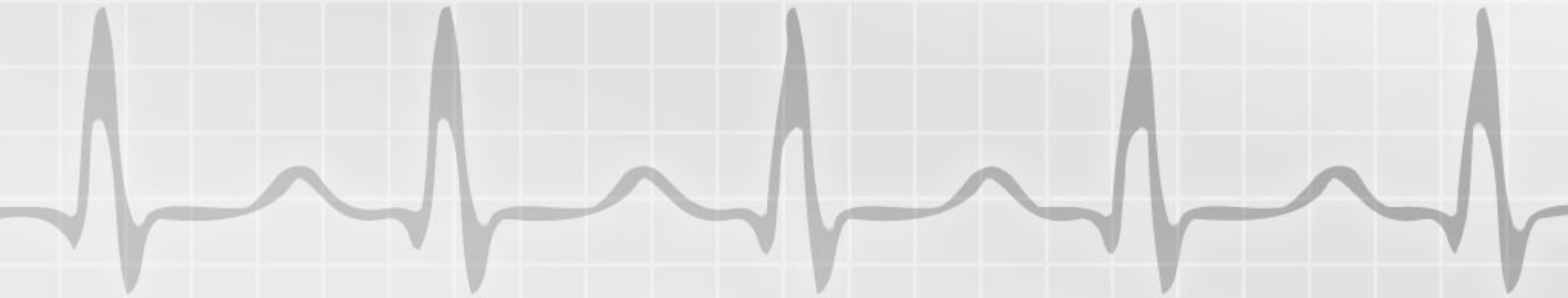


Normal/Abnormal Heart Sound Classification



Project Source

PHYSIONET ▼

> [challenge](#) > [2016](#)

Search

CLASSIFICATION OF NORMAL/ABNORMAL HEART SOUND RECORDINGS: THE PHYSIONET/COMPUTING IN CARDIOLOGY CHALLENGE 2016

- **31 March 2016:** The deadline for submitting entries has been extended. Please see [Rules and Deadlines](#) for details.
- **21 March 2016:** Scoring is now open for the Unofficial Phase.
- **15 March 2016:** [Example code](#) for Matlab and Octave has been released.
- **1 March 2016:** The 2016 Challenge is now open!

If you have any questions or comments regarding this challenge, please post it directly in our [Community Discussion Forum](#). This will increase transparency (benefiting all the competitors) and ensure that all the challenge organizers see your question.

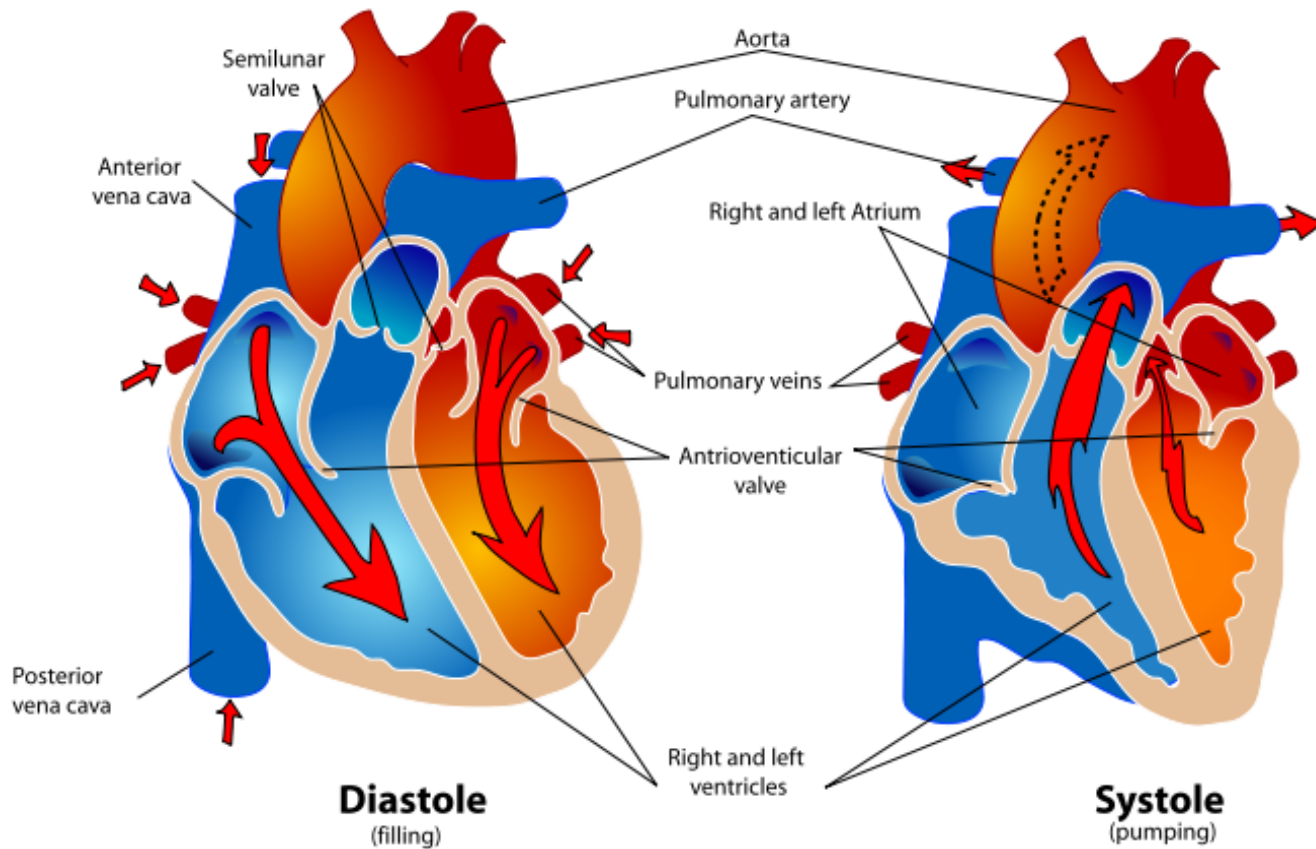
On this page:

- Introduction
- Quick Start
- Rules and Deadlines
- Challenge Data
- Sample Submission
- Preparing an entry for the challenge
- Scoring
- Obtaining complimentary MATLAB licenses
- Community Discussion Forum
- References

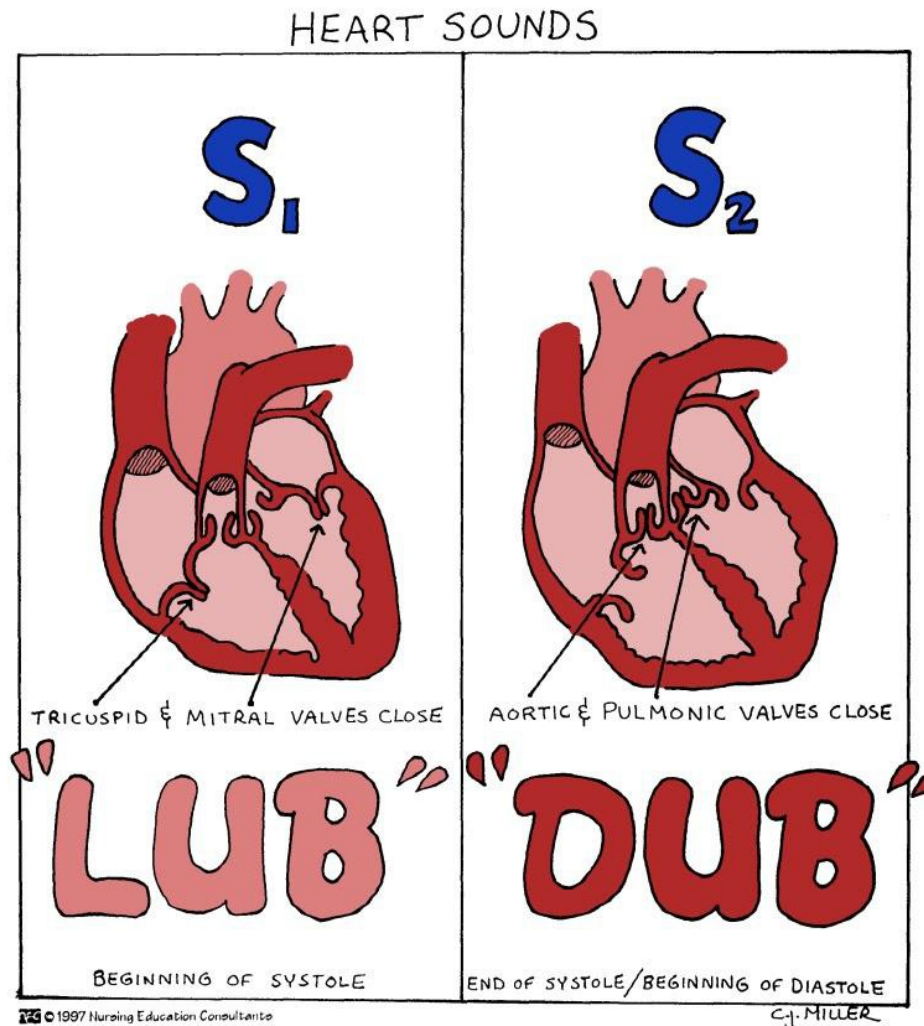
INTRODUCTION



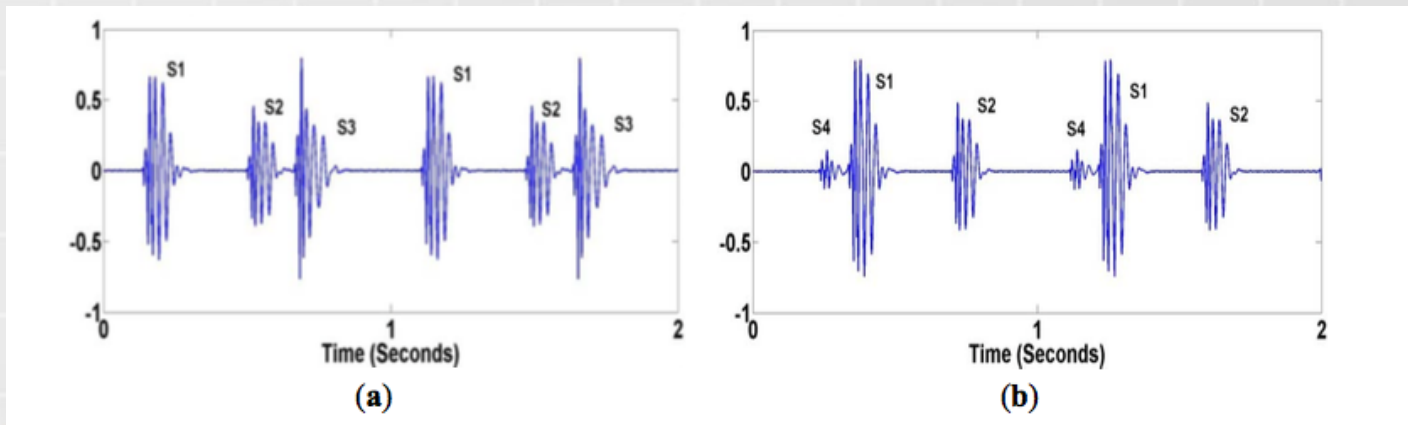
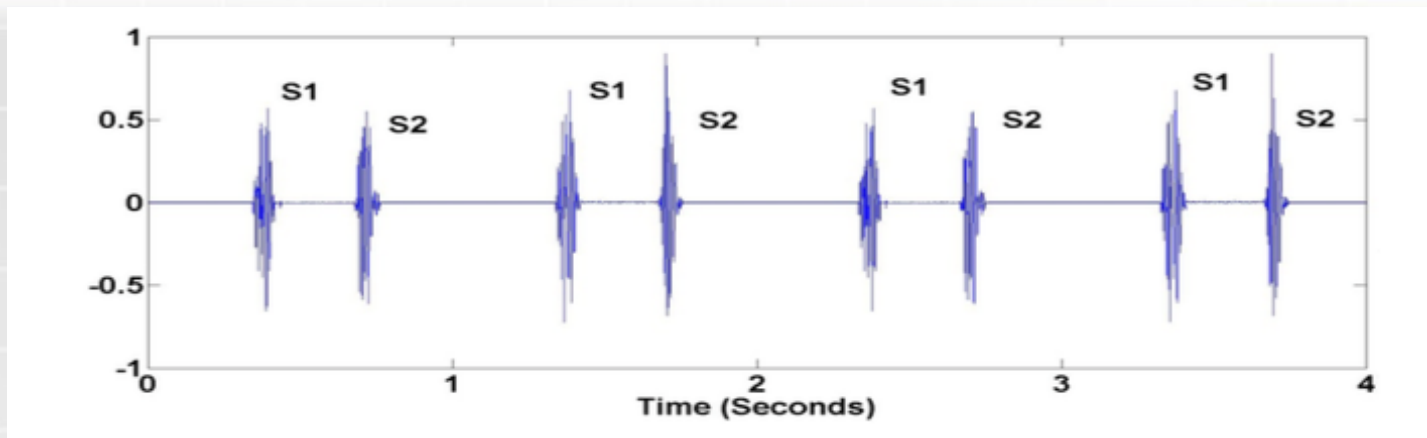
Overview



