Milestone 4

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Division of Work:

Reading Documentation/Leading Discussion:	Swana
Lab Rat:	Arif
Data Analytics:	Ryan and Arif
Algorithm/Implementation Design:	Arif and Ryan
Peer Programming:	All

Heart Rate Detection:

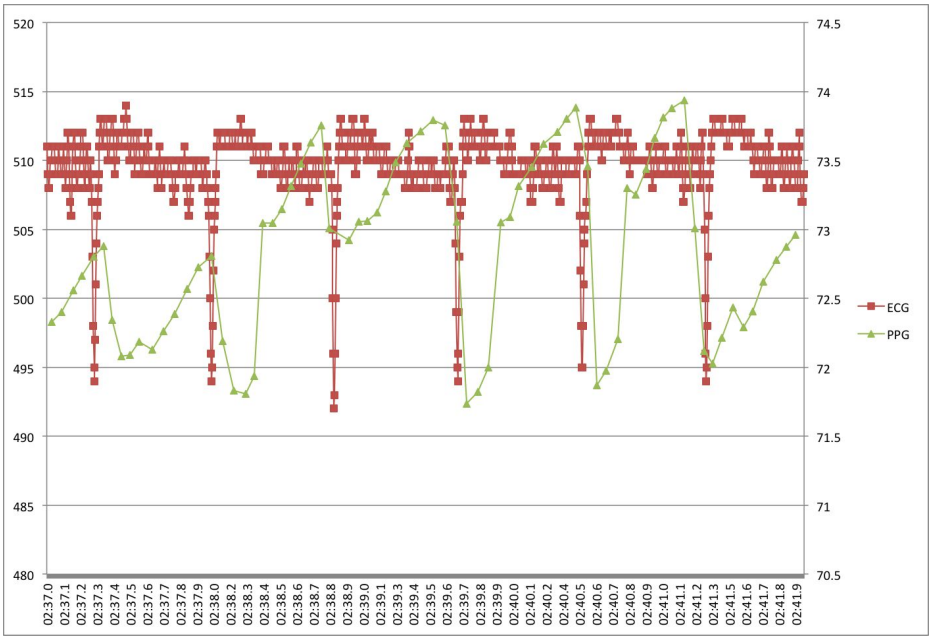
During testing we found that increasing the camera resolution was necessary in order to properly detect a change in red value. To find the ‘perfect fit’, we looked for a heartbeat ourselves using the preview, settling with the lowest resolution that still gave a visible heartbeat. During this process we kept the phone’s display on the brightest setting. After finding a usable resolution, we played with the amount of pixels used to find the average red value until we reached a ‘relatively fast’ log rate. In the end we used every third pixel for the algorithm.

We did change the log process a little bit to collect better results. Originally the program added timestamps after the data has already been collected. Now the program saves each timestamp as the values collected. When the file is being written, we decided it would be more useful to change the timestamp to match the format of the ECG heart rate monitor: “HH:mm:ss.SSS”. This allowed us to visualize the data using excel much easier.

Our algorithm focuses on finding an average interval in between heartbeats and scaling that value up to find the beats per minute. We first we search through our buffer for any possible dips. A dip is defined as the last point following a negative slope. During our data analytics, we discovered that dips whose values change greater than 0.45 could be safely considered ‘real’ dips. We also noticed that in most cases, dips are large and sudden enough to never include a positive slope. Every time we discovered a real dip, we added it’s timestamp to a list. After collecting roughly 5 seconds worth of timestamps, we averaged the intervals between each timestamp, or dip, to find the average heartbeat interval. Using this average value, we were able to scale up to figure out the user’s heart beats per minute.

Resting

ECG	79 bpm
PPG	80 bpm
Accuracy	1.26%



Exercise

ECG	123 bpm
PPG	125 bpm
Accuracy	1.63%