

Health Monitoring Using Digital Stethoscopes and Machine Learning

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Abstract – Cardiovascular disease is the leading cause of death in the United States. We are going to be using machine learning techniques on data obtained from digital stethoscope sensors in order to detect whether a patient's cardiovascular and respiratory patterns are normal or pathological.

Introduction

Cardiovascular disease has quickly become a national concern in the United States, as the leading cause of death in both men and women. Around 1 in 4 deaths in America have been attributed to some form of cardiovascular disease.



Figure 1 – Digital Stethoscope (taken from stethoscope.com)

Many heart diseases can be detected using the pulse sounds produced by the beating of the heart. However, it takes great skill and practice to distinguish between different heart conditions solely based on the sound of the heart beat. Using a digital stethoscope sensor and machine learning, diagnosis can be performed more accurately with less training. Digital stethoscopes take these sounds and convert them into signals that can be processed with a classification algorithm to distinguish a healthy heart from a

diseased heart. Additionally, digital stethoscope data can also be used to check breathing and respiratory health.

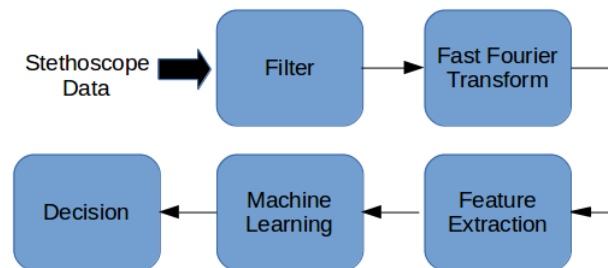


Figure 2 – Flowchart for signal processing

We are first going to use an averaging filter to remove the noise from the signal. We will also perform a fast fourier transform on the filtered signal to prepare the data for feature extraction. Then, we will test different classification algorithms using machine learning to see which gives the best accuracy.

References

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