

# DSAA Project Report

## Team 06

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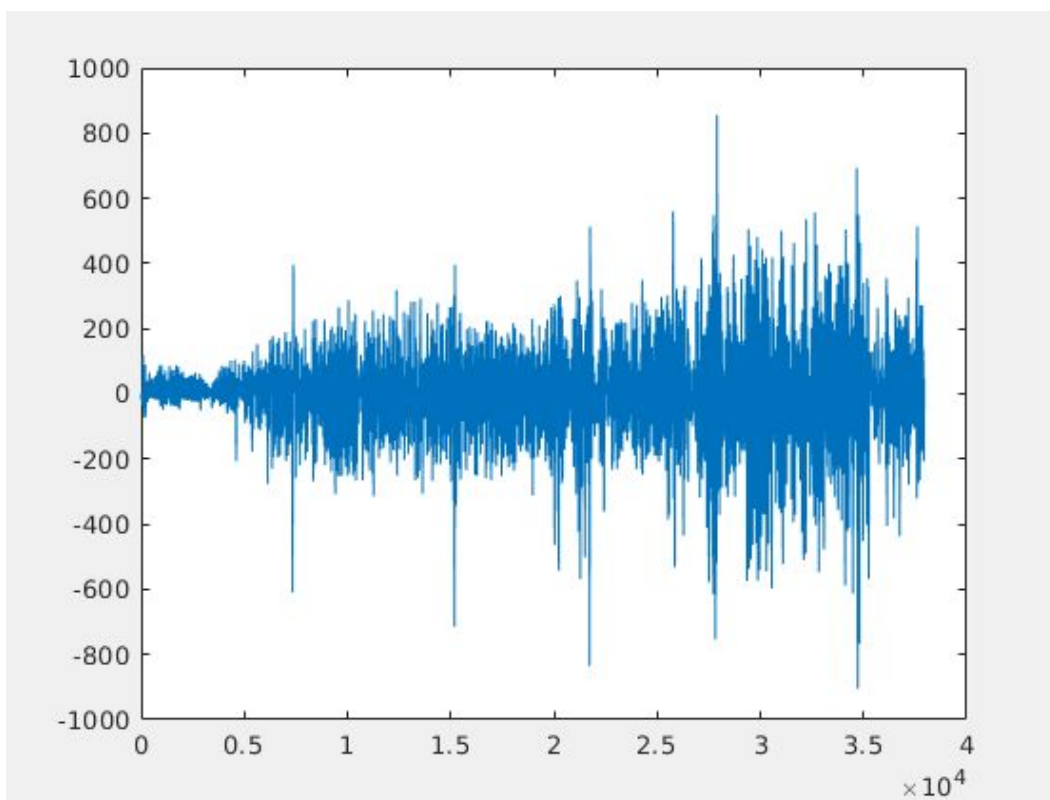
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The method used, involves removing the motion artifact in PPG signal using the fourier analysis. Motion artifact means the noise produced due to the acceleration of the hand to which the sensors are attached.

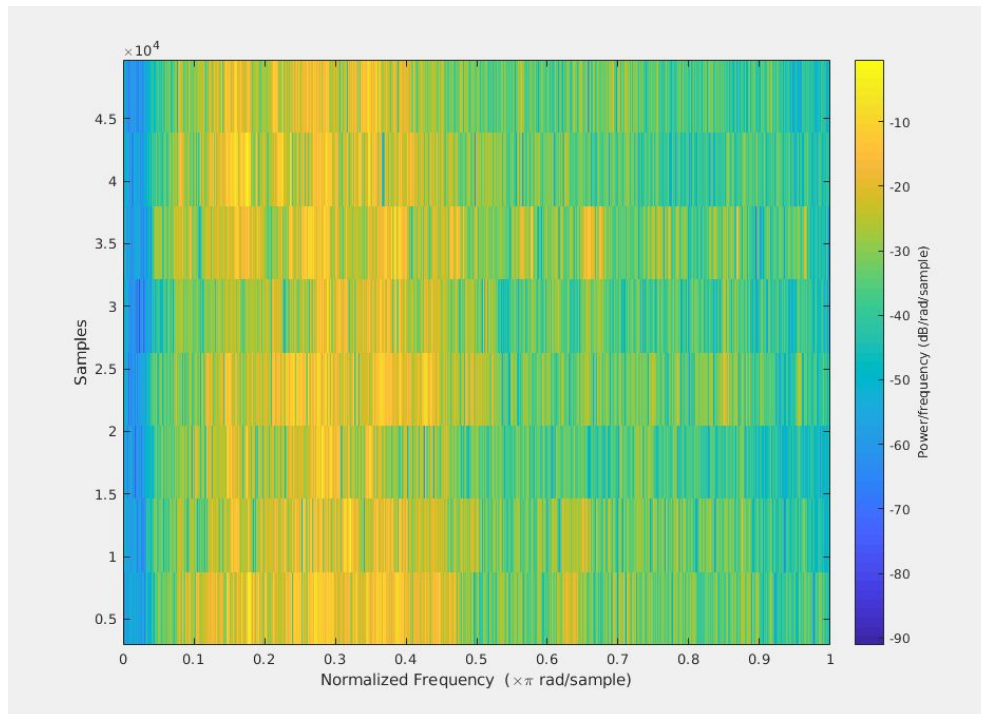
A PPG signal has the following three components:

