# Abstract

Left ventricular ejection fraction (LVEF) has been used as prognostic indicator for heart failure and several other cardiovascular diseases. Current LVEF assessment relies on relatively inaccessible modalities such as transthoracic echocardiography (TTE), cardiac magnetic resonance (CMR), and computed tomography (CT). This study developed a CNN-RNN machine learning framework to predict LVEF from 5-seconds Holter and high-resolution ECG signals. Data used for training was obtained from the MUSIC dataset hosted on PhysioNet. Two types of deep learning architectures, such as CNN-LSTM, and CNN-GRU were trained and evaluated using mean average error (MAE), mean squared error (MSE), and Pearson correlation coefficient (PCC). The CNN-GRU model outperformed CNN-LSTM model. CNN-GRU model trained with high-resolution ECG reached PCC of 0.68 with MAE of 7.82 and MSE of 99.81. These values indicated a moderately strong positive correlation between predicted and actual LVEF values.



Keywords: ECG, machine learning, LVEF