DETECTING HEART ANOMALIES USING HEARTBEAT SOUNDS

- ### An Abstract

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Abstract:

Lub dub Lub dub.. The heart is a very important organ in our body that keeps beating 24/7 pumping out blood for us. It takes in impure blood and pumps out pure blood to be circulated around the Body.

The noise produced by the heart when pumping blood is called Heart beats. In 2004, 17.1 million people died from CVDs, accounting for 29% of all deaths worldwide. Coronary heart disease was responsible for an estimated 7.2 million of these deaths. Any approach that aids in the detection of heart attack symptoms can be extremely beneficial.

Machine learning researchers are particularly interested in the problem because it requires the classification of audio sample data, and distinguishing between groups of interest is difficult. Data is collected in real-world environments and often includes various types of background noise.

Differences in heart sounds that lead to different heart symptoms can be very subtle and difficult to distinguish. Classifying this type of data successfully necessitates the use of extremely robust classifiers. Despite its medical importance, machine learning and deep learning are yet to be used in this application.

This Project was taken up by Sri. MVSSS Durgesh (19230) and myself as a group project under the guidance of our Professor. Dr. Sampath Lonka.

Workflow:
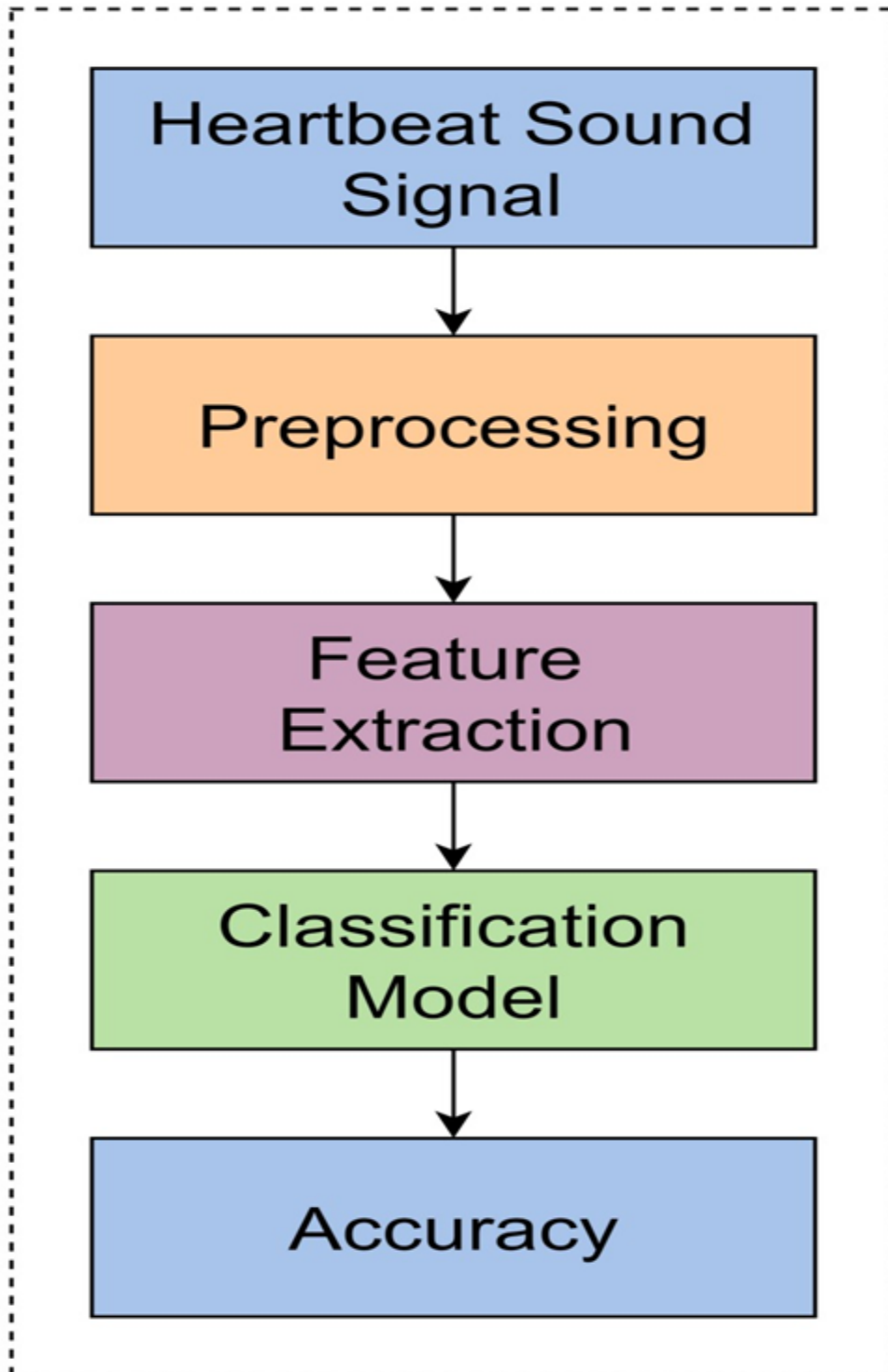
The project begins with audio files being read. After that, the audio files are processed to remove certain key features. After extracting

the functions, we model the data to suit the Machine Learning and Deep Learning models. We transfer the data to some predefined computer algorithms in the fourth level. We also develop our own CNN and LSTM models from scratch. The best algorithm is then chosen based on the various metrics we described earlier. We use several web integration frameworks to merge the concept with the web tool in the next step. In the final level, we deploy it on Heroku's free tier so that it can be accessed from anywhere.

LIBRARIES USED

1. NUMPY

2. PANDAS

3. LIBROSA

4. SCIKIT LEARN

5. TENSOR FLOW

6. OS

DEPLOYMENT

We created a user interface using Python Flask and integrated the best model with it. We then published our model using Heroku Cloud's free tier cloud service. This model can be used on any computer from anywhere in the world.

MY CONTRIBUTIONS

My Project partner Sri. MVSSS Durgesh (19230) contributed towards the Data Pre-processing, Machine Learning Algorithms and I Contributed towards Deep Learning Models and Deployment of Project.

CONCLUSION

This project developed Machine Learning and Deep Learning models for heartbeat sound classification. This procedure can effectively monitor the heartbeat signal and provide information that can be used to determine whether or not additional treatment is required. Normal, Murmur, Extra Heartbeat, Artifact, and Extra-Systole are the five sections in which the data is split The noise is filtered out of the heartbeat sound signal. Down-sampling reduces the dimension of the heartbeat sound signal wave to extract further discriminative characteristics, while data framing transforms the sampling frame rate of each audio file into a fixed-size frame rate. In this analysis, the Gradient Boosting model was applied to Dataset, which had the maximum Test accuracy of 99.31. Our approach is more competitive and effective, as shown by the experiment.