

LUNG SOUND RECORDER

The Quad Chips

Team 38

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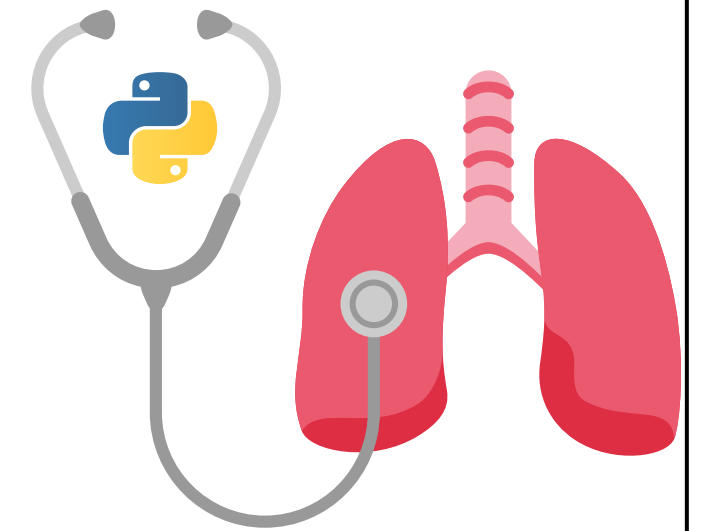
Motivation

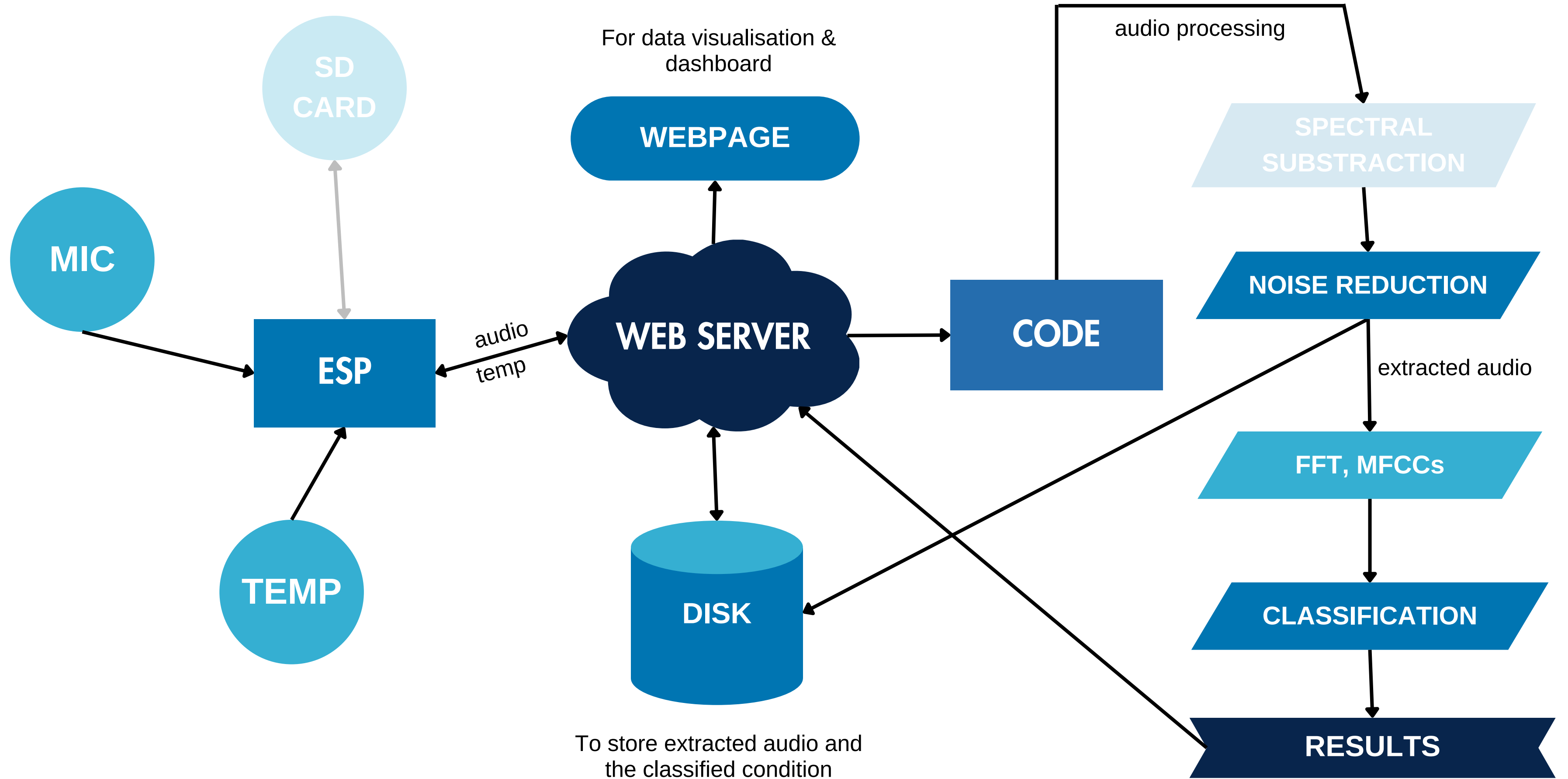
The early diagnosis of respiratory related diseases in children below the age of 5 is crucial

