CS407 Fall 2021

Lab 9: Sensor Processing

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1.

I have smoothed all the data first using the **EWMA** method mentioned in lecture. Then I find the steps number can be counted based on the **accel_x** data. Turning activity are be found based on the smoothed **gyro_x and mag_x, mag_y** date plot. Here are the 1s smoothed data in WALKING.CSV.

Other smoothed data are stored in xlsx files in the zip.
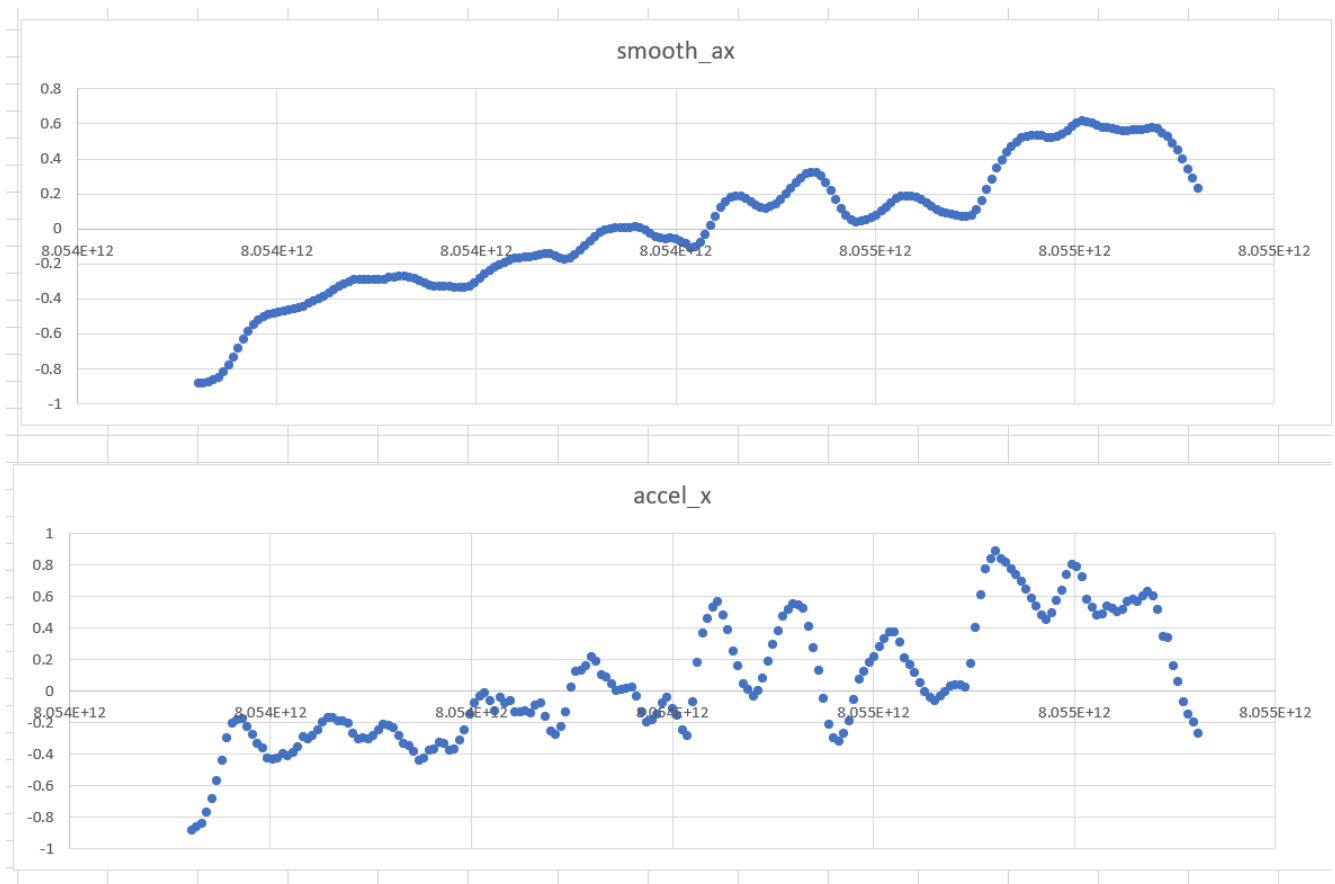
Then I developed a findPeak algorithm for count the steps and turns in python. I was trying to do the function myself at fast. Then I found it is hard to get the those "mount area" number. So I searched found there is a **SciPy find Peaks method**

https://docs.scipy.org/doc/scipy/reference/generated/scipy.signal.find_peaks.html