Overview



Phonocardiogram (PCG)

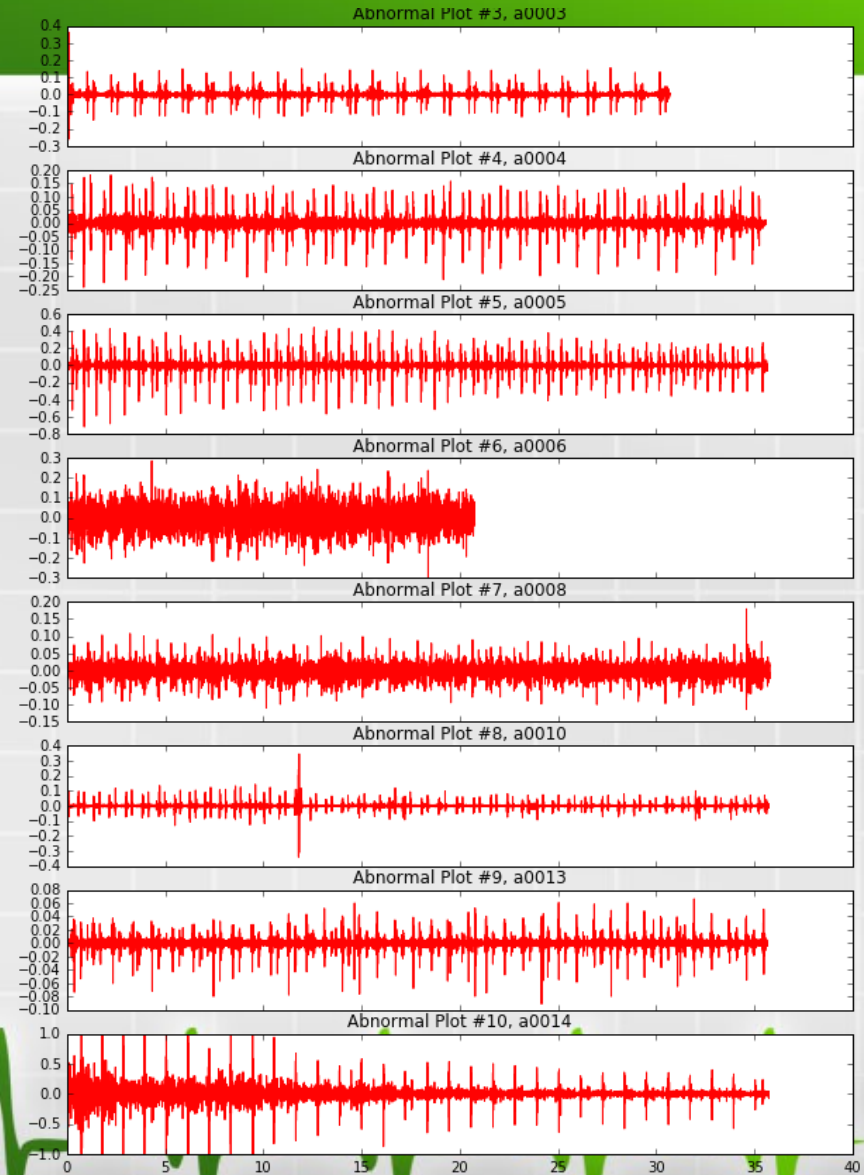
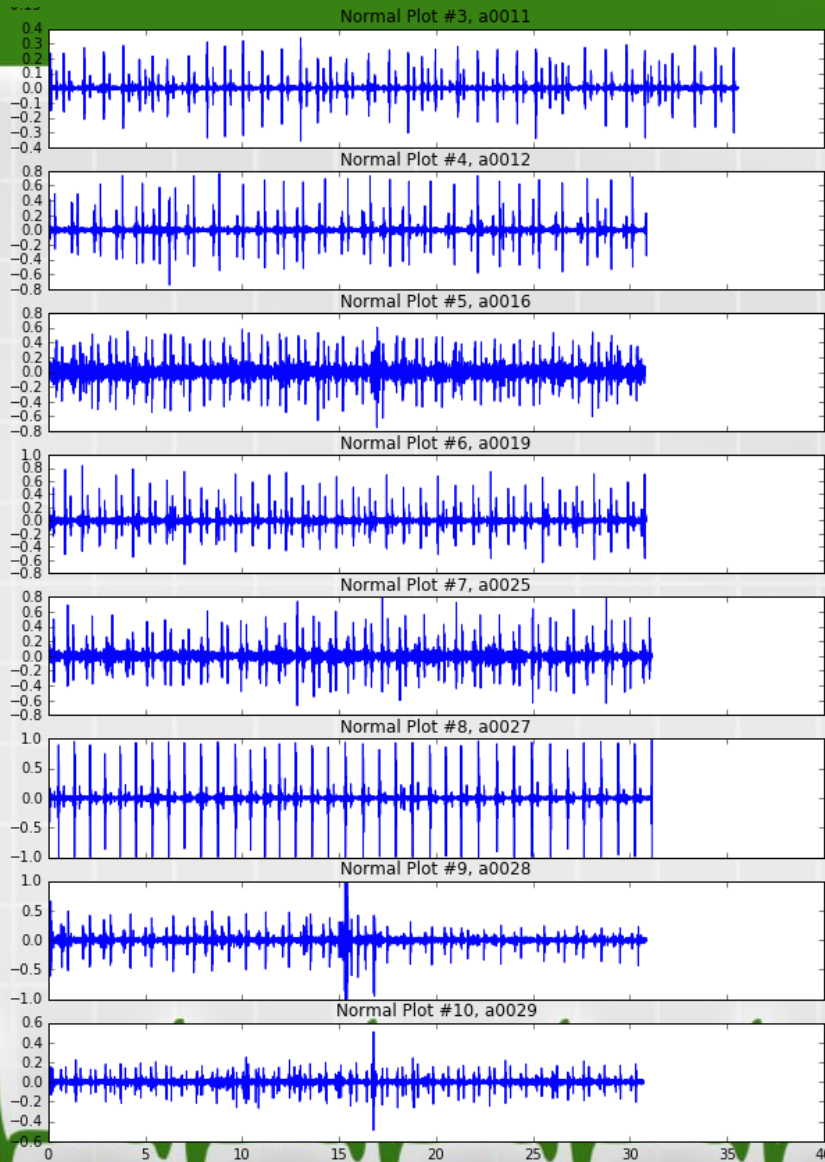


