

Samson March
Project Proposal

CSCI 4237 Project Proposal
Heart Health Diagnostic Monitor
October 1st, 2012

Project Abstract:

The project will entail using a mobile phone to diagnose heart conditions based on heart rate variability (HRV). The phone will use an audio recording of the patients chest to determine heart rate and from there compute HRV and compare those values to a disease library in order to display a diagnosis.

Strategy:

The application will be built on iOS for iPhone and iPod use. The application will require the devices' built-in microphone in order to record the audio signal. The design will use the audio recording and compute the power spectral density of it in order to find the heart beats amongst the noise of the recording.

Unknowns and Problems:

The problems anticipated will occur with respect to audio sampling and display of diagnosis. The algorithms used to identify heart beats and convert those to diagnosis may present issues as well.

Implementation Plan:

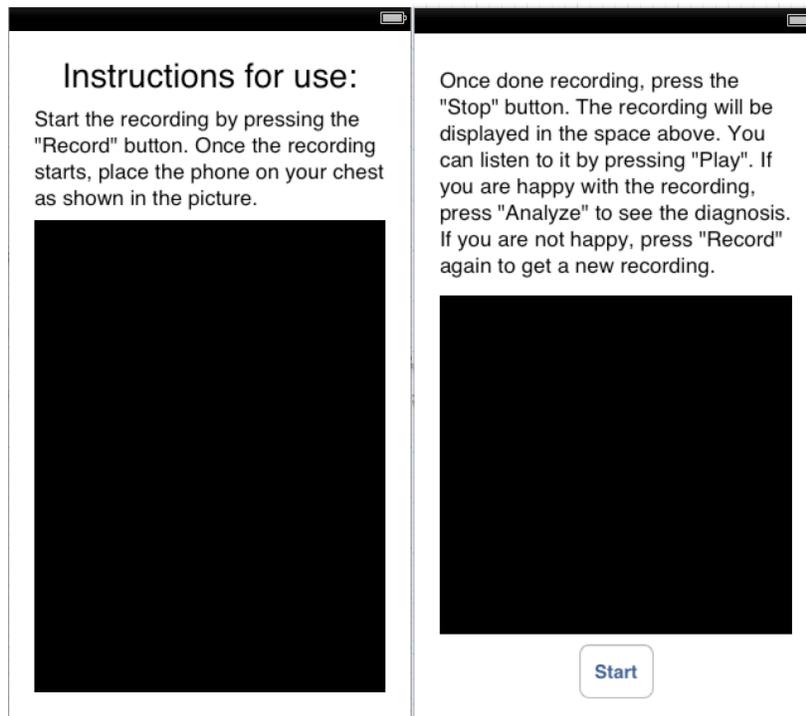
In order to complete the project, the algorithm development in addition to the GUI will need to be organized early in order to have time to refine them. The following chart describes potential due dates for each component:

Component	Due Date:
Library of diagnosis	10/11/12
Analysis algorithm & Audio recording	11/03/12
GUI	11/11/12
Testing	11/18/12
Presentation	12/02/12

The best way to get rid of the unknowns and problems would be to simply take multiple audio and then use the FFT function to pull out specific frequencies we need (that aren't noise) and then amplify those frequencies for evaluation. Once the audio samples are taken, the power spectral density will be computed and the hearbeats found. Using the indexing values of the

heart beats we can then find when in time the occurred. From there, we can compute heart rate. Based on the heart rate we can compare those values to a healthy heart rate range. Next, we can take the heart rate and compute it's variability based on the time difference between beats. By computing the RR interval (the time between the QRS complex in an ECG) we can determine how variable they are by using another frequency transformation. If the frequencies are below a certain threshold they are not variable, if they are over they are variable. After all of these computations are done, the values will be compared to a library of known values for variability and heart rate to come up with diagnostic information/recommendations. The views will look like the following:

The app will open up to the image on the left, and will access the image on the right by swiping left.



After pressing the start button the user will be presented with the view on the left, and after pressing the analyze button the view on the right will be displayed.

