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PREDICTING MENTAL HEALTH RISK USING SOCIAL MEDIA DATA AND NLP

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ABSTRACT

Mental health such as depression, anxiety, and stress affects millions of individuals worldwide. While many suffer in silence, people increasingly share their emotions and mental stats on social media platforms like Twitter and Reddit. These digital expressions, often unfiltered and spontaneous, can offer critical insight into a person's psychological well-being. This research project explores how Natural Language Processing (NLP) can be used to analyse social media text to detect early signs reprocessing publicly available English language posts from social media, the study aims to identify linguistic patterns and emotional cues that indicate mental health conditions. Machine learning and Deep learning model including logistic regression, support vector machine (SVM) random forest and LSTM network-will be applied to develop a system capable of predicting potential mental health issue based on a language use. The goal is not to replace professional diagnosis but create a supportive tool for early detection and introversion. The project emphasizes ethical consideration ensuring by privacy, using only publicly available data, and focusing on responsible AI practices the anticipated outcome is scalable and ethical solution that leverages digital footprints to support mental health awareness and proactive care in today's increasingly online society.

Keywords: Depression, Anxiety, Stress, Social Media Analysis, Nature Language Processing (NLP).

1. INTRODUCTION

Mental health issues such as depression, anxiety, and stress affect a significant portion of the global population and are recognized as critical public health concerns. Despite increasing awareness, many individuals do not seek help due to stigma, lack of access, or an inability to recognize the severity of their condition. As a result, mental health disorders often go undiagnosed and untreated, leading to worsening symptoms and serious long-term consequences. In parallel, the rise of social media has transformed how people communicate and express emotions. Platforms like Twitter, Reddit, and Facebook have become digital outlets where users frequently share their thoughts, experiences, and emotional states-often in real time and without inhibition. This public expression can offer valuable insights into users 'mental well-being, sometime revealing signs of psychological distress that they may not share in traditional settings.

This research explores how Natural Language Processing (NPL)-a branch of artificial intelligence that enables machines to understand, interpret, and generate human language-can be used to analyse social media content and identify patterns associated with mental health risks. By leveraging NLP techniques and machine learning models, we aim to develop a system capable of automatically detecting linguistic indicators that may signal conditions such as depression, anxiety, or stress.

The goal of this study is to create a responsible and ethically sound framework that utilizes technology to support early detection and intervention for mental health issues. Such a system could assist mental health professionals, caregivers, and individuals themselves by offering timely insights, promotion awareness, and encouraging people to seek help before their condition worsens. Ultimately, this project seeks to demonstrate how modern computational tools can contribute to more accessible, proactive, and data-driven approaches to mental health care in today's digital society.

2. METHODOLOGY

Problem Identification

Mental health issues are widespread but often go unnoticed due to stigma and limited access to care. However, many individuals express their emotions openly on social media platforms. This project identifies this as an opportunity: by analysing such digital expressions, it becomes possible to detect early signs of distress automatically using AI and NLP.

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Data Source Selection

Platforms like Twitter, Reddit, and Facebook are chosen because users share posts and comments that reflect their mental and emotional state. These platforms have APIs that allow text data extraction for research purposes.

Data Source Collection

Using APIs or scrapping tools, the system collects text data containing mental health related keywords such as 'depressed', 'anxious', 'lonely', 'tired' etc.

Data Cleaning and Preprocessing

Data cleaning involves removing noise such as emojis, URLs, stop words, punctuation, and irrelevant posts.

NLP Feature Extraction

This step convert text into vectors using NLP techniques like:

TF-IDF (Term Frequency-Inverse Document Frequency) Finds important words.

Word2Vec or BERT Embeddings - Capture contextual meaning of text.

Sentiment Analysis - Measures emotional tone (positive, neutral, negative).

Emotion Detection – Identifies emotions like sadness, anger, fear, joy.

Data Labeling and Annotation

Supervised machine learning requires labelled data.

Labels can be assigned manually or semi-automatically based on keywords/emotional intensity.

Low Risk – Neutral or positive language.

Moderate Risk – Some emotional distress.

High Risk – Strong indicators of depression, anxiety, or suicidal thoughts.

Model Development and Training

Different algorithms are tested to determine which gives the best accuracy:

Traditional ML: Logistic Regression, SVM, Random Forest.

Deep Learning: LSTM.

Transformers: BERT or Robert for contextual understanding.

Training involves feeding the model input features and labels so it can learn linguistic patterns associated with mental health conditions.

Model Evaluation

Model performance is evaluated using metrics like:

Accuracy – Overall correctness.

Precision – Correctly identified positives.

Recall – Ability to capture all relevant cases.

F1 score – Balance between precision and recall.

ROC-AUC Curve – Measures model's discrimination ability.

Risk Prediction and Analysis

The final model can process new posts and assign a risk category:

Low Risk.

