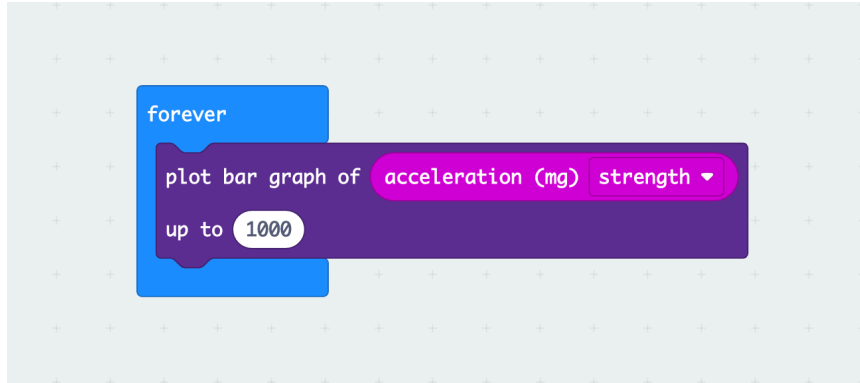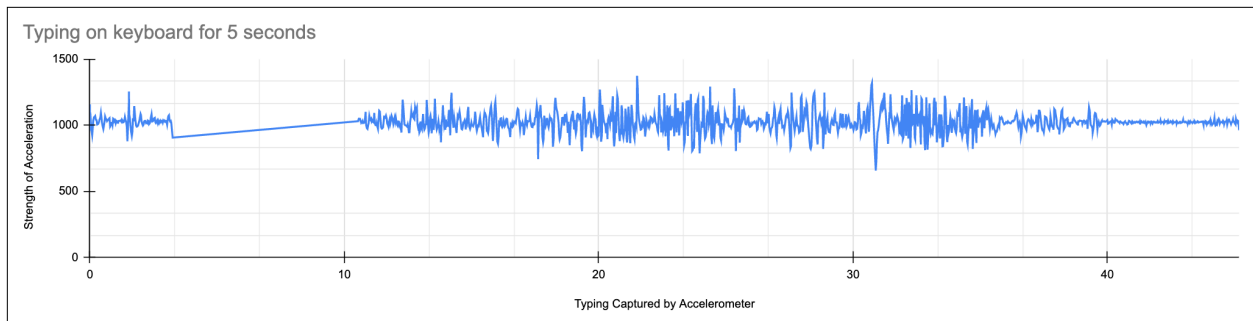# LAB 3- Inertial Measurement Unit

Lab 3- Exercise 4

Code for the exercise:

Line Graph for Gesture 1
(Type on keyboard for 5 seconds)

Here, it can be derived that the intense typing of keys have very abrupt frequencies- which also depends on how far away one key is from another, and because all the keys are in close proximity to one another, the strength of acceleration does not go above or below a certain point. The straight line in between was me trying to pause the recording just before I was about to start typing after beginning the simulation.

https://drive.google.com/file/d/1W43khvAfXTF9bgVG_K69IDRAkxDMfK9G/view?usp=sharing

Line Graph for Gesture 2
(Raise your hand from pockets)

Raise hand from pocket
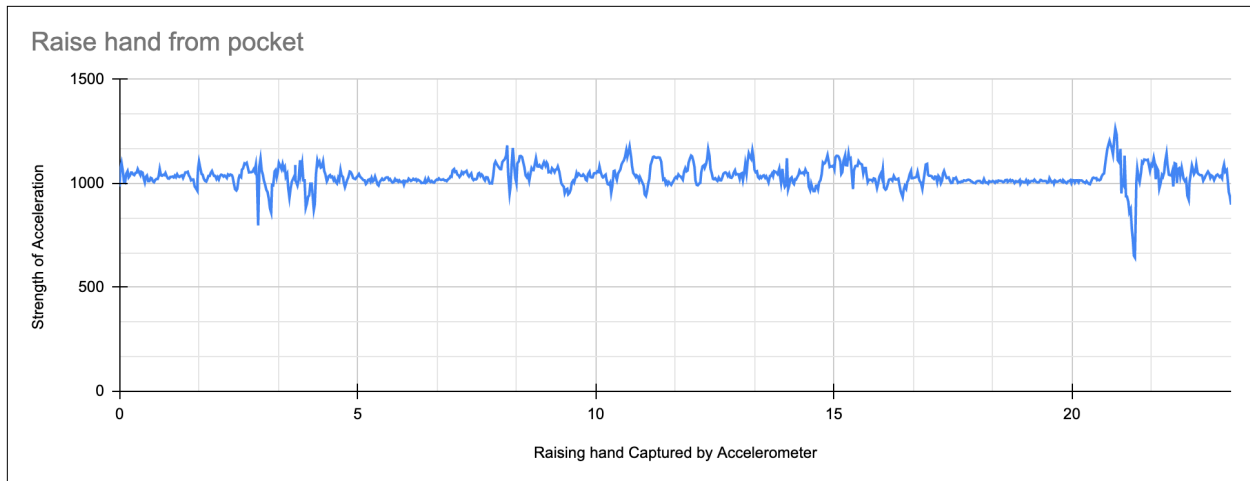
In this demo, it appears that movement in the upward direction (me raising my hand and then lowering it) did not cause much fluctuation in the graph, but grazing my hair and putting my hand back into the pocket caused more fluctuations and therefore, more frequency in the strength of acceleration. I think the point where I got my hand back into my pocket (towards the end of the graph) caused the most fluctuation in the graph.

