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AI-Based Multi-Modal Disease Screening Using Image Analysis and Rapid Diagnostic Test Recognition

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Abstract: *Early detection of diseases remains a major challenge due to limited access to healthcare facilities and high diagnostic costs, especially in rural and underdeveloped regions. This paper presents an AI-based multi-modal disease screening system that integrates image analysis and Rapid Diagnostic Test (RDT) recognition to provide a non-invasive and cost-effective solution for preliminary health assessment. The system utilizes images of nails, eyes, and facial features along with RDT strip images to identify potential health conditions. Advanced image processing techniques are applied for preprocessing, followed by feature extraction using Convolutional Neural Networks (CNN). Classification is performed using machine learning models such as Support Vector Machine (SVM) and Random Forest.*

The system provides a user-friendly interface and generates color-coded results indicating the health condition of the user. Additionally, a structured PDF report is generated to assist both patients and medical professionals. The proposed solution aims to reduce dependency on laboratory testing and promote preventive healthcare. The system is portable, affordable, and suitable for both rural and urban environments..

Keywords: Artificial Intelligence, Multi-Modal Screening, Image Processing, RDT Recognition, Machine Learning, Preventive Healthcare

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