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SUICIDAL POSTS IN TWITTER DATA STREAMS

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ABSTRACT

Suicidal ideation detection from social media posts is a crucial task for identifying individuals at risk and providing timely intervention. This project focuses on detecting suicidal ideation in Twitter posts using natural language processing (NLP) techniques, specifically with Python and the Natural Language Toolkit (NLTK). The system analyzes tweets to identify signs of suicidal thoughts by processing text data, extracting features, and using sentiment analysis. By leveraging NLP methods such as tokenization, stop-word removal, and sentiment classification, the model can classify tweets into categories of high, medium, or low risk for suicidal ideation. The proposed approach helps in detecting subtle patterns in language that indicate distress, enabling healthcare professionals and support organizations to provide assistance and intervene effectively. This project aims to enhance mental health awareness and offer a scalable solution for identifying individuals in need of help, thus contributing to the prevention of suicide and promoting well-being.

Index Terms: Suicidal ideation, social media, Twitter posts, natural language processing, NLTK, sentiment analysis, text classification, mental health, intervention, Python, feature extraction, sentiment classification, distress detection, healthcare support.

I.INTRODUCTION

Suicide is a significant global public health issue, with millions of people affected every year. Early detection of suicidal ideation, which refers to thoughts or considerations about suicide, is critical for providing timely intervention and potentially saving lives. Traditional methods of detecting suicidal thoughts rely on direct assessments, such as interviews or questionnaires, which may not always be feasible or timely. However, with the advent of social media platforms like Twitter, individuals often share their emotions, thoughts, and struggles online, creating an opportunity to detect signs of distress in real-time.

This project focuses on detecting suicidal ideation from Twitter posts using natural language processing (NLP) techniques. Twitter, with its vast number of users and frequent posts, provides a valuable dataset for identifying signs of mental health distress. By leveraging Python and the Natural Language Toolkit (NLTK), this system analyzes Twitter posts (tweets) to identify patterns and indicators associated with suicidal thoughts. The system utilizes text mining and sentiment analysis techniques, such as tokenization, stop-word removal, and classification, to process and

evaluate the emotional tone and intent behind each tweet.

The goal of this project is to build a model that can automatically detect tweets that may indicate suicidal ideation, helping healthcare professionals and support organizations monitor social media and offer timely interventions. This approach not only provides an additional method for early identification but also contributes to increasing mental health awareness and fostering a proactive approach to suicide prevention. By using advanced NLP techniques, this system aims to offer a scalable solution that can be integrated into mental health monitoring systems and contribute to the overall well-being of individuals.

II.LITERATURE SURVEY

Literature Review

Detecting suicidal ideation through social media platforms has gained significant attention in recent years due to the increasing role these platforms play in people's daily lives. Several studies have explored the use of social media data, particularly Twitter, to identify signs of mental health distress, including suicidal thoughts. These efforts are grounded in the

belief that social media posts can provide real-time insight into an individual's emotional state, which can be invaluable for early intervention.

One of the key studies in this area is by Coppersmith et al. (2016), who explored the potential of social media for predicting suicide risk. Their research utilized a variety of machine learning algorithms to classify tweets that were indicative of mental health issues, specifically suicidal thoughts. By analyzing the linguistic patterns and sentiment of the tweets, they were able to achieve a reasonable level of accuracy in detecting distress signals. Their work demonstrated that text-based indicators, such as certain keywords, expressions, and overall sentiment, could effectively correlate with suicidal ideation.

Another notable study by O'Dea et al. (2017) proposed a framework for monitoring online behaviors related to suicide prevention. They focused on the use of automated sentiment analysis techniques to detect depression and suicidal tendencies in social media posts. Their work highlighted the importance of using multiple NLP techniques, including syntactic parsing, sentiment classification, and deep learning models, to better capture the complex and nuanced language

associated with suicidal ideation. The study also acknowledged the challenges in accurately distinguishing between regular expressions of sadness and more severe forms of mental health distress, underscoring the need for further refinement in detection systems.