- for effective treatment
- lung sounds provide valuable
- essential to develop a device that can extract and record these sounds.

Aim

To design a portable healthcare device that will capture lung sounds and temperature readings using a microphone and stethoscope, and transmits them to dashboard for further analysis.





HARDWARE COMPONENTS



Mic Module



Stethoscope



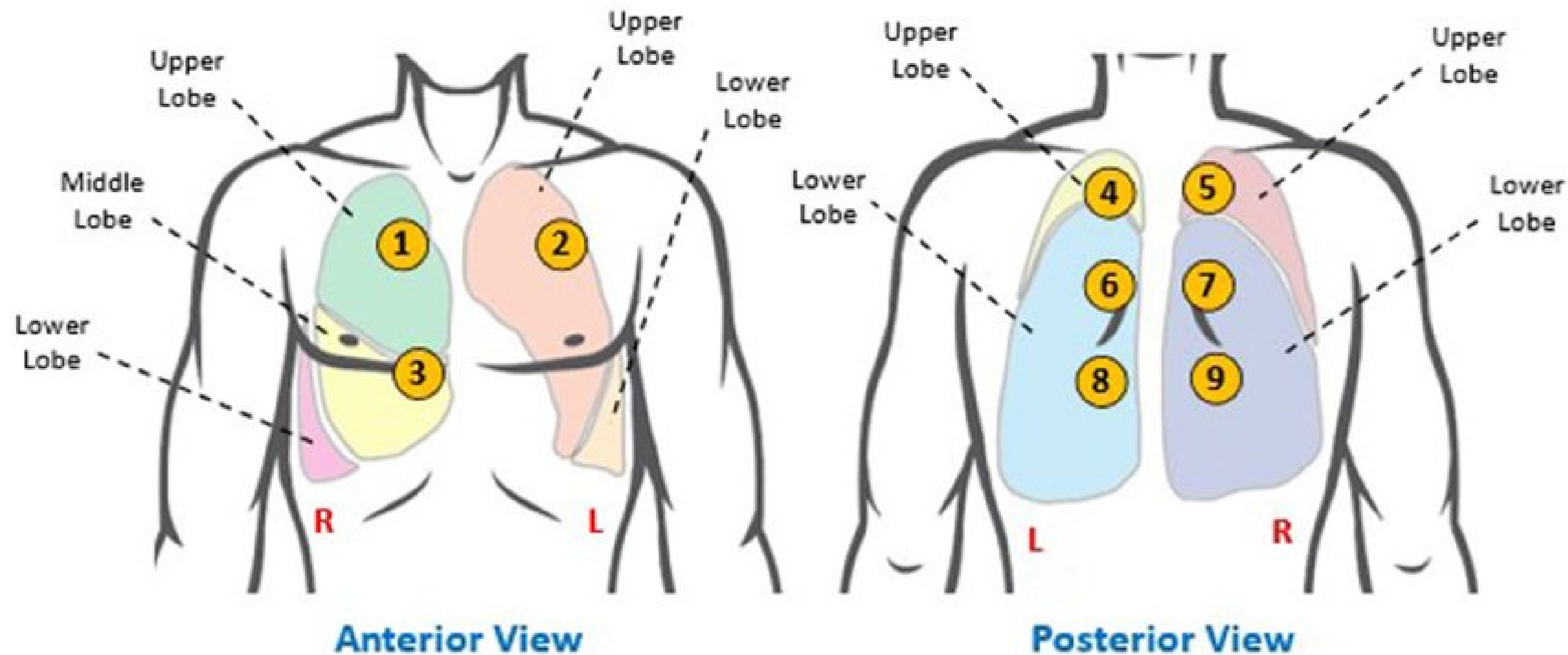
Temperature sensor



DEVICE FOR RECORDING

In this simple recording device, we attached the mic to the cut-wire of a high-sensitivity stethoscope with a sound-proof tape.

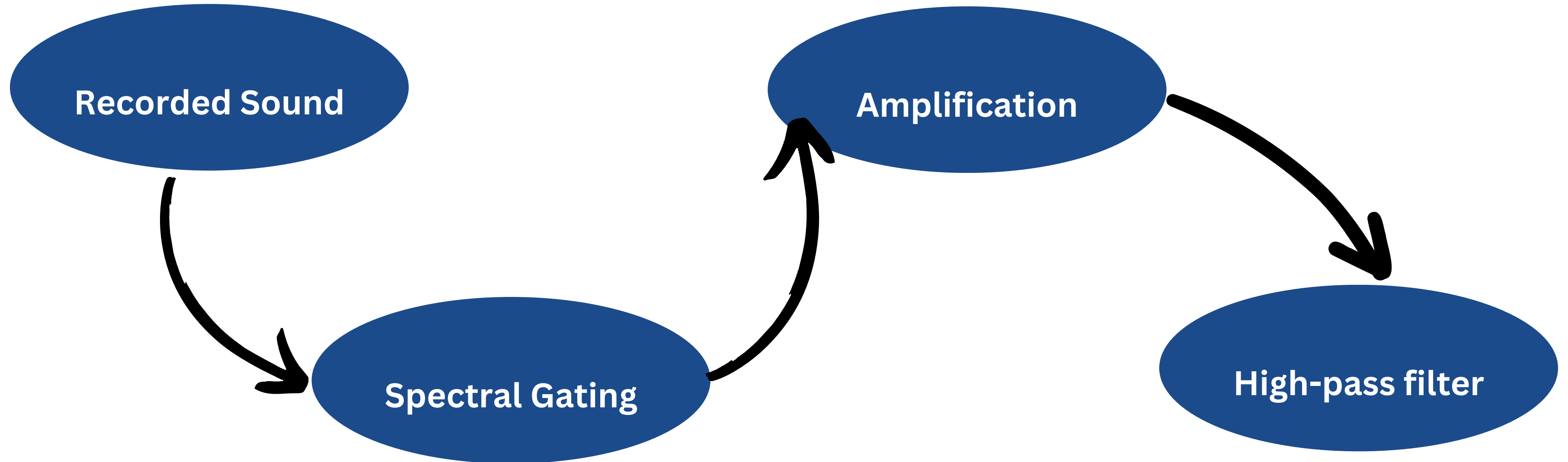
AUSCULTATION



Lung sounds are recorded with the stethoscope.

