A4:
Photoplethysmography

Group 5

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1. **Unsmoothed and Smoothed PPG Signal Displayed on Android UI**
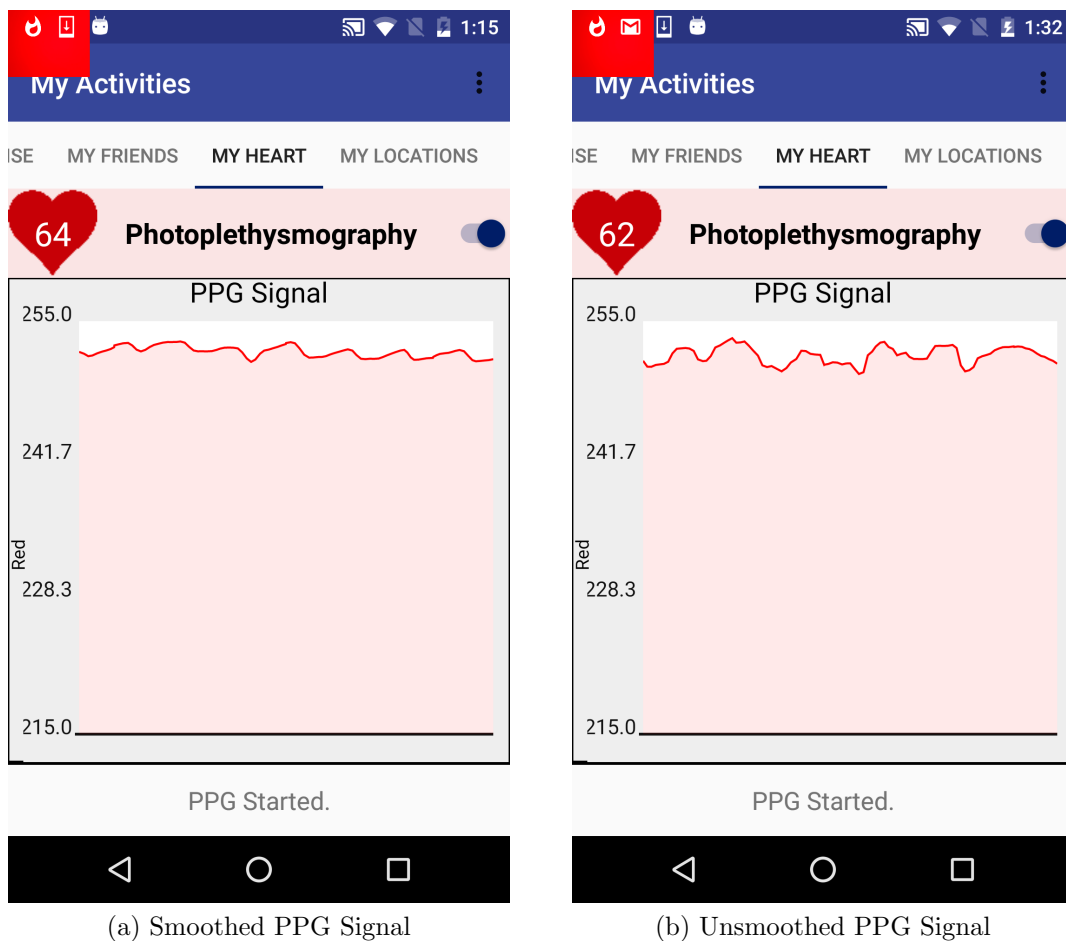