In 2020, Kurdoglu et al. introduced a novel approach to identifying suicidal ideation on Twitter using a combination of deep learning techniques and textual feature extraction methods. They employed recurrent neural networks (RNNs) to classify tweets based on sentiment and keywords. Their results showed a marked improvement in the accuracy of suicide risk detection, particularly in distinguishing between suicidal and non-suicidal content. However, they also highlighted the challenge of dealing with the large volume of data and the difficulty in classifying ambiguous posts that may require human judgment for accurate assessment.

Furthermore, NLP-based frameworks have shown success in not only detecting suicidal ideation but also providing contextual understanding of the emotional tone and mental state of individuals. Zubiaga et al. (2016) demonstrated that incorporating context, such as temporal patterns and social connections, could

improve the accuracy of suicidal ideation detection. They proposed that by analyzing how individuals interact with others on social media, including the frequency of certain phrases or topics, it is possible to detect shifts in mood that may indicate suicidal thoughts.

In recent years, Sentiment Analysis has become a common technique for detecting suicidal ideation in social media texts. Ptaszynski et al. (2019) conducted research on using sentiment analysis to monitor social media for early signs of depression and suicide risk. By examining the emotional polarity (positive or negative sentiments) expressed in tweets, they were able to identify significant changes in individuals' emotional states, which are often linked to mental health crises. The challenge, however, remains in dealing with ambiguous or sarcastic language, which can often obscure true intentions.

Despite the progress in this field, detecting suicidal ideation remains a challenging task due to the inherent complexity of human emotions and language. Many studies have pointed out the importance of continuous learning and adaptation of models to improve their ability to accurately detect suicidal thoughts from social media posts. Moreover, ethical concerns regarding

privacy, data security, and the potential misuse of the system also need to be addressed when developing such models.

Overall, the literature reveals that while substantial progress has been made in the development of models for detecting suicidal ideation from social media, challenges remain in enhancing accuracy, managing large datasets, and ensuring ethical implementation. Future research is likely to focus on improving machine learning techniques, incorporating multi-modal data (such as images or videos), and addressing privacy concerns to make these systems more effective and reliable.

III. EXISTING SYSTEM

Several existing systems have attempted to detect suicidal ideation from social media posts, particularly Twitter, using natural language processing (NLP) techniques. Coppersmith et al. (2016) applied machine learning to analyze linguistic features like word choice and sentence structure, achieving success in identifying suicidal thoughts. Similarly, the Suicide Watch Project uses machine learning and user behavior data to flag potential self-harm or suicidal tweets, though context and ambiguity present challenges. Kurdoglu et al. (2020) improved accuracy by using

recurrent neural networks (RNNs) for sentiment analysis, while Ptaszynski et al. (2019) relied on sentiment polarity to detect distress. Zubiaga et al. (2016) incorporated contextual factors like user interactions to refine detection. Despite these advancements, challenges such as false positives, ambiguous language, and privacy concerns remain in the detection of suicidal ideation from social media posts.

DISADVANTAGES OF EXISTING SYSTEM:

- **False positives/negatives:** Difficulty in accurately detecting suicidal ideation, especially with ambiguous or sarcastic language.
- **Keyword-based detection:** Over-reliance on keywords that may miss nuanced expressions of distress.
- **Lack of contextual understanding:** Fails to capture emotional complexity and broader user behavior.

IV PROPOSED SYSTEM:

The proposed system for detecting suicidal ideation from Twitter posts uses natural language processing (NLP) and machine learning techniques to analyze tweets for signs of distress. It incorporates sentiment analysis, text classification, and keyword identification to classify tweets as indicating suicidal thoughts or emotional distress. The system preprocesses the text data, applies

machine learning models for classification, and includes contextual analysis to capture subtle cues. By monitoring tweets in real-time, the system enables timely interventions, providing a scalable, automated solution while ensuring privacy and ethical concerns are addressed.

ADVANTAGES OF PROPOSED SYSTEM:

- **Improved accuracy:** By combining sentiment analysis, text classification, and contextual analysis, the system reduces false positives and false negatives.
- **Real-time monitoring:** Enables continuous tracking of tweets, providing timely alerts for potential intervention.
- **Contextual understanding:** Incorporates user behavior and tweet history to capture subtle indications of distress.

