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"Mental Health Risk Detection in Text Using NLP and Logistic Regression"

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Abstract - This project presents a machine learning approach to detect mental health risks from user-generated text using Natural Language Processing (NLP) techniques. A dataset containing labeled mental health-related text is preprocessed with stopword removal, lowercasing, and token cleaning. The clean text is then vectorized using TF-IDF and classified using a Logistic Regression model. The model achieves strong performance metrics, including accuracy and precision, in identifying potential mental health concerns. A prediction function is also developed for real-time risk assessment of new input text. This tool aims to assist in early detection and intervention by flagging potential indicators of mental distress.

Key Words: Mental Health, Natural Language Processing (NLP), Text Classification, Logistic Regression, TF-IDF Vectorization.

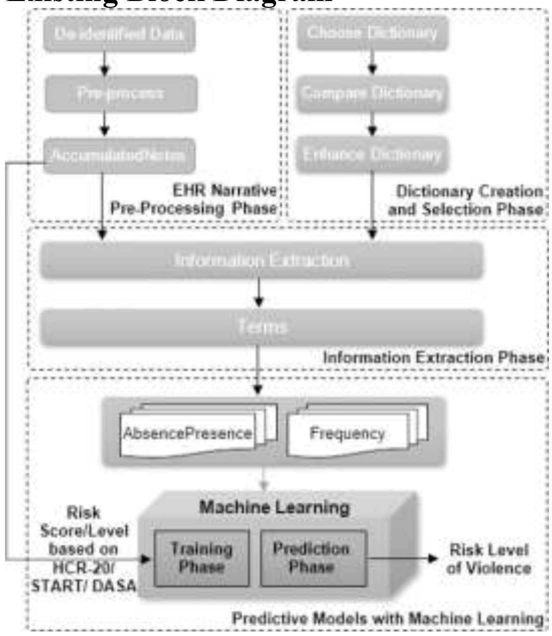
1.INTRODUCTION

Mental health issues are increasingly prevalent in today's society, and early detection plays a crucial role in effective intervention. With the widespread use of social media and digital communication, user-generated text offers valuable insights into individuals' mental states. This project leverages Natural Language Processing (NLP) and machine learning to classify text as indicative or non-indicative of mental health risk. Using a labeled dataset, the system is trained to recognize linguistic patterns associated with distress

2. Body of Paper

The study focuses on detecting mental health risks in textual data using Natural Language Processing (NLP) and logistic regression. Text data is collected from sources such as social media platforms and online forums. The data undergoes preprocessing, including tokenization, stop-word removal, and lemmatization. Key linguistic and emotional features are extracted using NLP techniques like TF-IDF and sentiment analysis. These features are used to train a logistic regression model to classify the mental state of individuals. The model is evaluated on accuracy, precision, and recall, demonstrating its effectiveness in identifying mental health issues such as depression, anxiety, and suicidal tendencies.

Existing Block Diagram



Proposed Block Diagram

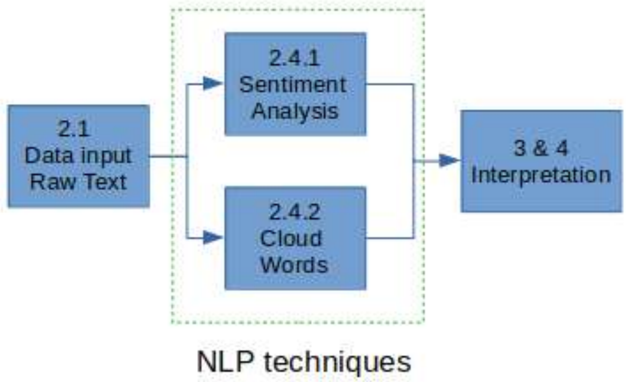
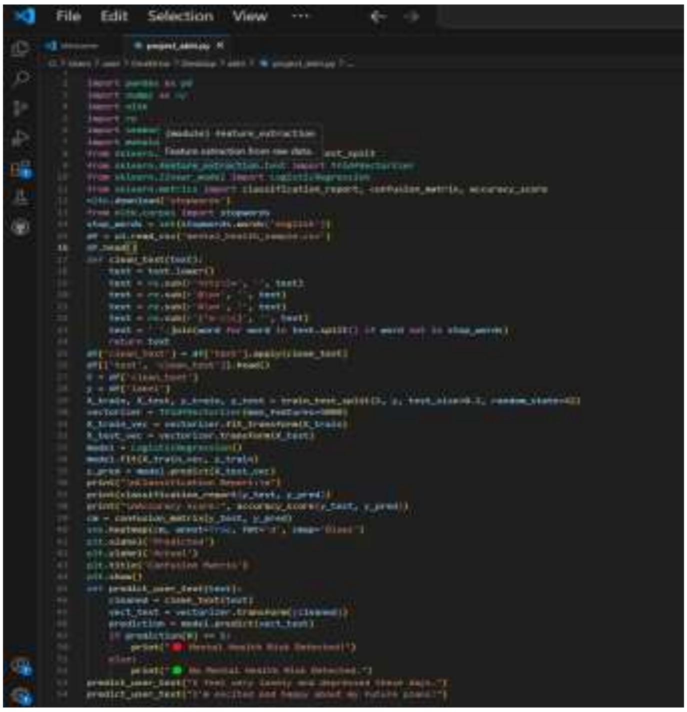