Project Data

- 3000+ wav files
- wav files split into 5 groups A-E
- wav files are 5 secs to 120 seconds
-



Normal vs Abnormal

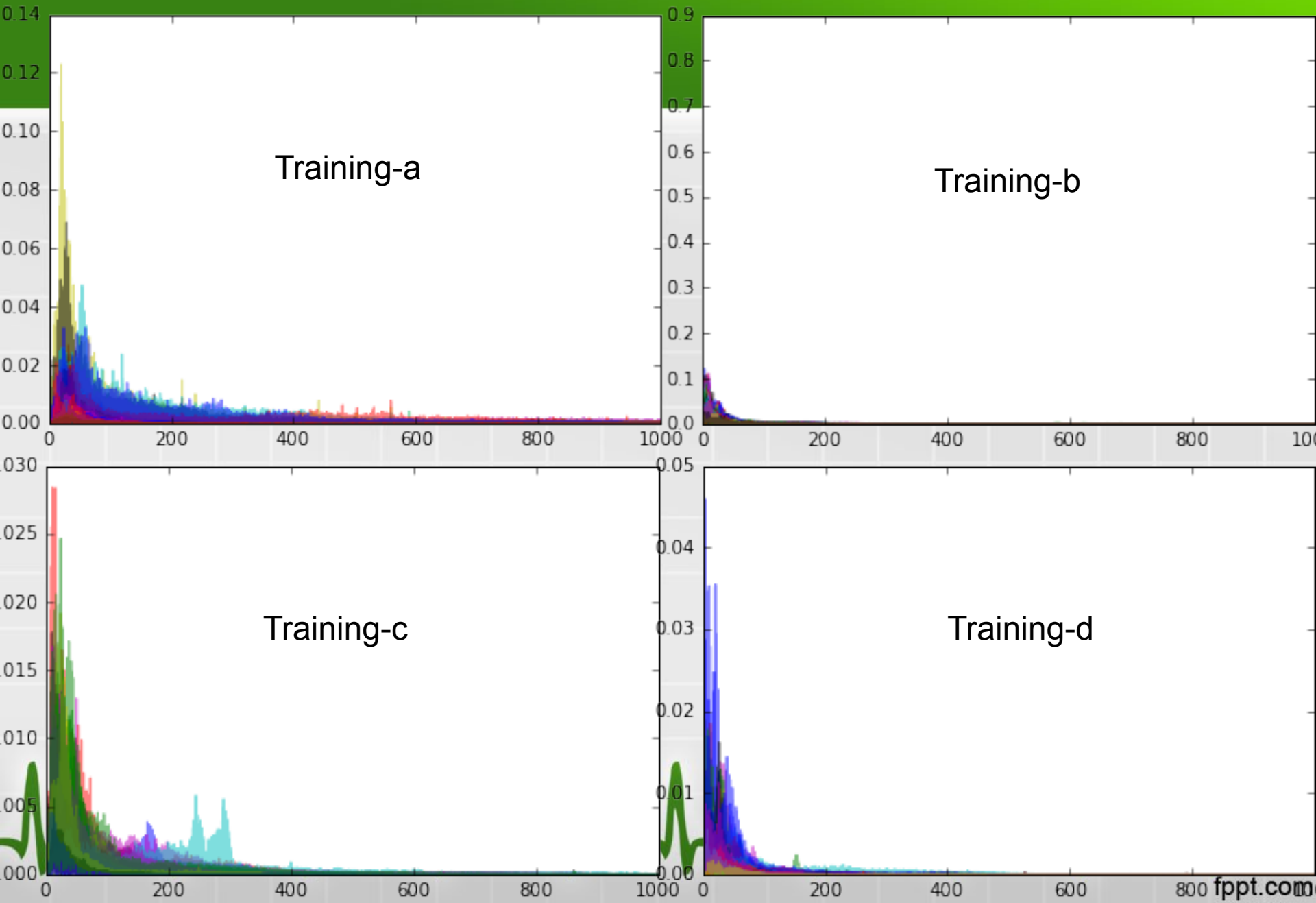


Model Approach

- Wav files are in time domain
- Convert to frequency domain
 - Fast Fourier Transform (FFT)
- S1 and S2 are roughly 20 Hz to 200 Hz
- S3 and S4 are 50 Hz or lower
- Heart murmur 20 Hz to 20 kHz
- Use neural network for FFT analysis

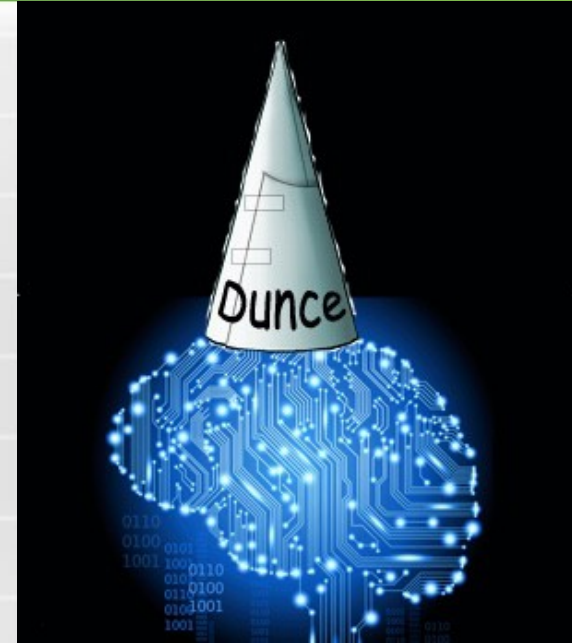


FFT Visualization



Neural Network

- Neural network
 - 600+ inputs
 - 300+ hidden nodes
 - 1 output
- Complicated to setup
- Long processing time
- Would not learn



Random Forest

Training Set	Normal	Abnormal	Cross Val	Score D Validation (50% Abnor/Norm)
A	-	71.39%	57.7%	50.9%
B	78.78%		56.5%	43.6%
C	-	76.67%	70.0%	38.2%
D	-	50.91%	82.1%	-
E	91.40%	-	98.1%	49.1%

- Each set has a different distribution for normal and abnormal hearts.
- The cross validation for each set varied. The worst being 57.7% and the best being 98.1%.
- When training set D was set as the hold out the highest accuracy was 50.9%. This score is too low to be of use.

Conclusion

- FFT alone is not enough for classification
-
- Other possible features
 - FFT noise reduction
 - Beat detection
 - Autocorrelation
-

