A Machine Learning model for Early Depression Detection

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April 16, 2024

1 Introduction

Depression is a serious mental health condition that affects many people in our society today. It can have a big impact on a person's daily life, causing them to lose interest in things they used to enjoy and even leading to thoughts of suicide. Social media platforms like Twitter provide a vast amount of data that can offer insights into individuals emotional well-being. This project proposal aims to leverage Twitter data from Kaggle for sentiment analysis to detect signs of depression early on and by using machine learning (ML) techniques like LSTM.

2 Problem Statement

Despite improvements in mental health awareness and treatment, depression remains difficult to diagnose early. Traditional methods of depression screening tend to depend on personal or clinical assessments, which can be time-consuming. Furthermore, many people may not seek care or do not exhibit obvious symptoms, making it harder to identify those at risk. Using social media data for sentiment analysis gives a potential to address these

problems by providing a safe, scalable method for detecting early signs of depression.

3 Literature Review

The article "Depression detection using emotional artificial intelligence and machine learning: A closer review" aims to give an overview of the several AI and ML methods that aid in the detection and analysis of emotion, and thus depression, as well as the research questions that are associated with them [4].

The study "Artificial intelligence assisted tools for the detection of anxiety and depression leading to suicidal ideation in adolescents: a review" helps in obtaining a combination of data from deep models, including voice signals, face images, and visual and clinical history features, to automatically identify depression and/or anxiety disorders in people in the future. This could make it easier to identify those who are contemplating suicide [1].

The article "A textual-based featuring approach for depression detection using machine learning classifiers and social media texts" helps to detect depression via social media texts even when the training datasets do not contain specific keywords (such as 'depression' and 'diagnose'), as well as when unrelated datasets are used for testing [2].

The article "Depression detection from social network data using machine learning techniques" aims to perform depression analysis on Facebook data collected from an online public source. To investigate the effect of depression detection, we propose machine learning techniques as an efficient and scalable method [3].

The study by Chenhao Lin provides an attempt to use social media to detect depression since the patterns of opinions and thoughts expression of the posted text and images, can reflect users' mental state to some extent. In this work, we design a system dubbed Sense Mood to demonstrate that the users with depression can be efficiently detected and analyzed by using the proposed system [5].

4 Objectives of the study

This project's major objective is to use Kaggle Twitter data for sentiment analysis to detect early signs of depression. The project aims to:

1. Develop a machine learning model that uses LSTM networks to evaluate sentiment analysis on Twitter data.

2. Train the machine to detect tweets containing signs of depression using predetermined keywords and linguistic patterns.

3. Evaluate the model's performance in terms of accuracy, precision, recall, F1-score, and ROC-AUC on the testing dataset.
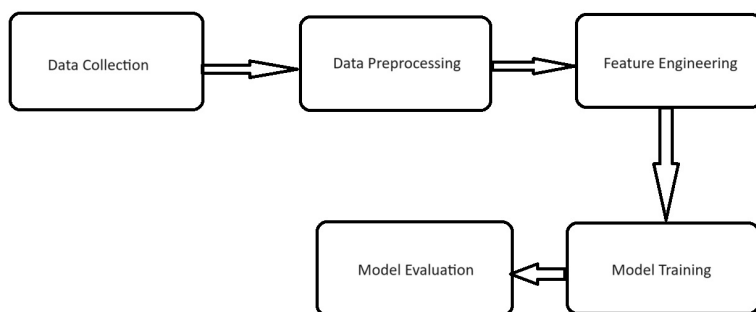
5 Research Design and Methodology

Figure 1: Research Design

6   Datasets

1. .The dataset is collected from Kaggle tweets data with 1.6 million tweets.

2. extraction of keywords with early depression. Early depression keywords such as sad, unhappy, lonely, low mood and so on

3. sentimental analysis of that data..

7   Contributions

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1. Sreekethana Gunuru: Data preprocessing, feature engineering, model Training

2. Sahithi singireddy: Data preprocessing, feature engineering, model Training

3. Sai Sruthi Thileti: data collection, model Evaluation, documentation

4. Anirudh Muppidi: data collection, model Evaluation, documentation

As a team, we each did our part to create this project proposal. Moving forward, we'll continue working together to reach our project goals and objective, using our skills and knowledge to succeed.

8   Conclusion

In conclusion, this project suggests an innovative approach to utilize Twitter data for early detection of depression via machine learning techniques such as LSTM networks. The project's goal is to detect signs of depression early on and provide rapid support and assistance to those who need it. The findings of this study have the potential to help increase mental health monitoring and detection utilizing social media data. The results of this study can have a substantial impact on the data science community beyond its direct implications for mental health. In addition to opening the path for future study and development in the area of data science and mental health, the

project demonstrates the use of social media data in improving mental health monitoring and detection.

References

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