

PHASE-1

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1. Problem Statement

- Social media has become a powerful medium where people express their emotions.
- Unstructured data from platforms like Twitter can reveal public sentiment about sensitive topics like mental health.
- There is a growing need to automatically detect and understand these emotional signals at scale.

2. Objectives of the Project

- To collect real-time tweets related to mental health using Twitter API v2.
- To preprocess and clean tweet data for analysis.
- To classify tweets into Positive, Negative, or Neutral emotions using sentiment analysis.
- To visualize sentiment trends and provide insights.

- To lay the groundwork for potential deployment in mental health monitoring tools.



3. Scope of the Project

- Focused on English-language tweets related to *mental health*.
- Uses keyword-based tweet extraction (e.g., "mental health").
- Employs basic NLP techniques with TextBlob for sentiment classification.
- Short-term scope: sentiment detection.
- Long-term potential: real-time emotional monitoring, mental health dashboards, integration with chatbots, etc.



4. Data Resources

- **Primary Source:** Twitter API v2
- **Query Used:** "mental health -is:retweet lang:en"
- **Volume:** 50 most recent tweets
- **Fields Collected:** Text content of tweets
- tweets



5. High-Level Methodology



Data Collection

- Twitter API v2 via Tweepy.
- Fetch tweets related to mental health (non-retweets, English).



Data Cleaning

- Remove URLs, mentions, hashtags, special characters.
- Convert text to lowercase for normalization.

Exploratory Data Analysis (EDA)

- Distribution of sentiment categories (positive, negative, neutral).
- Word frequency analysis (optional improvement).

Feature Engineering

- Not applicable in basic TextBlob sentiment analysis (already has built-in features).
- Future improvements: TF-IDF, word embeddings.

Model Building

- TextBlob for rule-based sentiment scoring using polarity.

Model Evaluation

- Limited as it's rule-based (no train/test split).
- Could add manual evaluation or benchmark against labeled datasets.

Visualization & Interpretation

- Count plot of sentiment categories using Seaborn.
- First few tweets and their associated sentiments displayed in a table.

Deployment (Optional/Future Scope)

- Could deploy as a Flask API, Streamlit app, or integrate with dashboards.
- Real-time sentiment tracking for public awareness or organization use.

6. Tools and Technologies

Programming Language

- **Python:** powerful for data manipulation, NLP, and visualization.

Notebook/IDE

- **Google Colab:** cloud-based notebook for coding, visualization, and sharing.

Libraries

- **tweepy** – to interact with Twitter API.
- **textblob** – for sentiment analysis.
- **pandas** – for data manipulation.
- **matplotlib & seaborn** – for visualizing data.

Optional Tools for Deployment

Flask / Streamlit – for creating web apps.

Heroku / Render – for deploying apps online.

Docker – for containerization (advanced use case).

7. Results & Visualization

- Bar chart showing the number of tweets per sentiment category.
- Example tweet table with sentiment classification.

8. Conclusion & Future Work

- Successfully demonstrated emotion detection in social media data.
- Shows potential for tracking public sentiment on mental health.
- Future improvements:
 - Use of deep learning models like BERT.

- Larger datasets for training & testing.
- Real-time dashboard or alert system.



9. Team Members and Roles

Team Member	Roles
MADHUMATHI S	Project Lead, Twitter API Integration.
SIVA JENANI S	Sentiment analysis logic, Data cleaning.
KAVIYA P	Exploratory data analysis, Model building.
DHANUSH M	Presentation Design, Deployment Research.
RAGAVAN R	Report Writing, Visualization.