Fig -1: Figure

3. SYSTEM ARCHITECTURE

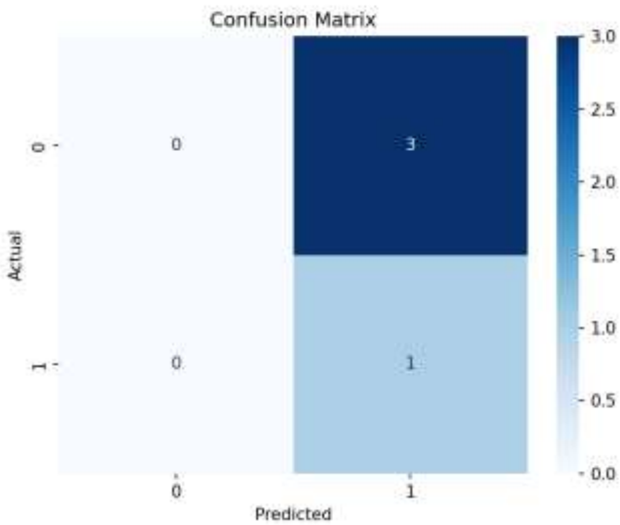
The system architecture includes a data collection module that gathers text data from sources like social media, followed by a preprocessing stage using NLP techniques for tokenization, lemmatization, and feature extraction. These features are then input into a logistic regression model for classification, with outputs indicating potential mental health risks.

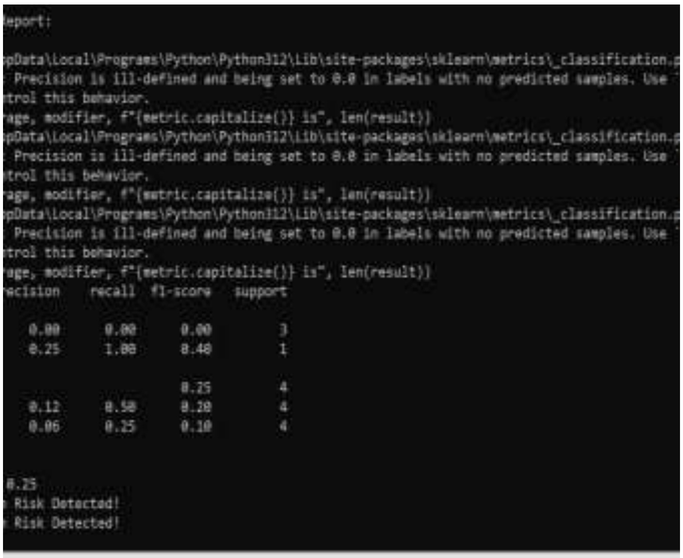


Dataset

2	I feel so lost and alone.	1
3	Excited for the new opportunities ahead!	0
4	Struggling with constant anxiety and fear.	1
5	What a beautiful day to enjoy!	0
6	I have no motivation to do anything.	1
7	Feeling positive and grateful today.	0
8	Depression is eating me alive.	1
9	Can't wait for the vacation trip!	0
10	Life seems meaningless these days.	1
11	Happy birthday to my lovely friend!	0
12	Battling insomnia and sadness again.	1
13	Loving my new fitness journey!	0
14	Feeling overwhelmed with sadness.	1
15	Had a productive and joyful day!	0
16	Hopelessness surrounds me lately.	1

output





4. CONCLUSION

In conclusion, the integration of Natural Language Processing (NLP) and logistic regression provides a powerful framework for detecting mental health risks from textual data. NLP techniques enable the extraction of meaningful linguistic and emotional features, while logistic regression offers a simple yet effective and interpretable classification method. Studies consistently show its utility in identifying conditions like depression, anxiety, and self-harm from social media and clinical texts. Though deep learning models like BERT offer improved accuracy, logistic regression remains a strong baseline due to its computational efficiency and transparency, making it valuable for real-world mental health monitoring and early intervention systems.

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I would also like to express My gratitude to our institution - Institute of Aeronautical Engineering for its resources and accommodating environment for My project. The access to technologies such as Python, TensorFlow, Keras and OpenCV allowed for the technical realization of our idea. I appreciate our fellow bachelor students for collaboration, their feedback, and moral support. Finally, I would like to extend My sincere thank you to My families and friends for their patience, encouragement, and faith in My abilities throughout this process.

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BIOGRAPHIES

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