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EE 425 Project Interim Report
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1 Introduction

In this project, we wanted to test what we've learned in class so far, in a practical situation. Our aim is to explore the idea of using phone sensor data(Particularly accelerometer), and test how well different models that we've learned so far works on detecting when we've just taken a step. That meant in this situation, that we needed to collect our own data to be able to test our trained model in real time.

2 What we've done so far

2.1 First Phase

Initially, we focused on understanding the task that we had in hand. Once this was fully understood, we worked on finding a suitable high sample rate programs that we can utilize so that one person, while holding the phone, can walk. While the other person can press space exactly when the person A is walking. This is so that both the accelerometer data and whether or not in that particular sample person A was walking can be registered at the same time.
Later on, we decided to use MATLAB to collect the data, because MATLAB had built in communication libraries to collect phone sensor data. We had to implement a low-level scientific library to collect information about whether or not space is being pressed in low latency.

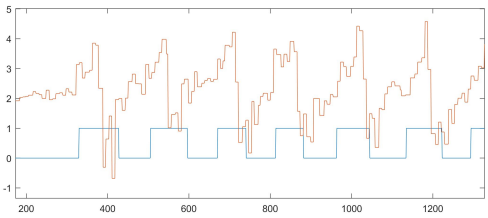

Figure 1: Graph shows a snippet of the data we've been collecting. Blue line being 1 refers to when we were taking a step, and orange line is specific measurements of phone accelerometer on a single axis.

2.2 Second Phase

Daeyoo Kim was the person pressing space, while Ege Demir was walking around a big room to collect this data, for later purposes. A snippet of the collected data can be observed in Figure 1 above.

```
Data = [0 0 0 0];
while true

    pause(0.01)
    currentSample = m.Acceleration;

    [keyIsDown, secs, keyCode, deltaSecs] = KbCheck();


    if keyCode(32) == 1
        currentSample(4) = 1;
    else
        currentSample(4) = 0;
    end

    Data = [Data;currentSample];
    disp(currentSample)
end
```

Figure 2: The above code snippet is from our data collection code in MATLAB.

3 Future Work

We need to understand how to divide our collected dataset into samples. We can't identify whether or not if we've taken a step by classifying accelerometer data in a single timestep. Therefore, these samples need to consist of certain amount of time-steps. We will make sure to take same amount of time in every step so we can keep this sample length constant.
What each student will focus on, given the collected data is specified below;

3.1 Ege Demir

- Tensorflow-based neural network. (Will be testing with different amount of hidden layers and activation functions)
- GDA Implementation

3.2 Daeyoo Kim

- Logistic Regression
- Support Vector Machine (Will try several different kernels e.g. linear, and radial basis function)
- K Nearest Neighbor