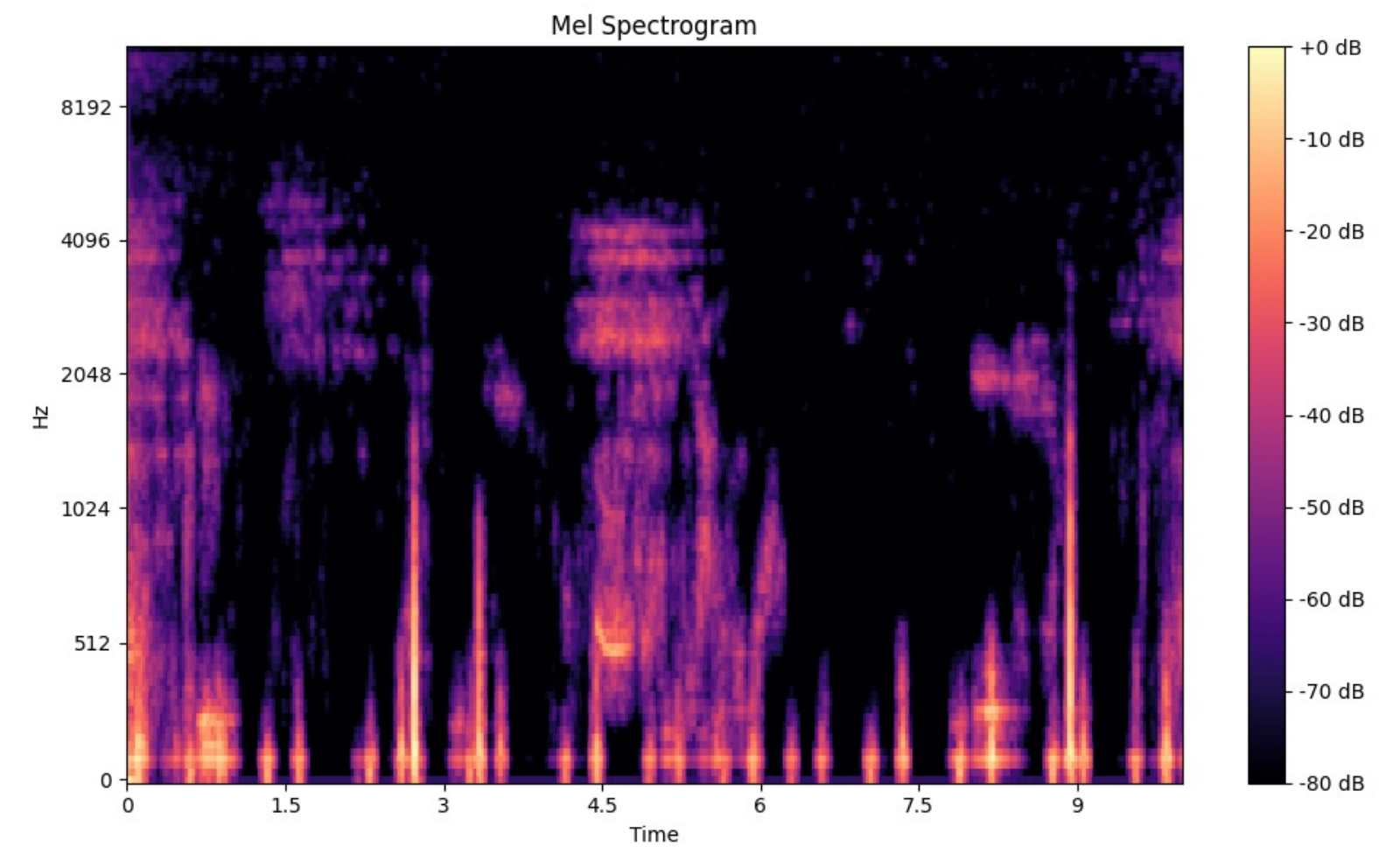
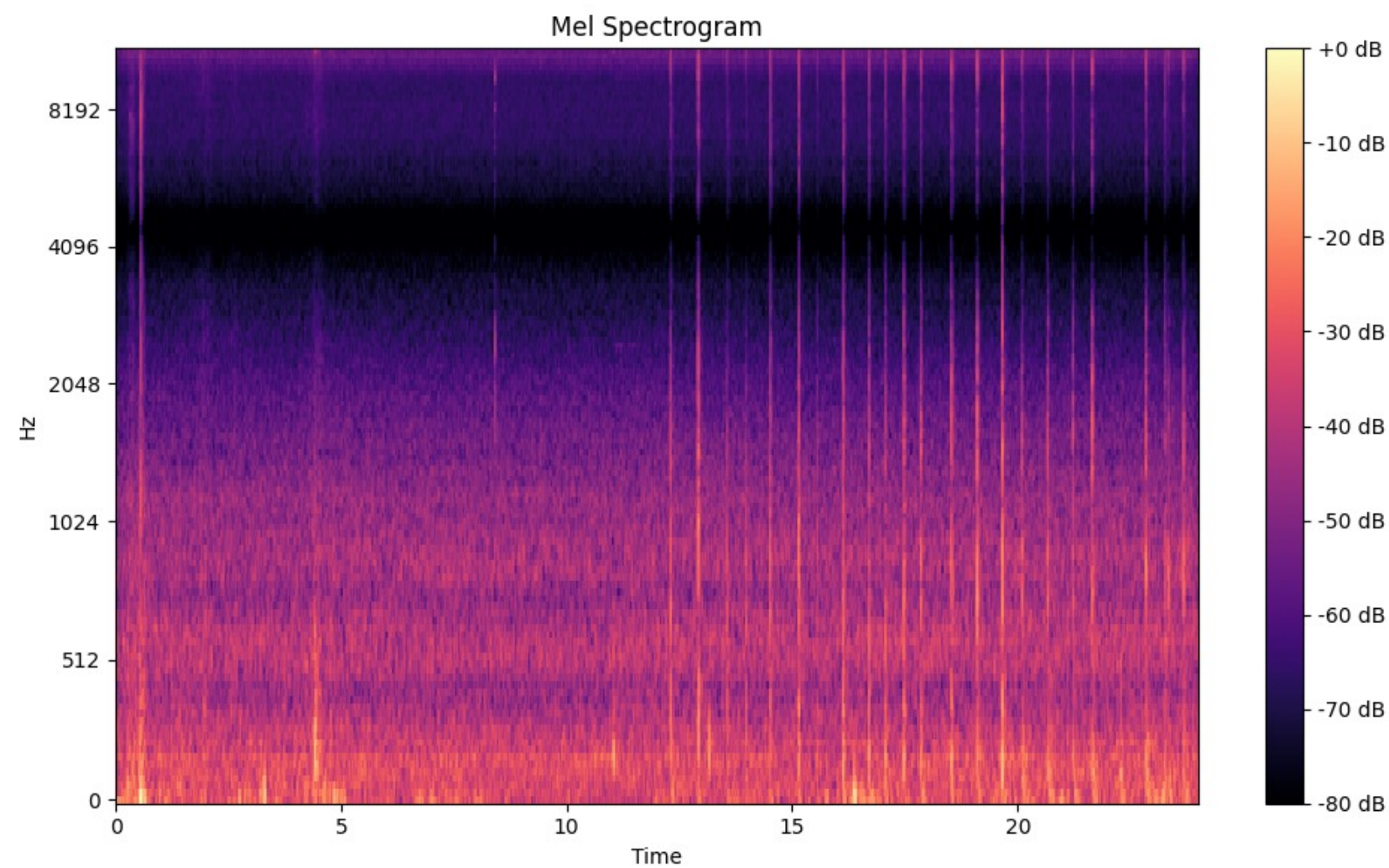
<https://youtu.be/2NvBk61ngDY?si=nOZtcsPfdxRB2E11>

