Analyzing Physical Activity with the iPod Accelerometer

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Motivation

- iPhone/iPod accelerometers are heavily used to detect human movement
- Mobile game applications can encourage youth to be more physically active
- Acceleration data can provide practical measurements of physical activity

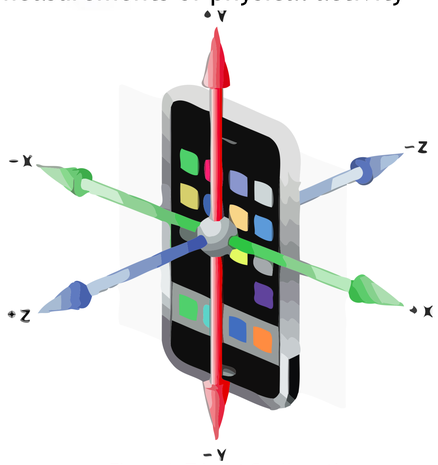

Figure 1: Triaxial Configuration

Methods

- Four UCSC students each placed the iPod Touch in pants pocket with *AcelDataCollection* running during ambulation session.
- Walking and running acceleration data was collected at various sampling frequencies ranging from 4-80 Hz.
- Matlab was used to filter data and compute average magnitude of each session.

Results

- Data was collected using iPod application *AcelDataCollection*
- Implemented high-pass butterworth filter to filter out DC gravity component
- Cutoff frequency that best removed gravity was around 0.25Hz

Figure 2: AcelDataCollection

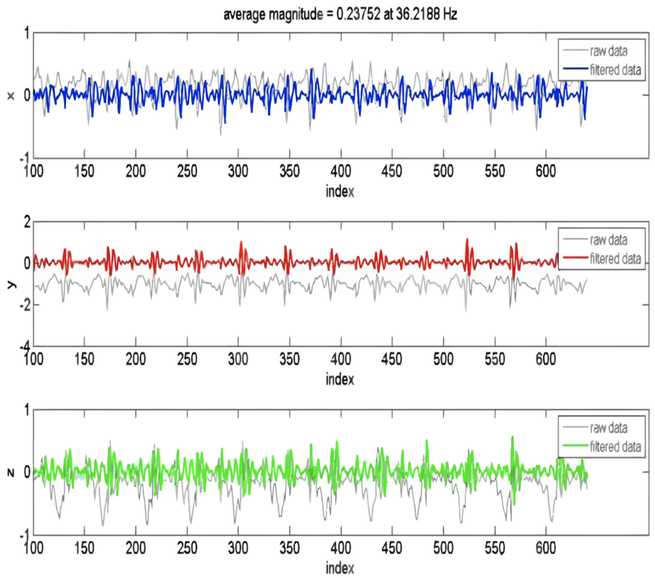

Figure 3: Walking Session data

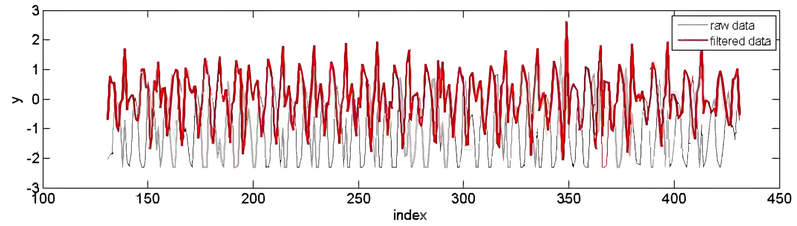

Figure 4 : y-axis data of running session

- Accelerometer measures up to ±2.3g.
- Data is truncated during running sessions.

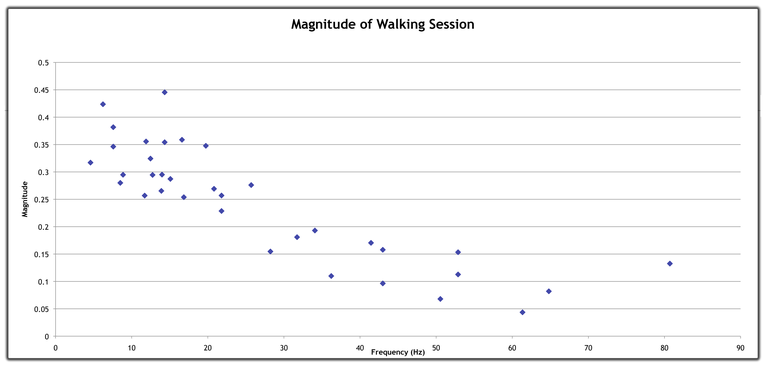

Figure 5: Magnitude vs. Frequency

Future Work

- Collect and analyze data of other physical activities
- Use filtered data for physical activity recognition program
- Implement program into physical activity mobile applications.
- Analyze iPod gyroscope.

References:

•Figure 1: http://developer.apple.com/iphone/library/documentation/uikit/reference/UIAcceleration_Class/Art/device_axes.jpg