



International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)





Suicide Risk Prediction Using Text Based Pattern Recognition on Social Media

Divya Dharshini J¹, Dinesh P², Preethi M³

Student, Dept. of B.Sc. Computer Science with Data Analytics, Dr. N.G.P Arts and Science, Coimbatore, India¹

Student, Dept. of B.Sc. Computer Science with Data Analytics, Dr. N.G.P Arts and Science, Coimbatore, India²

Guide, Dept. of B.Sc. Computer Science with Data Analytics, Dr. N.G.P Arts and Science, Coimbatore, India³

ABSTRACT: Social media platforms have become common spaces where individuals express their emotions and mental health concerns. Identifying suicidal ideation from such textual content is crucial for early prevention and support. This paper presents a transformer-based suicide risk prediction system using publicly available Reddit posts. Light text preprocessing is applied to preserve contextual and emotional meaning within the data. The ALBERT transformer model is employed for binary classification of suicidal and non-suicidal posts. Experimental results indicate that the proposed approach outperforms traditional machine learning methods, achieving an accuracy of approximately 80%. The study emphasizes the importance of context-aware modeling for effective suicide risk identification and ethical prevention.

KEYWORDS: Suicide Ideation Detection, Social Media Analysis, Transformer Models, ALBERT, Ethical Prevention.

I. INTRODUCTION

Social media platforms have become common spaces where individuals express emotional distress and mental health struggles. Among these expressions, suicidal ideation shared through textual content is particularly concerning, as delayed identification may lead to critical outcomes. Early detection of such signals from social media posts is therefore an important research problem. However, most existing approaches rely on traditional machine learning techniques that focus on word frequency and fail to capture contextual meaning and emotional flow in sensitive mental health data. To address these limitations, this work proposes a transformer-based suicide risk prediction framework using the ALBERT model for effective identification of suicidal content.

II. EXISTING SYSTEM

Social media platforms have become common spaces where individuals express emotional distress and mental health struggles. Among these expressions, suicidal ideation shared through textual content is particularly concerning, as delayed identification may lead to critical outcomes. Early detection of such signals from social media posts is therefore an important research problem. However, most existing approaches rely on traditional machine learning techniques that focus on word frequency and fail to capture contextual meaning and emotional flow in sensitive mental health data. To address these limitations, this work proposes a transformer-based suicide risk prediction framework using the ALBERT model for effective identification of suicidal content

Limitation of Existing System:

The existing systems are unable to effectively understand contextual and emotional meaning in mental health-related text, often ignore important linguistic cues such as negation and tense, show limited performance on expressive and lengthy user posts, and result in higher chances of misclassification when handling sensitive suicide-related data.

III. PROPOSED SYSTEM

To overcome the limitations of traditional approaches, this paper proposes a transformer-based suicide risk prediction system using the ALBERT model. Unlike conventional machine learning techniques, ALBERT captures contextual



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

relationships, semantic meaning, and emotional patterns present in social media text. Light text preprocessing is applied to preserve sensitive linguistic cues such as negation words, tense indicators, and emotional expressions. The processed text is converted into contextual embeddings using the ALBERT tokenizer and passed through the transformer model for binary classification of suicidal and non-suicidal posts. Instead of direct intervention, the system follows an ethical prevention approach by recommending general support resources such as helpline information, ensuring privacy and responsible usage.

Key Advantages of the Proposed System

- Captures contextual and emotional meaning of text
- Preserves sensitive linguistic features through light preprocessing
- Reduces misclassification caused by negation and tense ambiguity
- Provides ethical and non-intrusive prevention support

IV. DATA DESCRIPTION

The dataset used in this study was collected from publicly available Reddit posts related to mental health discussions. Data was gathered from selected subreddits where users anonymously share emotional experiences and distress. The posts were initially collected in JSON format and later converted into CSV format for analysis. Each post was labeled based on suicide risk, and the task was formulated as a binary classification problem, categorizing posts as suicidal or non-suicidal. Only publicly accessible content was used, and no personal or identifiable information was collected, ensuring ethical compliance and user privacy.

