Detection from Text [8]

Detecting emotional state of a person by analyzing a text document written by them appear challenging but is also essential many times because the fact that most of the times textual expressions are not only direct using emotion words but also result from the interpretation of the meaning of concepts and interaction of concepts which are described in the text document.

9. Recommendation System Based on Text Analysis [9]

Recommendation Systems have been developed by most companies to assist customers in buying their products. The reason to use recommendation systems varies from company to company. Some companies like YouTube, Facebook use it to enhance user experiences for customer retention while companies like Amazon, eBay use it to make the customer spend more money by suggesting related products. The main idea

behind deploying such algorithms is mostly to retain more customers.

10. Recommendation Based on Review Texts and Social Communities: A Hybrid Model [10]

With the popularity of the Internet and the development of e-commerce, a large amount of personalized information is being produced, such as user ratings, reviews, social networks and so on. Different heterogeneous data reveal the different user preferences and the different business features from different perspectives. How to utilize the personalized information to make an accurate and valuable recommendation is the key to the success of e-commerce.

3. METHODOLOGY

The proposed system (Fig(1)) classifies processes from data collection to model selection in a flowchart.

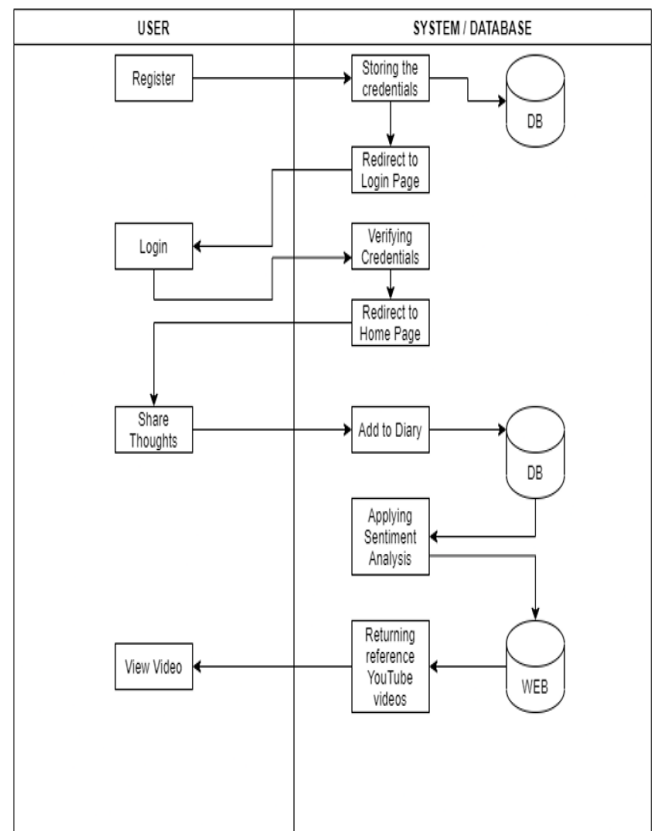


Fig 1. Proposed Methodology

3.1 Data Collection

This research paper is based on the project Mood Trend which aims to analyze a person's mood on a daily basis. The user shares the thoughts on the system and the system stores it in the database. These Thoughts are stored in the database, similar to a user writing them in a diary. Users write down in the system every day and the written content will be used for sentiment analysis.

Each user has a separate database/diary filled with moods they feel or go through every day and the same will be used for analyzing whether they are consistently having the same mood

3.2 Data Analysis

The type and kind of data collected plays a key role in deciding which algorithm to use. So it is very important to know data. The data is collected from the user, and analysis is performed on

it. The users share their thoughts which can be more than a word. Analysis is necessary to segregate important words which emphasize whether a sentence is good or bad from a sentence.

3.3 Algorithm Selection

This step serves as a baseline. Since the output of the prediction is a class, it is a classification problem. The study is carried out with a selected set of features in a number of classifier algorithms. For our system, we have selected the Naive Bayes Classifier.

