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# MoodMate

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## INTRODUCTION

In this project “MoodMate”, my aim is to develop a mental wellness and self-care bot, which is capable of understanding the mood of the user through the input text provided. It will be able to provide emotional support and personalized wellbeing tips to the user based on his/her emotions. Also, it will be able to identify if the user has any suicidal tendency or not and will emergency resources to the user. I have planned a lot of stuff for this project, and I will be adding features in a phase-by-phase manner. The bot will also suggest motivational and inspirational quotes to the user to improve his mood (and they will be suggested based on the identified mood of user). After a successful model including the above stuff, I will add an option to generate a mood-based music playlist for the user. In this way, this bot can act as a “All in One” wellbeing tool for people to use in their daily lives.

The project will be created in a phase-by-phase manner, here is a breakdown of the project-

### 1. Data Collection:

The bot must be able to identify emotions perfectly, and detect harmful or suicidal behaviour as well. Thus the quality of the responses depends heavily on the type of data used for training.

For emotion/mood detection, we can use a sentiment analysis dataset, I have decided to use ‘The Emotion in Text’ dataset by Crowdfunder, it has nearly 40k tweets labelled with emotion. The categories include “empty, sadness, enthusiasm, neutral, worry, sadness,

love, fun, hate, happiness, relief, boredom, surprise, anger”. Earlier I decided to use the Sentiment140 dataset (has 1.6 million tweets labelled) but I doubt whether I will have enough computational power to deal with it. It can be used in the advanced stages of my project.

To generate an empathetic response based on our identified mood, we can utilize the EmpatheticDialogues dataset (has empathetic responses for 25k one to one convos), for suggesting wellbeing tips we can use reddit posts related to mental health as resources.

For detecting suicidal tendencies, the “Suicide and Depression Detection” dataset from Kaggle can be used to label text inputs as “high risk” and “low risk”. It contains a collection of posts from the "SuicideWatch" and "depression" subreddits from reddit.

I couldn't find a dataset which has inspirational quotes with emotional labels, so I am thinking of using the “Inspirational Quotes” dataset from Kaggle, I believe I will have to map a relevant quote using a rule-based approach (after identifying user's mood).

## **2. Preprocessing:**

It will involve removal of unwanted characters /symbols from the input text ( for ex, the punctuation marks, numbers, extra spaces, or URLs), the text will be converted to lowercase and tokenization would take place. Sentences with negations must be handled carefully as they might be interpreted in a confusing manner. The input text will undergo stemming and vectorization so that they can be used by the model.

## **3. Mood Identification and Sentiment Analysis:**

The core component of the project is to determine the user's mood based on their input text. Natural Language Processing (NLP) and Sentiment Analysis would be used for this task:

Frameworks: The project would use Hugging Face's Transformers library for pre-trained models such as BERT or DistilBERT, as these are highly effective in sentiment analysis tasks from textual data.

The pre-trained model will be used on the Crowdfunder dataset to classify the textual input into different moods (e.g. neutral, worry, sadness, love, fun etc.).

The model will be trained to detect emotions from text inputs and provide an appropriate response based on the identified mood. The responses can be categorized according to different moods from the datasets we have decided above.

#### 4. Suicidal Tendencies Detection

Since my project uses “Suicide and Depression Detection” Dataset from Kaggle, it will label texts containing harmful content as “high-risk” and others as “low-risk”. A simple classification model such as Logistic Regression will be trained on this data. As soon as a high-risk message is identified, the bot will provide a direct response that encourages the user to seek professional help (e.g., contact a counselor/ helpline and to reach out to someone you trust).

#### 4. Motivational Quotes Generator

Upon detecting the user’s mood, the chatbot would suggest an inspiring quote from the dataset. A rule-based algorithm can be used to match mood labels with appropriate quotes. For ex: if the mood is “sad,” the bot will output a quote like, “Tough times don’t last, but tough people do.”

#### 5. Mood-Based Music Playlist (Optional)

For an additional layer of emotional support, the bot should be able to generate a personalized playlist based on the identified mood. I would like to add this feature in my project after a successful working of other features.

