EECE5554 – ROBOTIC SENSING AND NAVIGATION

LAB -1 REPORT

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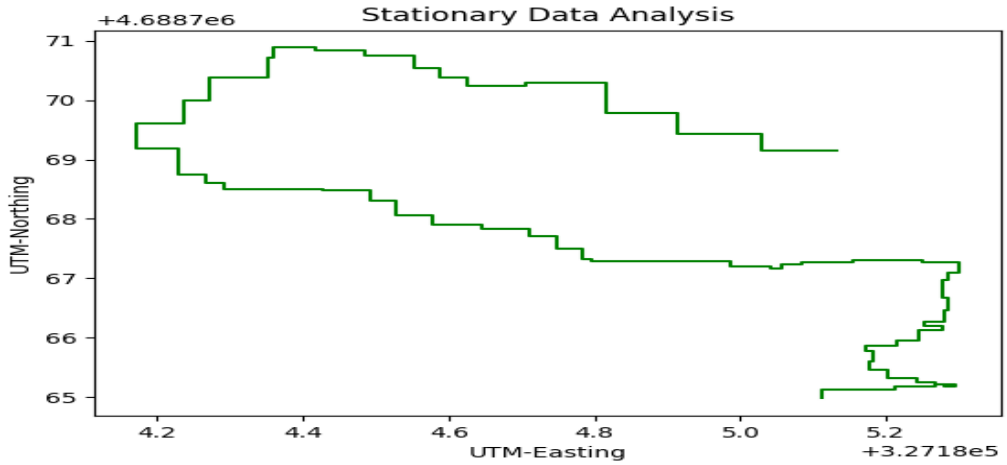
Environnent Used For Analysis

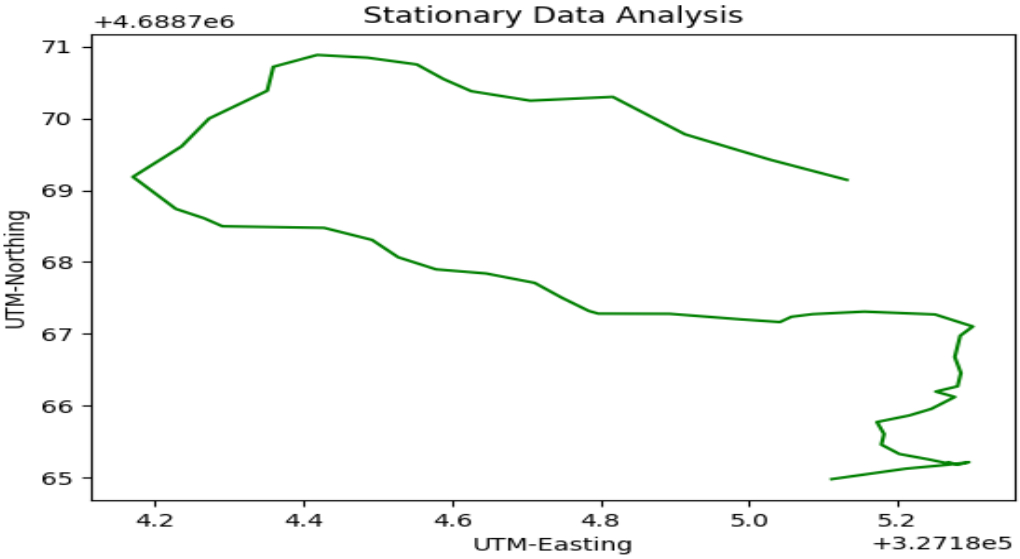
Location: Northeastern University, near Snell Library

