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AI-Driven Early Detection of Mental Illness Using Psychological Assessments and Multimodal Analysis

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ABSTRACT

The early detection of mental health conditions is a critical challenge in healthcare, where timely intervention can significantly improve patient outcomes. This study presents a novel AI-driven framework that utilizes responses to pre-set psychological questions, complemented by multimodal data analysis, to identify early indicators of mental illness. By integrating natural language processing (NLP) techniques with behavioral signal analysis, the model captures and analyzes both verbal and non-verbal cues such as sentiment, semantic patterns, facial expressions, and vocal tone. A hybrid approach combining deep learning architectures—such as Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs)—is employed to process sequential and visual data. This research also explores the ethical considerations of deploying AI in sensitive healthcare applications, including issues of privacy, algorithmic bias, and patient trust. The findings demonstrate the feasibility of leveraging psychological assessments and multimodal AI to improve early mental health diagnosis, paving the way for enhanced telemedicine solutions and personalized healthcare.

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