1. Cardiac portion, corresponding to 0.5 - 4 Hz frequency range
2. Frequency of respiratory activity in the frequency range 0.2 - 0.35 Hz
3. Motion artifact noise that corresponds to frequencies more than 0.1 Hz.

We start by combining the two given PPG channels. By setting the other entire frequency component, except that of cardiac frequency and respiratory frequency to zero, the clear PPG signals are obtained.

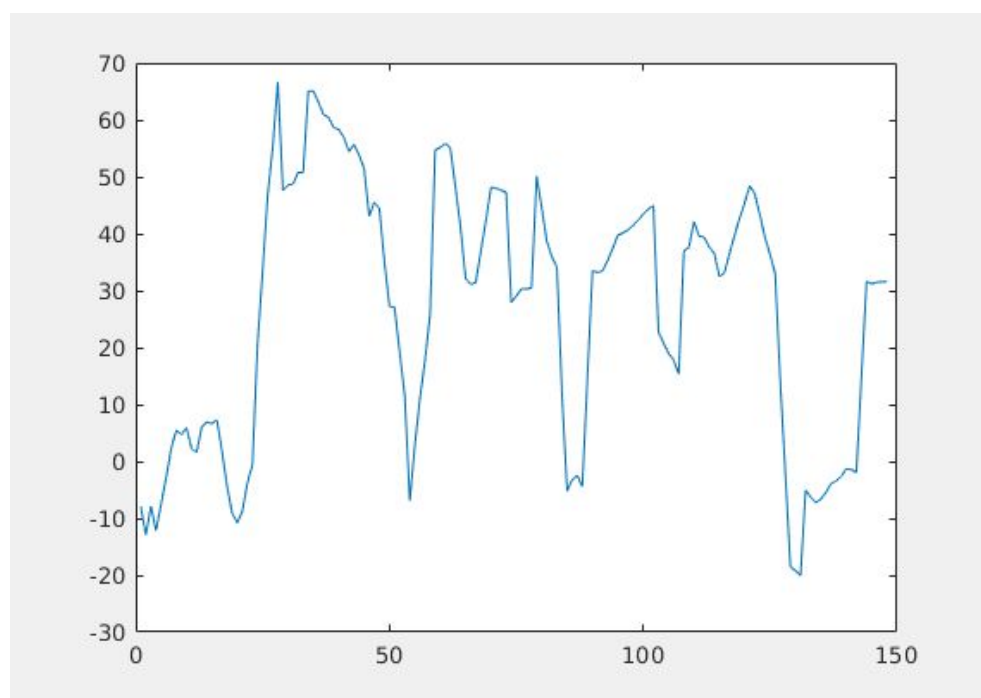


After denoising the PPG signals, short time fourier transform (STFT) is implemented using spectrogram.



