Abstract

Arrhythmia is a heart irregularity, a disorder that refers to the frequency, arrangement, and disruption of the origin or state of electrical impulses. Arrhythmia diseases can also lead to heart conditions, and one of the more deadly arrhythmias is atrial fibrillation (AF). Atrial fibrillation (AF) is the most common clinical arrhythmia, posing a threat to patient health and significantly increasing morbidity, mortality, and healthcare-related costs. Electrocardiogram (EKG) signals are one of the methods used to detect arrhythmia diseases. There are numerous arrhythmia classifications that employ wavelets to denoise signal data, thereby achieving high accuracy. However, for this final project, the focus will be on using autoencoders, as only a few utilize autoencoders for data preprocessing. The types of autoencoders employed are deep LSTM autoencoders, deep RNN autoencoders, and deep CNN autoencoders, as they are suitable for analyzing signals in EKG waveform data. The method used for arrhythmia detection involves three stages: preprocessing, data extraction, and classification. Preprocessing involves techniques for separating signal data and eliminating noise in the signals. The next stage is data extraction, which entails recognizing data patterns used to determine the characteristics of arrhythmia diseases. The results are then fed into the classification stage. In classification, accuracy values play a crucial role in detecting the specific type of arrhythmia disease. During the preprocessing stage, deep RNN autoencoders, deep CNN autoencoders, and deep LSTM autoencoders will be utilized.

Keywords: Denoising, Arrhythmia, Autoencoder.