ECG Arrhythmia Classification Using CNN

Category: Deep Learning

Introduction:

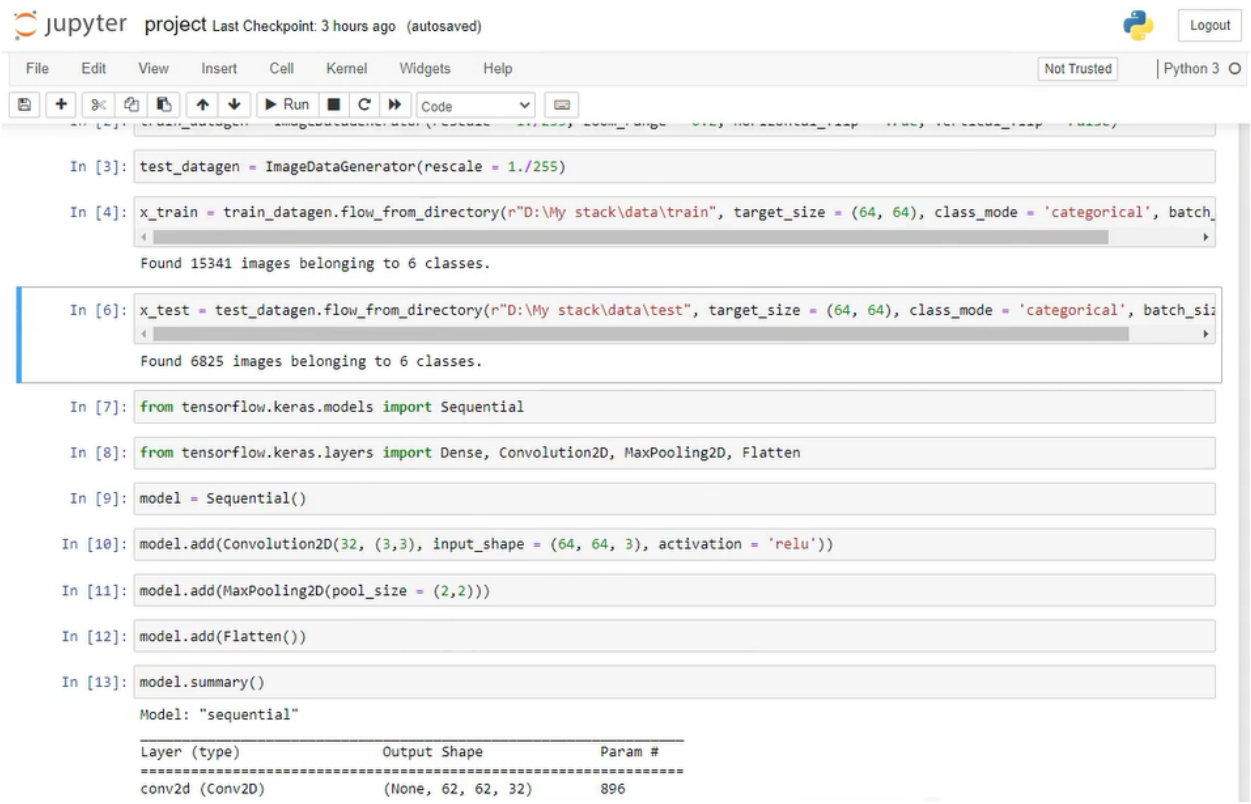
According to the World Health Organization (WHO), cardiovascular diseases (CVDs) are the number one cause of death today. Over 17.7 million people died from CVDs in the year 2017 all over the world which is about 31% of all deaths, and over 75% of these deaths occur in low and middle income countries. Arrhythmia is a representative type of CVD that refers to any irregular change from the normal heart rhythms. There are several types of arrhythmia including atrial fibrillation, premature contraction, ventricular fibrillation, and tachycardia. Although single arrhythmia heartbeat may not have a serious impact on life, continuous arrhythmia beats can result in fatal circumstances. For example, prolonged premature ventricular contraction (PVCs) beats occasionally turn into a ventricular tachycardia (VT) or ventricular fibrillation (VF) beats which can immediately lead to heart failure. Thus, it is important to periodically monitor the heart rhythms to manage and prevent the CVDs. Electrocardiogram (ECG) is a non-invasive medical tool that displays the rhythm and status of the heart. Therefore, automatic detection of irregular heart rhythms from ECG signals is a significant task in the field of cardiology.