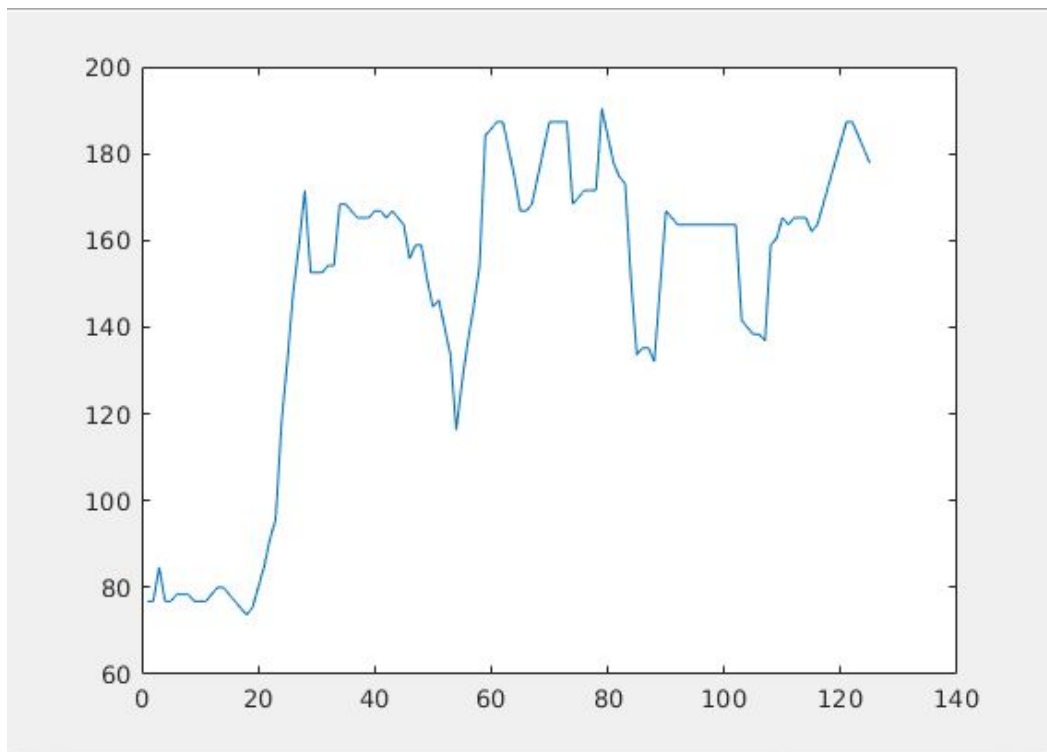
Then we figure out the indices of the maximum frequencies from the spectrogram output. Denormalizing the values at the indices, we get the actual maximum frequencies from each column, i.e., from 1-1000 then from 251- 1250 and so on. This is followed by smoothening the final output by averaging each value with it's previous 5 values.

The following is the difference between the actual values and the values computed by the implemented algorithm.



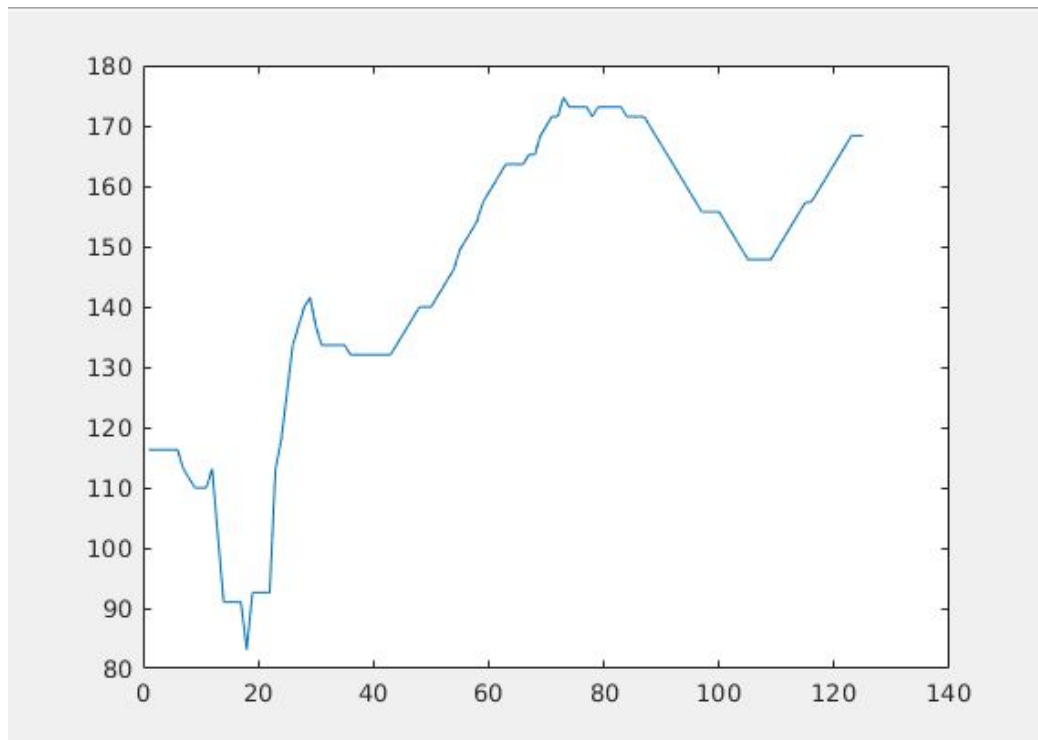
Final output of the BPMs are as follows:

1. Type 1



Data 1 Type 1

2. Type 2



Data 5 Type 2