https://drive.google.com/file/d/1zV0wiZ4WLTfG_UMyVg_3cDD8DgIYZSL3/view?usp=sharing

Line Graph for Gesture 3
(Write 20 words on paper)

Write 20 words on paper
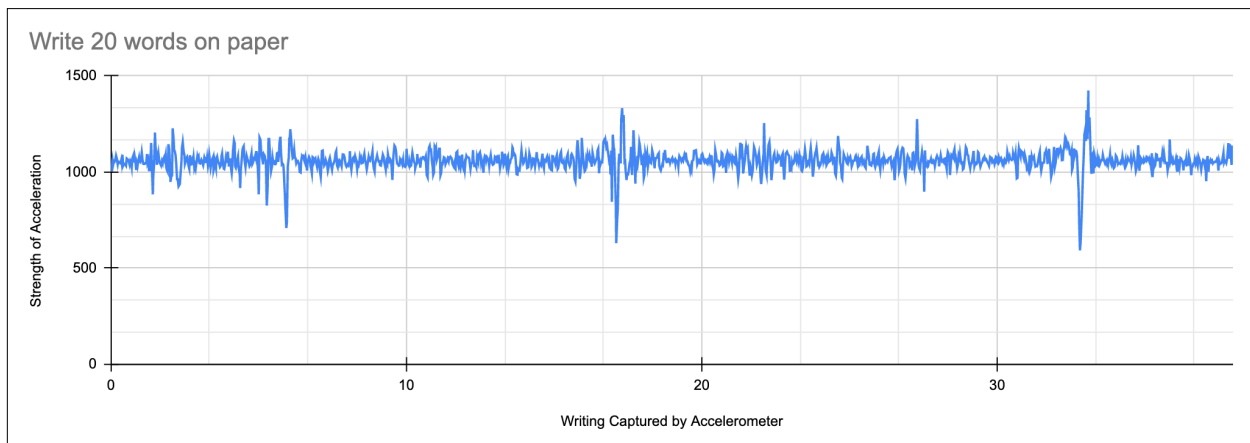
For this demo, I wrote single words on a line, moving down the page. The graph plotting of these words seemed to be consistent throughout the action, except at points where I moved back to the top of the page to start new words, which seems to have caused those low points in the strength of acceleration towards the value 500 on the vertical Y axis.

https://drive.google.com/file/d/18cNE2AClEYT41Ll2L3cxIY0m70SVr5aw/view?usp=sharing

Line Graph for Gesture 4
(Wave at someone)
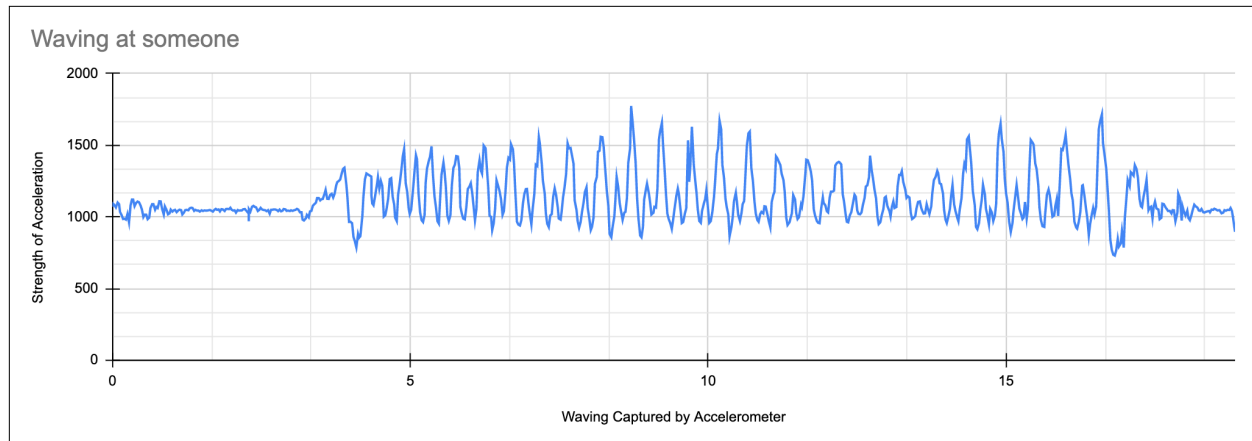
In this graph, we can see that waving is more-or-less a consistent movement, and seems to be more intense at the beginning of the action, and as time proceeds, the action becomes less intense/tired out till it comes to a halt. The initial almost-flatline in the graph was me setting up the device before actually beginning to wave.

https://drive.google.com/file/d/1QpjuWqt6MSGUflT_3kpIL32i-1A5XnPU/view?usp=sharing

Potential differences:
Since acceleration is essentially the change of velocity with respect to time, implies that the position of the object on the X, Y and Z axis will definitely reflect these changes.
I think it can also be derived that depending on the speed of the action, the fluctuations will increase (and be more abrupt) and a slower-more concentrated movement will cause less fluctuations in the graph. These graphs are different because the types of actions performed were different. The typing on the keyboard and the writing on paper were similar because the fingers were moving most of the time in a limited range of motion (to type or write), but were also different because some keys were further away and caused a peak in the graph, and for the writing activity, moving the entire hand up to the top of the page caused peaks in the graphs. The activity of raising hands from the pockets was probably the least motion involved activity, and the graph reflects this with the range (between 850 - 1100 strength). Waving at someone also required a different range of motion, and so even that captured different results. For the first and third gesture- the acceleration was plotted till 2000 and the second and fourth gestures were plotted at 1000.