Assignment 3: Real-time smartphone sensor data processing.

Accelerometer/Gyroscope applications

Algorithm for detecting phone shake:

1.Use the sliding window to restore the data and calculate the mean(average) when you hold your board still for some time. Get the mean.

2.Calculate the magnitude of the acceleration on three axis:

$$magnitude = \sqrt{xaccel^2 + yaccel^2 + zaccel^2}$$

3.Use the magnitude subtract average to get the real value:

Value = magnitude – average

4.Define the threshold when the value greater than the threshold, the shake detected.

5.Because the value will greater than the threshold for a while, so we need to define a time period to calculate the value:

Time = cur_time – pre_time

We can use the *System.currentTimeMillis()* to get the time now.

Algorithm for detecting pull-up:

1.Use the data from the Y-axis to calculate the mean(average) when you hold your phone portrait still for some time. Get the mean(average).

2.Calculate the magnitude of the acceleration on three axis:

$$magnitude = \sqrt{yaccel^2}$$

3.Use the magnitude subtract average to get the real value:

Value = magnitude – average

4.Define the threshold when the value greater than the threshold, the shake detected.

5.Because the value will greater than the threshold for a while, so we need to define a time period to calculate the value:

Time = cur_time – pre_time

We can use the *System.currentTimeMillis()* to get the time now.