Objective:

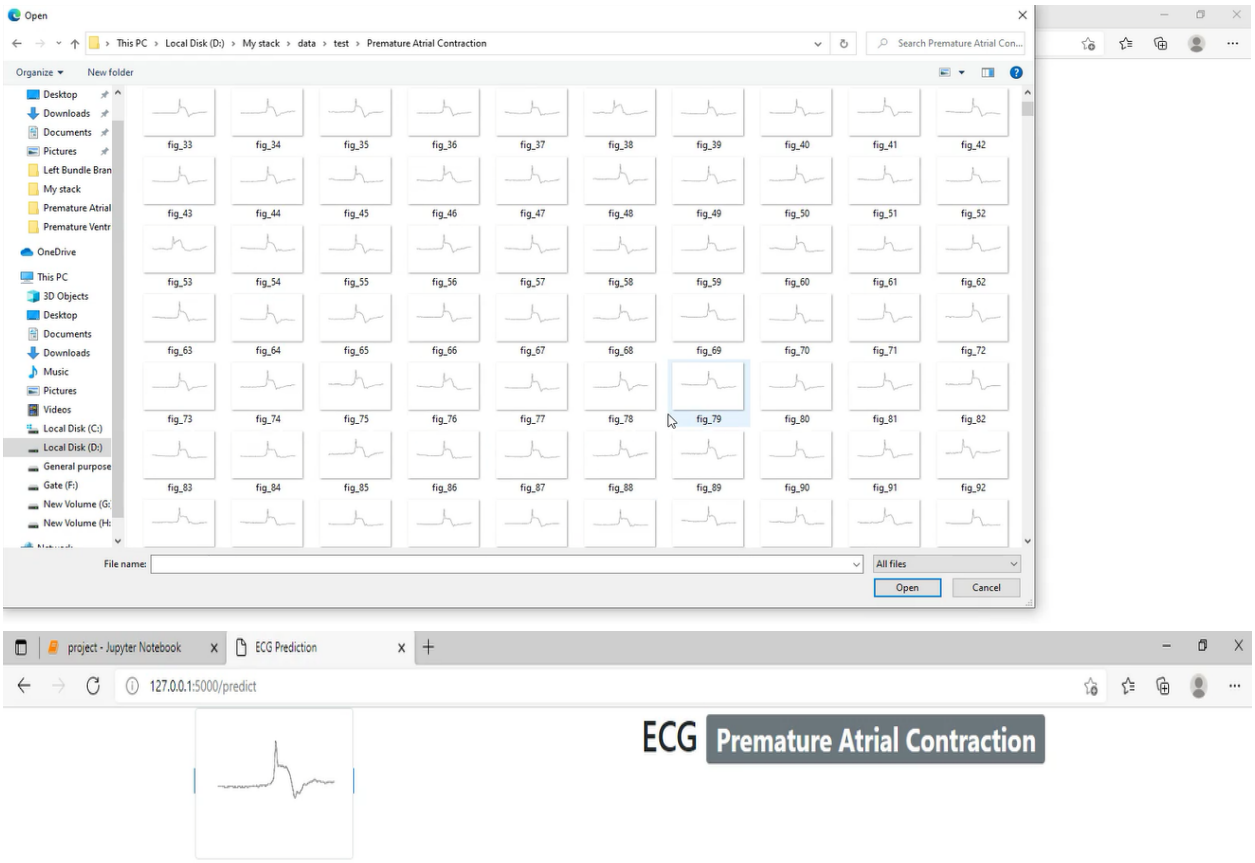
The objective of this project is to classify the given input ECG image and decide which category the ECG falls into out of 6 types.

Code:

A CNN model is built and trained with more than 1000 images of different types of ECGs and used in this project. Libraries such as tensorflow, keras, numpy, pandas are used in building the model.



A web app is designed with flask framework to use the model. The web app takes the ECG (image) via upload. It then classifies the image with the help of trained model and displays the output i.e., the name of the ECG.



Conclusion:

Thus the given ECG is classified saving a lot of time and man power.