#### 6. Evaluation

To evaluate the effectiveness of the bot, the project can use multiple evaluation metrics like:

Accuracy: For the mood classification model, F1-score will be used to measure performance.

Sentiment Accuracy: To evaluate the sentiment analysis model, comparison against manually labeled data can be used to check for consistency in the detection model.

### **MOTIVATION**

I recall watching Shark Tank India and seeing a lot of mental wellbeing and self-care apps being telecasted as products, I really was interested by the idea of having a portable personal psychiatrist with you all the time (considering that therapy is really expensive and also accompanies a lot of stigmas), also concepts like therapy and mental wellbeing are not discussed a lot in India, hence tools like these can help lower the stigma too. And though I didn’t know at that time how these applications were created; I believe now I can create something close to what they had as their product. Also, a recent suicide at

IITR reinforces how our society ignores the mental wellbeing aspect of our lives. These reasons touched my heart and I decided to make this the theme of my DSG project.

## **TIMELINE**

### **Primary Goals:**

1. Gain in-depth understanding of relevant topics by reading research papers, blogs, and articles.

Topics to cover:

- Sentiment analysis using machine learning.
  - Text preprocessing techniques for sentiment and emotion detection.
  - Techniques for detecting suicidal tendencies through text analysis.
  - Matching quotes or content based on semantic similarity.
  - Preprocessing Techniques for Text Data
2. Finalize datasets ( after testing all the abovementioned datasets)
  3. Prepare data:
    - Clean and preprocess the datasets.

### **Mid-Term Result:**

- Preprocessed datasets ready for modeling.

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## **Week 3–4: Implementation and Evaluation (End-Term Focus)**

### **Primary Goals:**

1. Build and test the core ML model:
  - Train a sentiment analysis model using **Logistic Regression**.
  - Fine-tune for mood detection and suicidal tendency detection.
  - Evaluate the outputs using metrics like F1 score.
2. Develop the bot framework:
  - Implement the bot logic to identify mood and suggest:

- Tips for managing emotions.
  - Relevant quotes based on mood (using semantic similarity).
  - Ensure the system can identify suicidal tendencies and provide safety warnings/resources.
3. Test the chatbot thoroughly:
    - Test using varied text inputs for accuracy.
  4. Add advanced features (Optional):
    - Implement mood-based music playlist selection.

#### **End-Term Result:**

- A functional chatbot with core and additional features implemented.

## **REFERENCES**

1. [Sentiment Analysis with Deep Learning](#)
2. [A Survey of Sentiment Analysis: Approaches, Datasets, and Future Research](#)
3. [Detecting Suicide Risk via NLP](#)
4. [A review on sentiment analysis and emotion detection from text | Social Network Analysis and Mining](#)
5. [Suicidal Ideation Detection: A Review of Machine Learning Methods and Applications | IEEE Journals & Magazine | IEEE Xplore](#)
6. [Affective Text Mining for Emotional Intelligence](#)

## **ABOUT ME**

I am a first-year student from Electrical Engineering department, IIT Roorkee, and although I am a beginner who started coding from the end of Class 11, I am ambitiously enthusiastic about exploring the intersection of development, AI/ML, and real-world applications. I am also interested in competitive programming (have started solving contests on codeforces). I have a good experience in C++ and Python with a decent knowledge of OOPs. I have worked with some libraries in Python like NumPy, Panda and Sci kit learn. I was really intrigued by the idea of Machine Learning (I heard it from my cousin brother, he's a software developer) and after taking some advice from him and seniors, I decided to complete the courses on Machine Learning by Andrew Ng on

coursera. I completed the Machine Learning Specialization Course before endsem and presently I am pursuing the Deep Learning Specialization Course. I really hope to learn and practice my skills through this project. I have not indulged in any book on ML until now, but I surely will give them a try in this winter break. I participated in the Syntax Error Hackathon as well ( with 2 more friends ) and we built a music synchronization tool named MuSync - [Sushant1703/MuSync: MuSync: A music synchronization tool that enables users to listen to audio files together in perfect sync, regardless of their location. Built with Node.js, Express.js, and Socket.IO, MuSync offers a user-friendly interface for seamless shared listening experiences. Perfect for virtual hangouts, collaborative workspaces, and fitness classes.](#)