Moderate Risk.

High Risk.

Predicted results are stored for further visualization and interpretation.

Ethical Framework, Visualization and Discussion

Develop visual dashboards showing model predictions.

Discuss ethical issues like data privacy, bias, consent, and misuse prevention.

Provide actionable insights for mental health professionals and policy-makers.

Emphasize that this system supports early detection, not clinical diagnosis.

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3. MODELING AND ANALYSIS

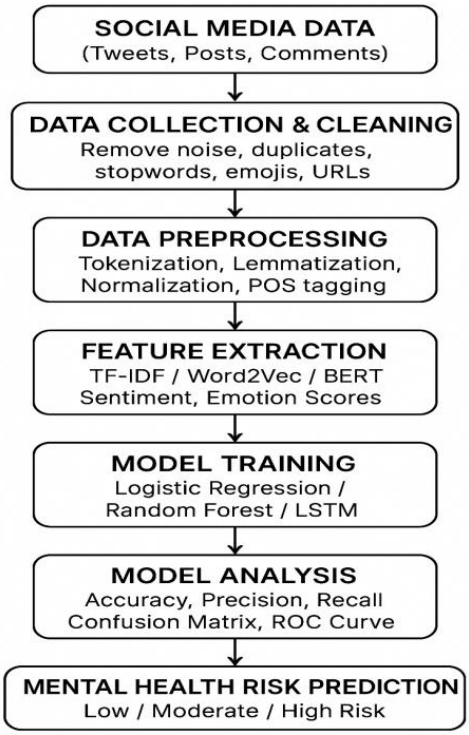

Figure 1: Conceptual Diagram.

4. RESULTS AND DISCUSSION

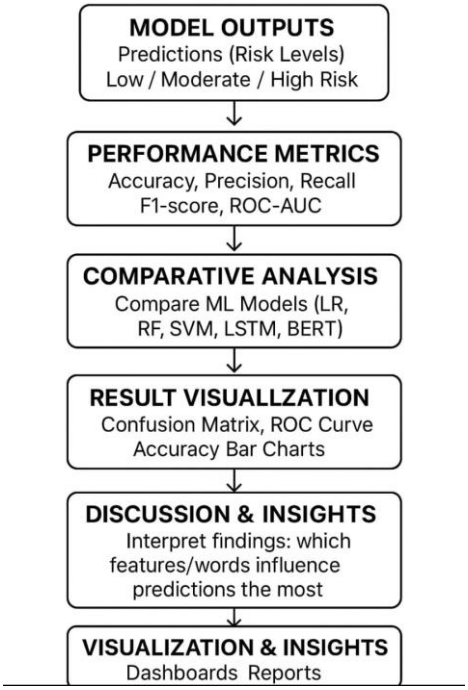

Figure 2:

5. CONCLUSION

This study demonstrates the potential using social media data and natural language processing technique to identify early signs of mental health issue such as depression, anxiety, and suicide risk. By leveraging linguistic patterns, sentiment analysis, and machine learning models, especially transformer-based approaches like BERT- it is possible to detect mental health risks with promising accuracy. While such a model offers valuable tools for large scale mental health monitoring. They must be implemented with caution, ensuring ethical standards, user privacy, and transparency. Ultimately, these systems are not replacements for professional diagnosis but can serve as complementary tools for early invention and public health support.

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6. REFERENCES

[1] Masab A. Mansoor, Kashif H. Ansari, V, Early Detection of Mental Health Crises through Artificial-Intelligence-Powered Social Media Analysis: A Prospective Observational Study, Journal of Personalized Medicine (J. Pers. Med.),14, Issue 9, Article 958, 2024.

[2] Ana-Maria Bucur Andreea-Codrina Moldovan, Krutika Parvatikar, Marcos Zampieri, Ashiqur R. KhudaBukhsh, Liviu P. Dinu, On the State of NLP Approaches to Modeling Depression in Social Media: A Post-COVID-19 Outlook," .

[3] Ranjeet Singh Thakur, J.P. Singh, "AI and NLP for Mental Health Prediction from Social", International Journal for Research in Applied Science & Engineering Technology (IJRASET), 13, Issue 8, 2024.

[4] Tianlin Zhang, Annika M. Schoene, Shaoxiong Ji and Sophia Ananiadou (2022), "Natural Language Processing Applied to Mental Illness Detection: A Narrative Review", NPJ Digital Medicine, Volume 5, Article 46, 2022, pp.

[5] Hitesh. Othman, N. A., Panchapakesan, C., Loh, S. B., Zhang, M., Gupta, R. K., Martenot, W., Phang, Y. S., Morris, R. J. T., Loke, W. C., Tan, K. B., Subramaniam, M., & Yang, Y. (2024). Predicting public mental health needs in a crisis using social media indicators: A Singapore big data study. Scientific Reports, 14, 23222.