

AI-DRIVEN ECG IMAGE CLASSIFICATION FOR ENHANCED CARDIOVASCULAR DISEASE DIAGNOSIS

Cardiovascular Diseases (CVD) represent one of the most critical challenges globally, contributing significantly to mortality and morbidity rates. Despite the extensive use of electrocardiography (ECG) as a diagnostic tool, manual interpretation of ECG signals remains prone to subjectivity and error, particularly in large scale clinical applications. This research addresses the existing gap in automated and accurate cardiovascular diseases diagnosis by proposing an artificial intelligence (AI)-based approach integrating image classification and ECG signal analysis. In this proposed method, ECG signals are converted into two-dimensional image representations to facilitate deep learning –based processing. A convolutional neural network (CNN) architecture is designed and optimized to automatically extract spatial and temporal features from ECG images for effective classification of cardiac abnormalities. The proposed framework minimizes dependency on manual feature extraction and enhances diagnostic precision. Performance evaluation is conducted using benchmark ECG datasets to validate the model's accuracy, sensitivity, and specificity. The findings demonstrate that AI-driven ECG image classification can significantly improve early detection and diagnosis of cardiovascular disorders. This proposed work contributes to the advancement of intelligent healthcare by introducing a robust, automated system capable of real –time cardiac assessment. The developed framework can serve as a foundation for future clinical decision –support systems, promoting efficient, scalable, and technology –assisted cardiac care.