EECE 5554 Robotics Sensing and Navigation
Lab-1 Report

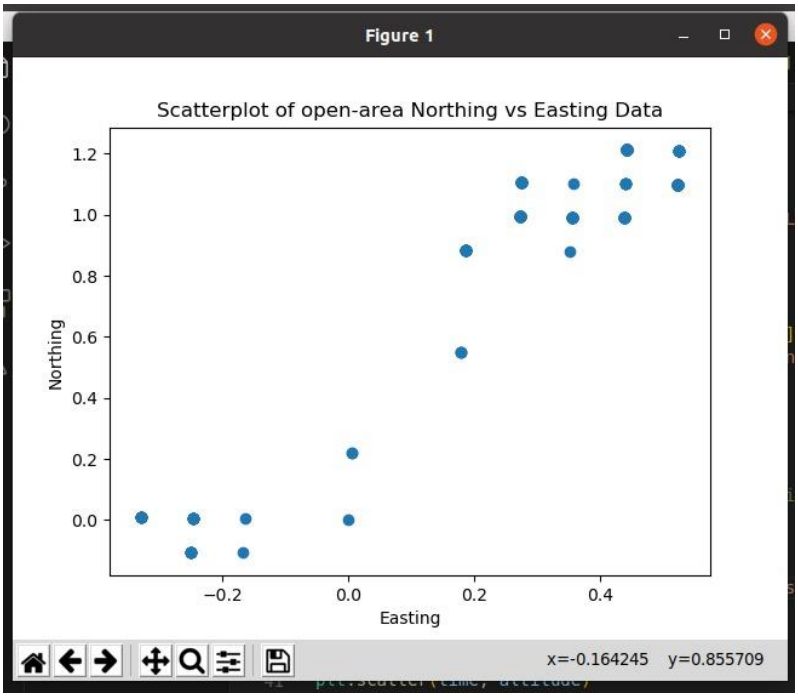
Introduction

The Lab focused mainly on writing a driver to obtain the Latitude and Longitude coordinates by parsing the raw data obtained from the GPS puck. The first part of the lab was to write a driver and then collect the raw data which would contain data in various formats so it was written to collect only the GPGGA format data and along with UTM values all the data was published on to the " /gps " rostopic. Once the driver was written, a launch file was also created for the gas driver. Once the driver and launch files are created, the data was collected in bag files using rosbag. Three types of data was collected, stationary open, close and open straight walking. The stationary data was collected beside snell engineering center which was later verified by checking the gps coordinates of the location on internet. The walking data is collected from neu's ISEC building through the straight way.

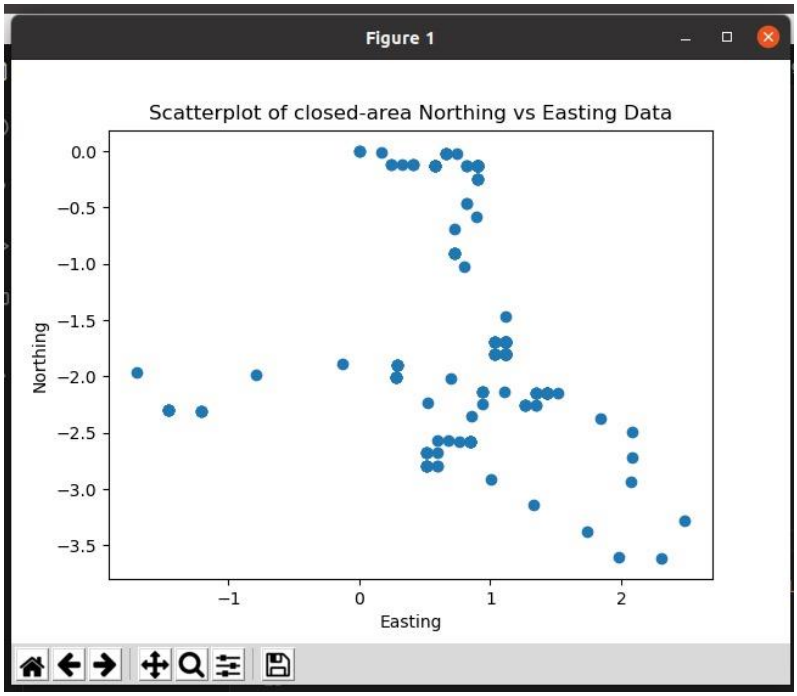
Analysis:

2. <u>Scatter plots of Northing vs Easting data:</u>

<u>OPEN-AREA:</u>

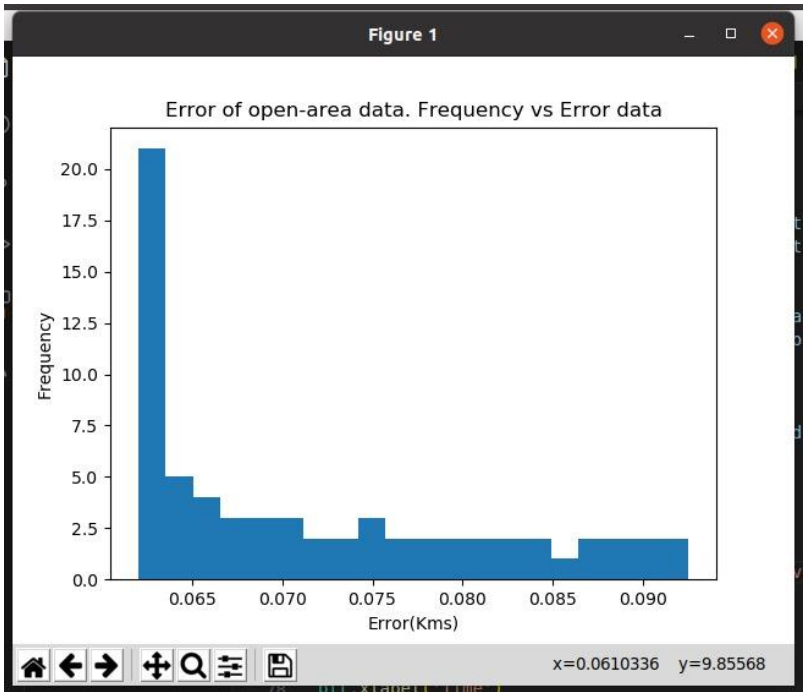


OCCLUDED-AREA:

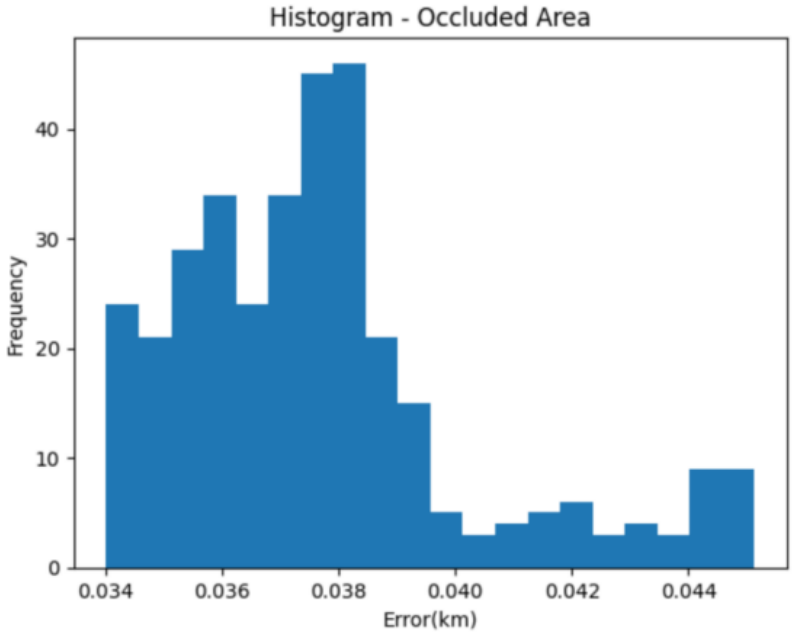


3.HISTOGRAMS:

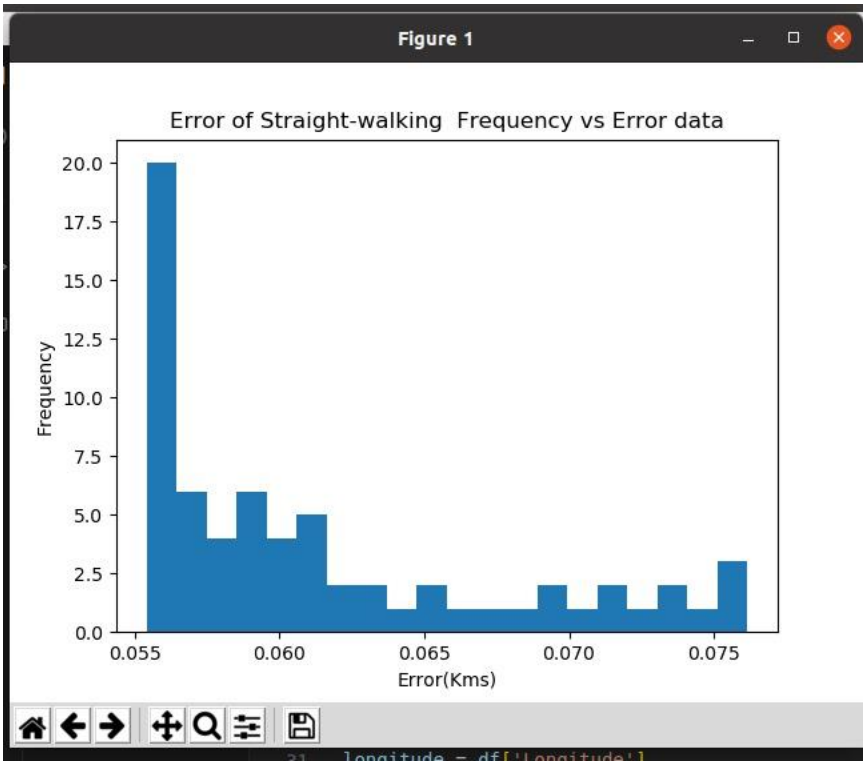
OPEN-AREA



OCCLUDED-AREA:

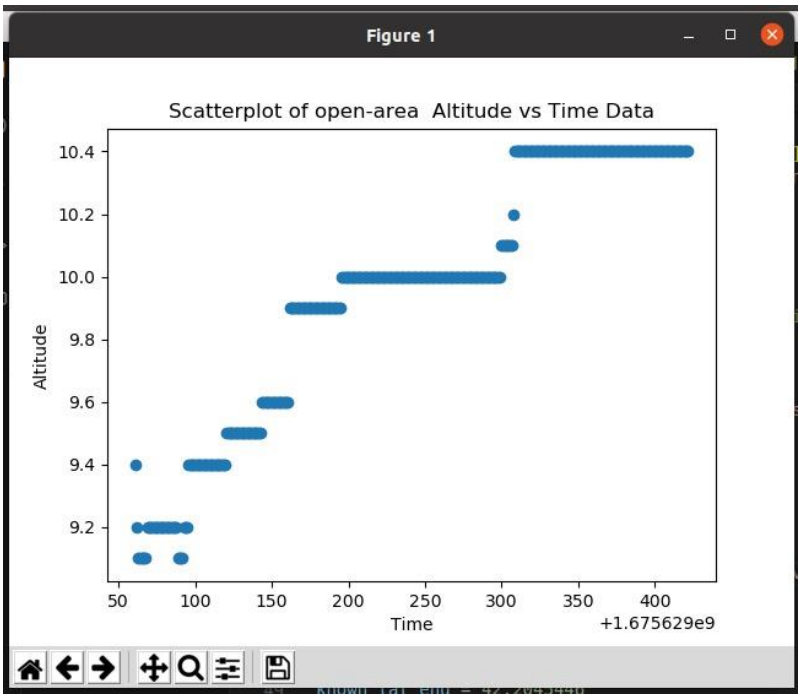


WALKING:

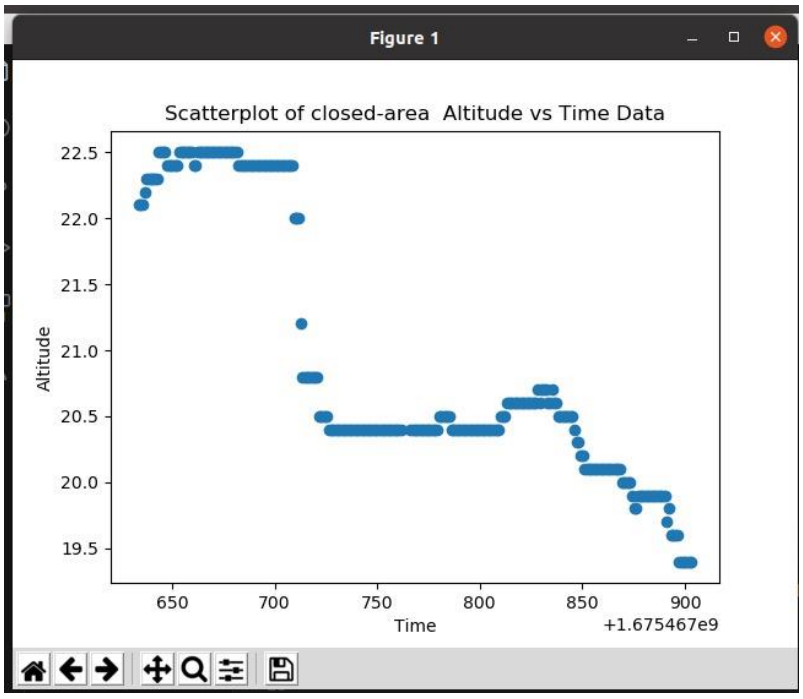


4.SCATTER PLOT ALTITUDE VS TIME:

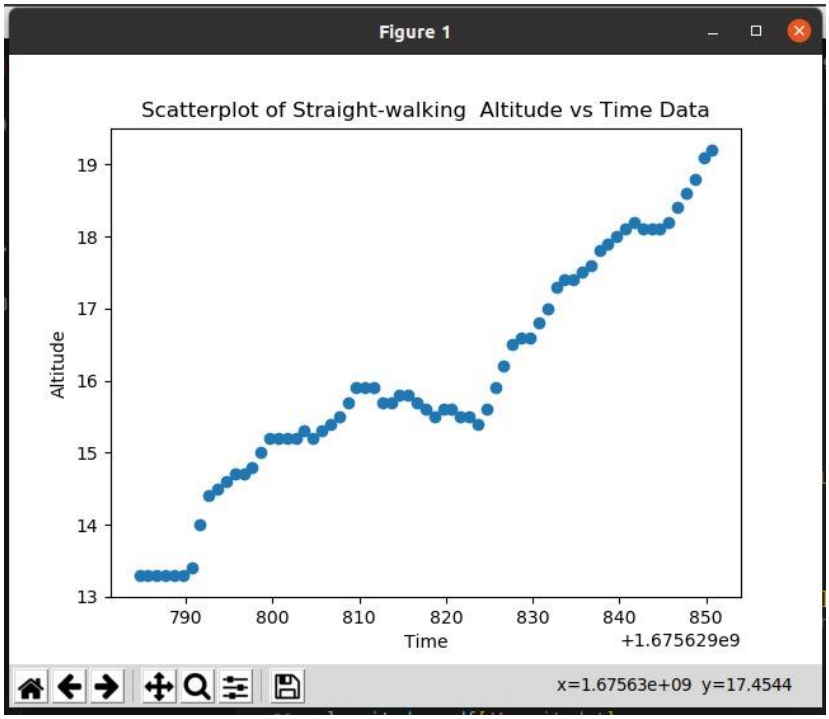
OPEN-AREA:



OCCLUDED – AREA:



5. WALKING IN STRAIGHT LINE:



6.

i. Error values are notably higher in the moving data compared to the stationary data. This is primarily due to the dynamic nature of moving objects, which experience continuous position changes and signal variations, resulting in increased error.

ii. The discrepancy in GPS error between stationary and moving scenarios highlights the impact of signal stability. Stationary objects benefit from consistent signal reception, while moving objects contend with signal blockages, multipath reflections, and interference, causing fluctuations in GPS data.

iii. Potential sources of error encompass signal interference from signal reflection off surfaces, signal blockage in obstructed areas, variations in GPS receiver sensitivity and quality, as well as atmospheric conditions affecting signal propagation