Naive Bayes is the simplest and quickest class set of rules for a massive bit of data. In diverse programs such as junk mail filtering, textual content classification, sentiment analysis, and recommendation systems, the Naive Bayes classifier is used successfully. Bayes probability theorem is used for unknown class prediction

In this project, we need all of the following python libraries :

1. pandas – Python Data Analysis Library. pandas are open-source, BSD-licensed libraries for the Python programming language that provide high-performance, simple-to-use data structures, and data analysis tools.
2. Numpy – NumPy is a scientific computing fundamental package in Python. NumPy can be used as a multi-dimensional container of generic data in addition to its apparent scientific applications. It is possible to define any number of data kinds. This enables NumPy to work with a wide range of databases with ease and speed.
3. Seaborn – Seaborn is a Python data visualization library based on matplotlib. It provides a high-level interface for drawing attractive and informative statistical graphics.
4. Neattext – Neattext a simple NLP package for cleaning textual data and text preprocessing
5. Textblob - TextBlob is a Python library for processing textual data. It provides a simple API for diving into common natural language processing tasks such as part-of-speech tagging, noun phrase extraction, sentiment analysis, classification, translation, and more.

Pseudocode:

Input : Uncleaned text ie user input

Output : Prediction of emotions

Suggestions : suggest audio video content

```
clean_text = remove_attribute(Input)
sentiment = get_sentiment(Input)
emotion = get_emotion(Input)
emotion_list = unique(emotion)
keyword_attribute =
extract_keywords(emotion_list)
```

```
Xfeature = Clean_Text
ylabels = Emotion
splitsize = z
```

```
X_train = z*Xfeature
Y_train = z*ylabels
X_test = z*Xfeature
Y_test = z*ylabels
```

```
nv_model = MultinomialNB()
```

```
nv_model.fit(X_train, y_train)
nv_model.score(X_test, y_test)
#accuracy
y_pred_for_nv =
nv_model.predict(X_test) #predictions
```

3.4 Pre-processing

Pre-processing is the technique used to clean the data or extract the data from the input. The following image shows the pre-processing of the uncleaned data or the input data.

[6]:	Unnamed: 0	Emotion	Text	Clean_Text
0	0	neutral	Why ?	NaN
1	1	joy	Sage Act upgrade on my to do list for tomorrow.	Sage Act upgrade list tomorrow
2	2	sadness	ON THE WAY TO MY HOMEGIRL BABY FUNERAL!!! MAN ... WAY HOMEGIRL BABY FUNERAL MAN HATE FUNERALS SH...	
3	3	joy	Such an eye ! The true hazel eye-and so brill...	eye true hazel eyeand brilliant.Regular feat...
4	4	joy	@lumiasantos ugh babe.. huggzzzz for u ! b...	ugh babe huggzzzz u babe naamazad nga ako e...

Fig 2. Pre-processing of data

3.5 Data Visualization

Visualization helps detect relevant relationships between various classes. Data Visualization will be done for each user to determine their daily mood. Visualization will be done using pie charts and bar charts.

The following are the various visualization mediums for interpreting the domination emotion which is detected from the input data after cleaning it. The dominating sentiment is treated as the final input.