Climate: Temperature of 15 degrees Celsius and a Windy Environment

Device Used: BU353S4 GPS Module

Stationary Data





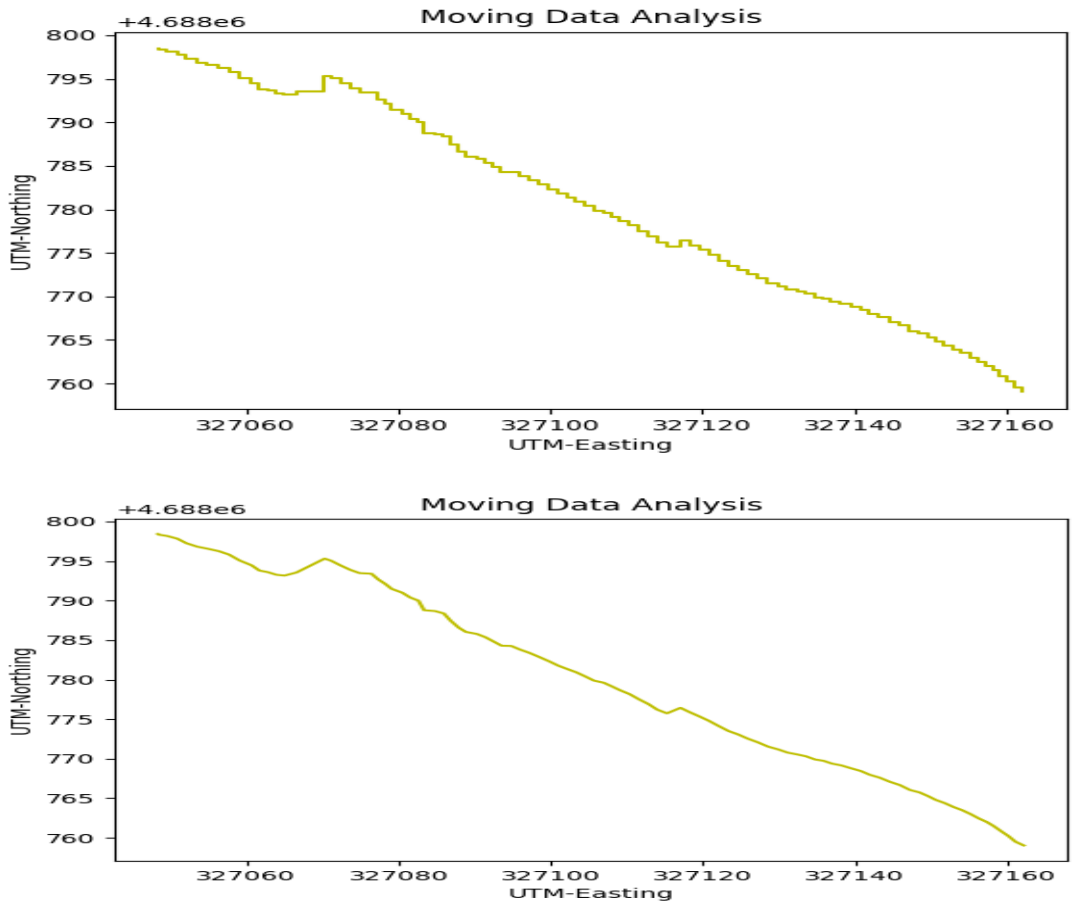
The GPS data plot has the UTM Northing vs UTM Easting data. The inference from the plot was that the readings were much more stretched and expanded. This shows a non-linear data plot.

By using the formula [(expected value – experimental value)/expected value] *100 we can get an error estimate at a point. If we take the mean of that value, we can get the error estimate for the whole data. By using the above formula, I am currently getting an error percentage of 9.615

The upper bound of the error value is 17.30 percentage and the lower bound is zero percentage as you can see from the graph the starting and end point is the same so the error in this case will be zero since we are in a stationary position.

GPS receivers calculate coordinates relative to the known locations of satellites in space, a complex task that involves knowing the shapes of satellite orbits as well as their velocities, neither of which is constant this involves changes in data received during working.

Straight Line Walk Data



While plotting data for moving data we can see a significant difference in the graph, here we can see a much more linear and straight line of data. Since while we are moving in a straight

line the GPS puck passes through multiple satellite orbits which enables it a wider access to connecting to these satellites and thus it can give as a much more accurate and better co-ordinates. Also, the Kaalman filter present in the GPS sensor provides better reading and tracking data during motion of the puck.

Incase of analyzing the data even though we are not getting a proper straight line here, the data distribution is like that of a uniform data. It looks like a straight line, so the error estimate compared to that of stationary data is negligible in this case. The slight cracks present in the graph are due to the non-uniform motion of the person carrying the puck and the movement of the satellites, so the puck won't be able to receive data in constant regular intervals.