

## Abstrak

Aritmia adalah gangguan irama jantung yang berisiko menimbulkan komplikasi serius jika tidak terdeteksi dini. Penelitian ini mengembangkan sistem deteksi dini aritmia menggunakan 1D-CNN dengan pendekatan *Explainable Artificial Intelligence* (XAI) berbasis SHAP pada sinyal Elektrokardiogram (EKG). Dataset MIT-BIH *Arrhythmia Database* dikategorikan menjadi kelas “Normal” dan “Abnormal”, diproses melalui filtering, segmentasi, pelabelan biner, normalisasi, kemudian data dibagi ke dalam data pelatihan, validasi, dan pengujian. Kinerja model dievaluasi menggunakan akurasi, *precision*, *recall*, *F1-score*, ROC-AUC, dan PR-AUC. Hasil menunjukkan akurasi 98,77%, *recall* 97,76%, dan *F1-score* 98,61%. Analisis SHAP menjelaskan kontribusi segmen EKG terhadap prediksi, meningkatkan transparansi model. Integrasi CNN dan XAI berpotensi menjadi sistem pendukung keputusan klinis untuk deteksi aritmia dini.

Kata kunci : Aritmia, Elektrokardiogram, CNN, XAI, SHAP.

## Abstract

*Arrhythmia is a cardiac rhythm disorder which may result in serious complication when not identified at an early stage. In this research develops an early arrhythmia detection system using 1D-CNN combined with Explainable Artificial Intelligence (XAI) based on SHAP on electrocardiogram (ECG) signals. The MIT-BIH Arrhythmia Database was categorized into normal and abnormal classes, processed through filtering, segmentation, binary labelling, normalization, followed by dividing the data into training, validation, and testing sets. The performance of the model was evaluated using accuracy, precision, recall, F1-score, ROC-AUC, and PR-AUC, achieving 98.77% accuracy, 97.76% recall, and 98.61% F1-score. SHAP analysis explained the contribution of ECG segments to the predictions, enhancing model transparency. The integration of CNN and XAI shows potential as a clinical decision support system for early arrhythmia detection.*

*Keywords: Arrhythmia, Electrocardiogram, CNN, XAI, SHAP.*