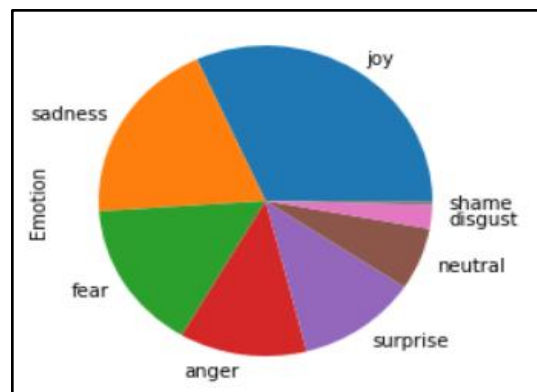


Fig 3. Pie Chart

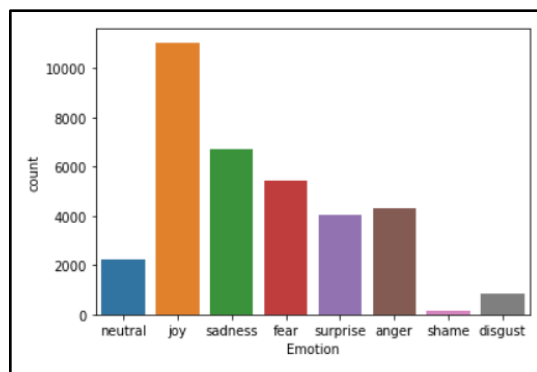


Fig 4. Bar Graph

Flowchart of the System :

The flowchart (Fig(1)) shows the flow of all the processes in the system.

1. A new user needs to register on the system to access it. The credentials are saved on the database.
2. After registration the user needs to login again to visit the homepage of the system. Once the user logs in, the system verifies the user and redirects the user to the homepage.
3. The homepage will have an option where the user can share their thoughts via typing in the text box.
4. The thoughts are stored in the database which is treated as a diary of a user. Each user has their own diary and they can store their thoughts in the diary.
5. Once the thoughts are stored in the database, the naive bayes classifier algorithm is applied to obtain Sentiment Analysis.
6. After the classifying process is completed, one dominated emotion is obtained and that emotion will be used further.
7. The emotion obtained after classification will be used for searching videos on the web.
8. A video will be retrieved from the web and will be shown to the user.

4. RESULTS

The following image displays the input part of the algorithm. The input is taken from the user and then analysis on that input text is done.

```
[70]: predict_emotion(["i am disappointed"], nv_model)
```

Fig 5. Input Text

The processing is done by the algorithm and predictions are displayed. The dominating emotion has the highest score.

```
Predictions:sadness, Prediction Score:0.6124850760666413
[70]: {'anger': 0.10366125700156281,
'disgust': 0.004522377644865751,
'fear': 0.019296795776513376,
'joy': 0.23138301308810444,
'neutral': 0.005445130474886796,
'sadness': 0.6124850760666413,
'shame': 3.590548257221338e-05,
'surprise': 0.0231704444464851916}
```

Fig 6. Prediction Score

The algorithm also has an option to upload the image and accordingly the emotion will be detected. The following image shows how an image is taken as an input for processing.



Fig 7. Input Image

This image shows the predictions done by the algorithm. Various emotions are given a certain score and the highest score is considered as the dominating emotion.

```
predictions = DeepFace.analyze(img)
Action: race: 100% | 4/4 [00:33<00:00, 8.44s/it]
predictions
{'emotion': {'angry': 1.7554360454141715e-05,
'disgust': 5.686155105794066e-10,
'fear': 9.545013313072559e-06,
'happy': 99.99384880065918,
'sad': 0.004925914254272357,
'surprise': 1.0337760159018217e-05,
'neutral': 0.0011848561371152755},
'dominant_emotion': 'happy',
'region': {'x': 112, 'y': 42, 'w': 90, 'h': 90},
'age': 31,
'gender': 'Man',
'race': {'asian': 0.26160494890064,
'indian': 2.4102015420794487,
'black': 0.18686382099986076,
'white': 34.79529619216919,
'middle eastern': 47.291409969329834,
'latino hispanic': 15.054623782634735},
'dominant_race': 'middle eastern'}
```

Fig 8. Score Prediction

5. CONCLUSION

For a human, it is very necessary to have emotional support or someone/something to enhance the mood. Mood Trend actually does the work here. The algorithm is designed in a way that it will detect the emotion and display the content to watch for the user. The research paper focuses on the project which detects the emotion on the basis of image input or a text input. When a user views the content, it will make an impact on the user's mindset and can be a catalyst for enhancing their mood. The focus of the project and the paper is to have emotional support or rather something to enhance the mood of a person.

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