

# EARLY SUICIDE PREDICTION USING NLP TECHNIQUES USING SOCIAL MEDIA DATA

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Suicide is a significant public health concern worldwide, necessitating early detection and intervention to prevent loss of life. With the proliferation of social media platforms, a vast repository of user-generated content could potentially reveal insights into individuals' mental health states. This research addresses the imperative to identify signs of suicidal ideation in social media content by harnessing advanced artificial intelligence (AI) and natural language processing (NLP) techniques. The primary problem addressed is the development of algorithms capable of effectively analyzing textual and behavioral patterns exhibited by users on Facebook, particularly focusing on young Sri Lankan adults aged 19-34. The proposed solution involves the creation of an AI-driven system integrating machine learning, NLP, and convolutional neural networks to detect early indications of suicidal ideation within Facebook posts. The methodology comprises multiple stages, commencing with sentiment analysis to ascertain the emotional tone of social media posts. Utilizing the state-of-the-art Transformers BERT model, the system conducts suicide prediction by scrutinizing linguistic nuances and contextual cues within the text. Comparisons with existing approaches, such as those utilizing SMS data for suicide intention analysis, highlight the enhanced accuracy and depth of our model. Unlike previous methods that often rely on surface-level sentiment analysis, our approach leverages contextual understanding provided by the BERT model, allowing for more nuanced predictions. Subsequently, a novel multi-model concept is introduced to predict the severity level of suicidal ideation, leveraging advanced features extracted by the Transformers BERT model. The initial findings from the implementation of the AI-driven system demonstrate promising results, showcasing high accuracy in detecting early signs of suicidal ideation and predicting the severity level of suicidal comments. The evaluation metrics, including precision, recall, and confusion matrices, underscore the efficacy of the system, with predictive accuracy of 90.35%, precision of 90.27%, and recall of 90.44%. Compared to existing models, our approach offers a significant improvement in predictive performance, thereby highlighting the potential of AI and NLP technologies to enhance suicide prevention efforts and provide timely intervention for individuals in distress.

**Keywords:** Classification, Suicide early prediction, Suicidal ideation, Transformers