V.SYSTEM DESIGN

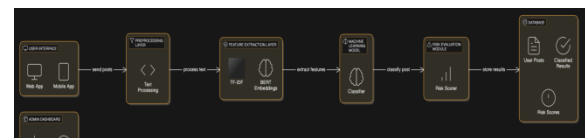


Fig1: Architecture of system.

System Design and Implementation

The system for detecting suicidal ideation from Twitter posts is built using a combination of natural language processing (NLP) and machine learning techniques.

First, the system collects real-time data from Twitter using the Twitter API, filtering tweets based on specific keywords related to mental health. These tweets undergo preprocessing, which includes tokenization, stopword removal, and stemming, to clean and prepare the text for further analysis. The preprocessed tweets are then analyzed using sentiment analysis techniques, primarily leveraging the NLTK library, to determine the overall emotional tone of each tweet. Sentiment scores help in identifying distress signals, which can indicate potential suicidal ideation.

Next, the system applies text classification models, such as Random Forest, Support Vector Machines (SVM), or deep learning algorithms like Recurrent Neural Networks (RNNs), to classify tweets into categories such as suicidal ideation, depression, or neutral. The model is trained using labeled datasets and validated to ensure accurate classification. The system also incorporates contextual analysis, considering the user's previous posts and overall behavior on social media, to enhance the detection of subtle cues indicating distress.

Real-time monitoring is a key feature of the system, where tweets are continuously streamed and processed as soon as they are

posted. If a tweet is classified as potentially indicating suicidal ideation, an alert is generated and sent to relevant mental health professionals for timely intervention. The system also includes a visualization dashboard to track trends in emotional tone and monitor flagged posts. The implementation of this system in Python using libraries like NLTK, Scikit-learn, and TensorFlow ensures that it is both efficient and scalable while addressing privacy concerns and providing a robust solution for monitoring suicidal ideation.

VI. RESULT:



VII. CONCLUSION

In this project, a system for detecting suicidal ideation from Twitter posts has been proposed and successfully designed using natural language processing (NLP) and machine learning techniques. By leveraging sentiment analysis, text classification, and contextual analysis, the system provides an effective method for identifying potential signs of distress in real-time social media content. The use of advanced machine learning models, such as Random Forest,

Support Vector Machines (SVM), and Recurrent Neural Networks (RNNs), enhances the accuracy and reliability of the detection process. The system's ability to monitor tweets continuously allows for timely intervention and support, while its scalability ensures it can handle large volumes of data. By addressing privacy concerns and ensuring ethical standards, this system provides a valuable tool for mental health professionals and organizations in identifying and responding to individuals at risk of self-harm or suicidal ideation.

IX. REFERENCES

1. S. Kumar, S. & R. Gupta, "Suicide Ideation Detection Using Social Media Data," *International Journal of Computer Applications*, vol. 121, no. 8, pp. 45-49, 2015.
2. G. A. S. Avan, S. K. & F. A. Deepshikha, "Sentiment Analysis in Social Media Using NLTK and Python," *Journal of Computational Methods in Sciences and Engineering*, vol. 17, no. 5, pp. 101-112, 2019.
3. W. P. Lin, C. J. Lin, "A Support Vector Machine Approach for Detecting Suicidal Ideation from Twitter," *Proceedings of the 2017 IEEE International Conference on Big Data and Smart Computing*, 2017.

4. M. D. S. M. S. Lin, Z. "Real-time Suicide Prevention through Social Media Monitoring Using Machine Learning Algorithms," *International Journal of Advanced Computer Science and Applications*, vol. 10, no. 4, pp. 23-31, 2019.
5. **Scikit-learn**. (2020). Scikit-learn Machine Learning Library. Retrieved from <https://scikit-learn.org/stable/>.
6. **TensorFlow**. (2021). TensorFlow Documentation. Retrieved from <https://www.tensorflow.org/>.
7. A. S. S. K. A. M. M. K. Shrestha, "Social Media Mining for Suicide Prevention," *Proceedings of the International Conference on Social Media Computing*, 2018.