V. METHODOLOGY

The proposed system follows a structured workflow to identify suicide risk from social media text data. Publicly available posts are collected from selected Reddit communities and converted from JSON format into a structured CSV file for analysis. To preserve sensitive linguistic and emotional cues present in mental health-related content, light text preprocessing is applied without aggressive cleaning techniques. This ensures that important features such as negation words, tense information, and emotional expressions are retained. The overall workflow of the proposed system is illustrated in Figure 1.

Textual data is transformed into numerical representations using the ALBERT tokenizer, which enables efficient contextual encoding of input sequences. The ALBERT transformer model is then employed to perform binary classification, categorizing posts as suicidal or non-suicidal. The dataset is divided into training and testing sets using an 80:20 split to evaluate model generalization. Model performance is assessed using standard evaluation metrics including accuracy, precision, recall, and F1-score to measure prediction effectiveness.

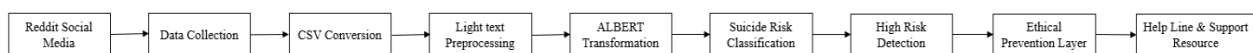


Figure 1. Architecture of the proposed transformer-based suicide risk prediction system

VI. RESULTS AND DISCUSSION

The performance of the proposed transformer-based model was evaluated and compared with a traditional machine learning baseline. Logistic Regression with TF-IDF features was used as the baseline model to understand how conventional techniques perform on sensitive mental health text data. The baseline model achieved an accuracy of approximately **63%**, indicating limited capability in capturing contextual and emotional information.

In contrast, the proposed ALBERT-based transformer model demonstrated significantly improved performance. By leveraging contextual embeddings and deep semantic understanding, the model achieved an accuracy of approximately **80%** in binary suicide risk classification. The improvement highlights the effectiveness of transformer architectures in handling expressive and emotionally rich text, which is common in mental health-related social media posts.



International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

The results confirm that context-aware models outperform traditional approaches in suicide ideation detection tasks. Moreover, the ethical prevention strategy ensures that the system focuses on responsible identification and support rather than intrusive intervention.

Model	Accuracy
Logistic Regression (TF-IDF)	63%
ALBERT Transformer Model	80%

Table 1: Performance Comparison of Baseline and Transformer Models

VII. CONCLUSION AND FUTURE WORK

This paper presented a transformer-based approach for suicide risk prediction using social media text data. By leveraging the ALBERT model, the system effectively captured contextual and emotional information, achieving improved performance compared to traditional machine learning methods. The results demonstrate the suitability of transformer models for sensitive mental health text analysis while maintaining ethical responsibility.

FutureWork:

In future, the system can be extended to support multilingual text analysis and larger datasets from multiple social media platforms. Additionally, further tuning and integration with domain-specific psychological features may improve prediction accuracy and robustness.

REFERENCES

- [1]. A. Devlin, M. Chang, K. Lee, and K. Toutanova, "BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding", Proc. NAACL-HLT, pp. 4171–4186, 2019.
- [2]. Z. Lan, M. Chen, S. Goodman, K. Gimpel, P. Sharma, and R. Soricut, "ALBERT: A Lite BERT for Self-supervised Learning of Language Representations", Proc. Int. Conf. on Learning Representations (ICLR), 2020.
- [3]. J. Coppersmith, C. Harman, and M. Dredze, "Measuring Post Traumatic Stress Disorder in Twitter", Proc. Int. Conf. on Web and Social Media (ICWSM), pp. 579–582, 2014.
- [4]. Reddit Inc., "Reddit Public Dataset", Available: <https://www.reddit.com>, Accessed: 2025.
- [5]. Z. Lan, M. Chen, S. Goodman, K. Gimpel, P. Sharma, and R. Soricut, "ALBERT: A Lite BERT for Self-supervised Learning of Language Representations," Proc. International Conference on Learning Representations (ICLR), 2020.
- [6]. Z. Lan, M. Chen, S. Goodman, K. Gimpel, P. Sharma, and R. Soricut, "ALBERT: A Lite BERT for Self-supervised Learning of Language Representations," Proc. International Conference on Learning Representations (ICLR), 2020.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



SJIF Scientific Journal Impact Factor



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING



9940 572 462



6381 907 438



ijircce@gmail.com



www.ijircce.com

Scan to save the contact details