WORKING SETUP OF NOISE REDUCTION



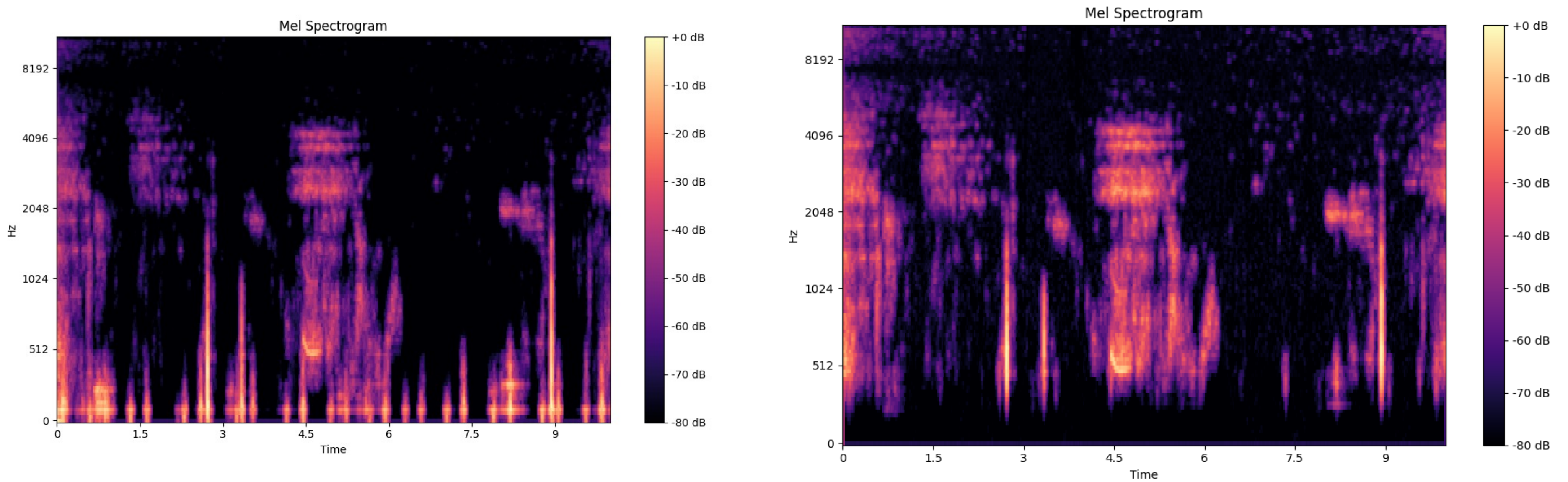
Spectral Gating and Amplification

Removes all background sounds (only lung and heart sounds remain)



High Pass Filter

Removes heart beats from extracted audios



Challenges faced

Noise Reduction: Difficulty in finding reliable method for noise reduction since it depends on kind of noise and recorded audio.

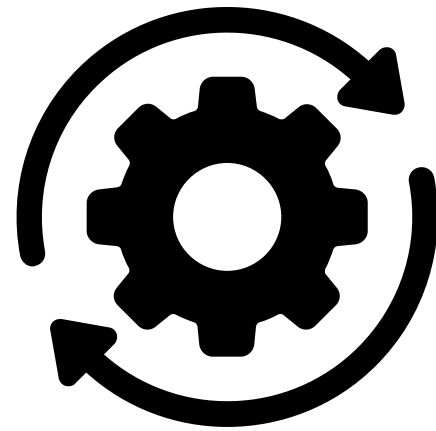
Training the model: Reliable data set was discovered later than anticipated, and due to its large size, the training and classification process on our machines is taking an extended period of time.

Coincidence of sound in multiple diseases: Challenging to differentiate between different diseases based solely on the sounds heard.

For example: wheezing or crackling sounds in the lungs can be indicative of various conditions, including asthma, bronchitis, pneumonia etc.

Integrating Raspberry pi: As we were not much familiar with raspberry pi, it took longer time to set it up. So we weren't able to complete integrating it.

Individual Works



Sai Praneeth:

Setting and testing of microphone,
Implementation of server, and web sockets,
Testing & Audio collection with stethoscope.
Sending Temperature Sensor data to thingspeak

Jahnavi:

Testing of temperature sensor,
MEL spectrogram and deriving MFCC coefficients.
Noise reduction using spectral gating
Amplification.

Sai Divya:

Pattern Matching

Studied different methods of Noise reduction

Classification using SVM

Front end part of website and database

Vaishnavi:

Studied different methods of Noise Reduction

Removing heart beats from amplified audio using high-pass filter.

UI front end part of website

Classifying audio with MFCC coefficients.