I use **Panda** to get csv column date in and implement this method get the following result. I tried use prominence at first, then find width factor is better. Code is in the walk_analyze.py.
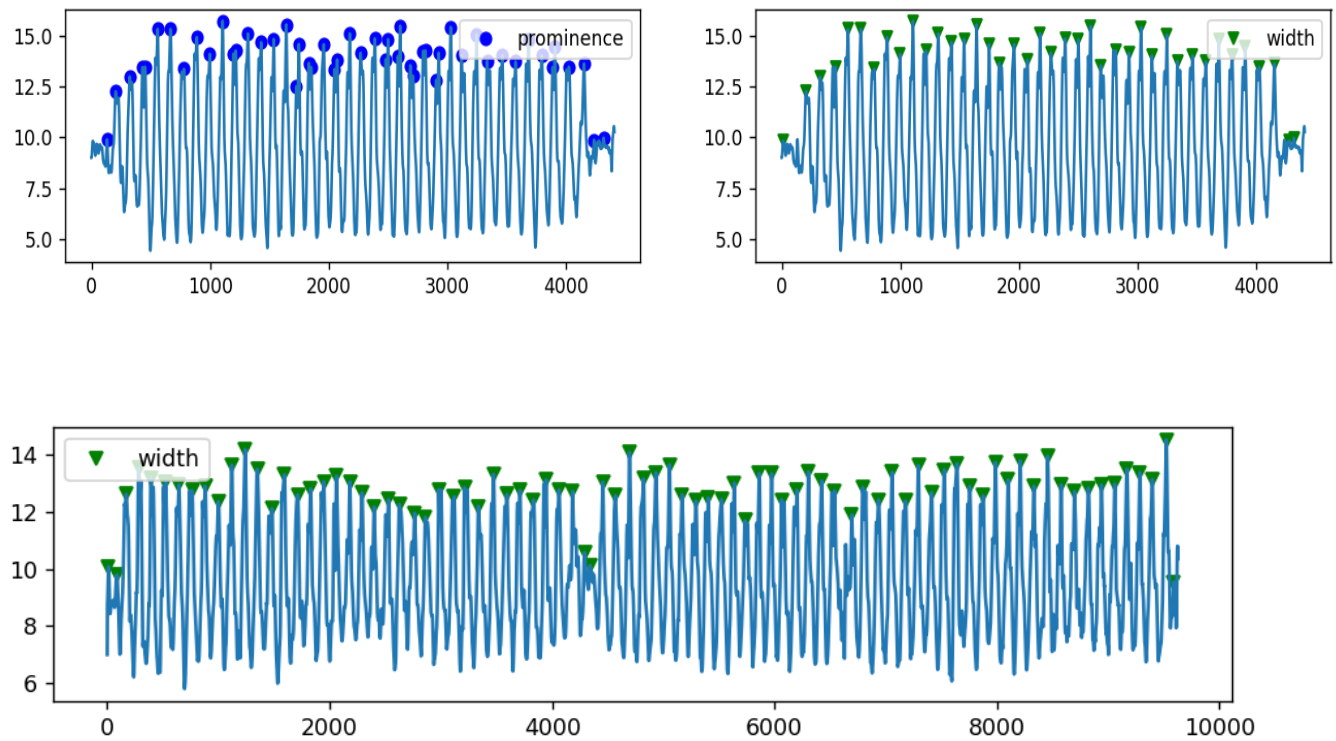
3. As it shown above, the number of steps in WALKING.csv is **38 or 39.** The number of steps in WALKING AND TURNING.csv is **80 - 85** (I guess if those turn do not count, if will close to **80**)

4. There are **4** turns in the WALKING AND TURNING.csv.

The first 2 turns are clockwise, the last 2 turns are counter clockwise.

5. Since we only got the data of 90 degree turns. From the data, I am not sure about some of the turn's angle close to 45* degrees.
I looked the document (https://developer.android.com/reference/android/hardware/ SensorManager#getOrientation(float[],%20float[]))

WALKING AND TURNING.csv result