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Prediction of Mental Health Risk Using Sentiment Analysis and Long Short-Term Memory (LSTM) Network

Dong Liang
College of Humanities and Law, Harbin University, China

Peilin Chen
http://orcid.org/0000-0002-5845-6348
China University of Labor Relations, China
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ABSTRACT

Traditional mental health assessments rely on questionnaires and interviews, which require manual data collection and cannot support real-time monitoring or early warning, especially for individuals with significant mood fluctuations. This paper proposes a model that combines sentiment analysis with LSTM networks to monitor emotional states in real time and capture temporal dependencies. The model collects and cleans user text data from multiple platforms and electronic health records, then applies natural language processing techniques such as word segmentation, vectorization, and sentiment analysis. Sentiment features are extracted using SentiWordNet and Bidirectional Encoder Representations from Transformers (BERT), and further classified with a convolutional neural network. The resulting sentiment scores are arranged chronologically and fed into the LSTM model to learn long-term patterns. After cross-validation and optimization, the model achieved 92% accuracy in predicting mental health risks, with an AUC between 0.9 and 0.95, demonstrating strong performance for real-time mental health risk prediction.

KEYWORDS

Mental Health Risk Prediction, Sentiment Analysis, Long Short-Term Memory, Real-Time Monitoring, Emotional Fluctuations

INTRODUCTION

As social economy development grows rapidly and people's lives become more stressful, mental health issues are increasingly becoming a public health challenge globally. More than 400 million people worldwide are afflicted by mental illness, with the prevalence of mental disorders such as depression, anxiety, and post-traumatic stress disorder increasing every year. Especially in modern cities, the fast-paced lifestyle, occupational pressure, and the complexity of social interaction make people face greater mental health risks (Chen et al., 2022; Zhang et al., 2022). Traditional mental health assessment methods, such as questionnaires, regular interviews, and face-to-face examinations, often rely on manual regular collection and analysis of data. Although these methods provide certain mental health information, they are less timely (Dhelim et al., 2023; Kováčová & Vaľko, 2023; Li & Sano, 2020) and cannot meet the needs of real-time monitoring and dynamic early warning of

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mental health. For individuals who have large emotional fluctuations and who may face psychological crises, traditional assessment methods often fail to capture sentiment changes in time, resulting in many potential mental health problems not being effectively identified and intervened in the early stage (Chen, 2023; Pradhan & Srivastava, 2024; Yu et al., 2025). This delayed risk prediction and intervention method means that once mental health problems break out, they often have a significant impact on the individual's life and work, and even cause serious psychological crises or social problems (Alqazzaz et al., 2023; Arshed et al., 2022; Pan & Yeh, 2023). Therefore, developing more precise, efficient, and real-time monitoring technology for mental health risk prediction has become a key issue that needs to be urgently addressed in the current fields of psychology research and public health.

In this study, we aimed to apply a new real-time mental health risk prediction model by combining sentiment analysis and long short-term memory (LSTM) network. By real-time monitoring of the emotional state of individuals, we used sentiment analysis technology to extract individual emotional characteristics. We combined the LSTM network to capture the time dependence of emotional fluctuations and constructed a prediction system for long-term tracking of individual mental health status (Bashiri & Naderi, 2024; Gupta & Sharma, 2023; Yedukondalu et al., 2024). In terms of research methods, user text data were first collected from social media, online consultation platforms, and electronic health records, and the data were cleaned, segmented, sentiment analyzed, and classified. Then, the sentiment time series data were modeled by LSTM to capture the long-term dependence of sentiment changes and predict mental health risks. The innovation of this paper is that by combining the advantages of sentiment analysis and the LSTM model, we could not only precisely identify individual sentiment changes but also provide dynamic risk assessment through real-time emotional monitoring, thereby achieving early warning of individual mental health problems. Finally, in this paper, we verified the effectiveness and superiority of this method through experiments. The area under the receiver operating characteristic curve (AUC) value of the model predicting mental risk reached 0.9–0.95, and the model accuracy reached 92%, proving that the model can provide real-time, accurate mental health risk prediction in practical applications, as well as theoretical support and a technical guarantee for mental health intervention.

RELATED WORK

As information technology advances rapidly, especially the rapid development of big data, artificial intelligence, and natural language processing (NLP) technology, methods for mental health analysis and prediction based on text data have received increasing attention. For example, Zhang (2024) developed a new hybrid convolutional neural network (CNN) and LSTM model to provide early warning for common mental health risks such as adolescent depression. Kodati and Tene (2023) studied the recognition of negative emotions on social media, including suicidal tendencies, based on transformer-based deep learning. Researchers have begun to explore how to use sentiment analysis technology to identify individual sentiment changes through online social platforms, online consultation platforms, user diaries, and other text data sources to predict their potential mental health risks. Sentiment analysis is a technology that infers an individual's mental state by analyzing the emotions and emotional information contained in the text. It has been widely used in social media, customer service, market research, and other fields (Han & Xu, 2024; Patlar Akbulut, 2022; Peng et al., 2022). Many studies have shown that by analyzing the positive and negative emotional words in user texts, symptoms of emotions such as depression and anxiety can be effectively identified. Taking social media as an example, public texts on platforms such as X (formerly Twitter) and Facebook provide researchers with a rich data source. Through these data, early signs of individual mental health were discovered and evaluated using sentiment analysis models (Fang, Peng et al., 2024; Fang, Xing et al., 2024). The technology of sentiment analysis is constantly developing, from the earliest dictionary-based sentiment classification method to the deep learning-based sentiment classification model, which has continuously improved the accuracy and effect of sentiment analysis. However,

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Tan Li Im, Phang Wai San, Patricia Anthonyand Chin Kim On (2018). *International Journal of Intelligent Information Technologies (pp. 39-54).*
www.irma-international.org/article/improving-polarity-classification-for-financial-news-using-semantic-similarity-techniques/211191