(a) Smoothed PPG Signal   (b) Unsmoothed PPG Signal

Figure 1: Smoothed and Unsmoothed PPG Signals

2. PPG Signal on Visualization.html

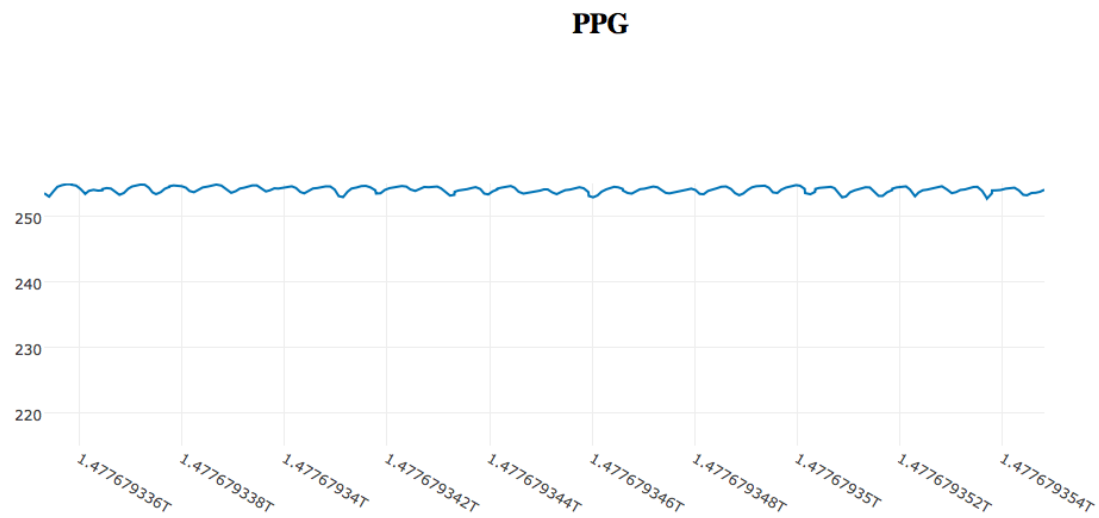### (a) Stationary

PPG

Figure 2: Sedentary PPG

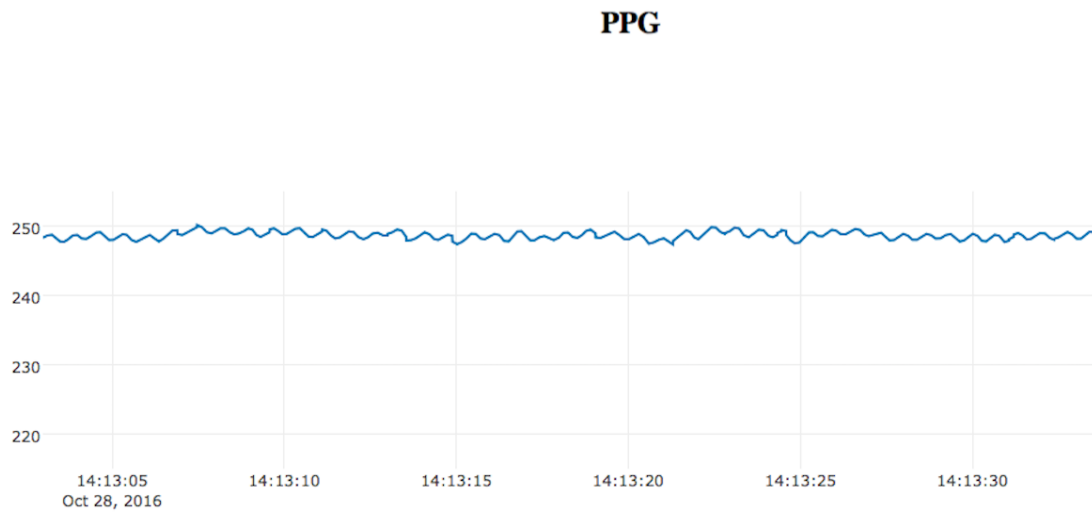### (b) After Vigorous Exercise

PPG

Figure 3: Jumping Jacks PPG

3. **Computing HRV**

Heart-rate variability (HRV), the changes in the beat-to-beat heart rate, is an indicator of an individual's cardiovascular condition. HRV has been shown to predict heart attack-related death, depression and congestive heart failure. Heart rate variability can be calculated by taking the standard deviation of the time intervals between beats. To compute it on our phones, we could take the difference between successive timestamps of detected heartbeats, then compute the standard deviation of these differences.

We implemented this for the HRV Estimation extra credit.

Source

- Huang, R., & Dung, L. (2016, January 29). Measurement of heart rate variability using off-the-shelf smart phones. BioMedical Engineering Online.