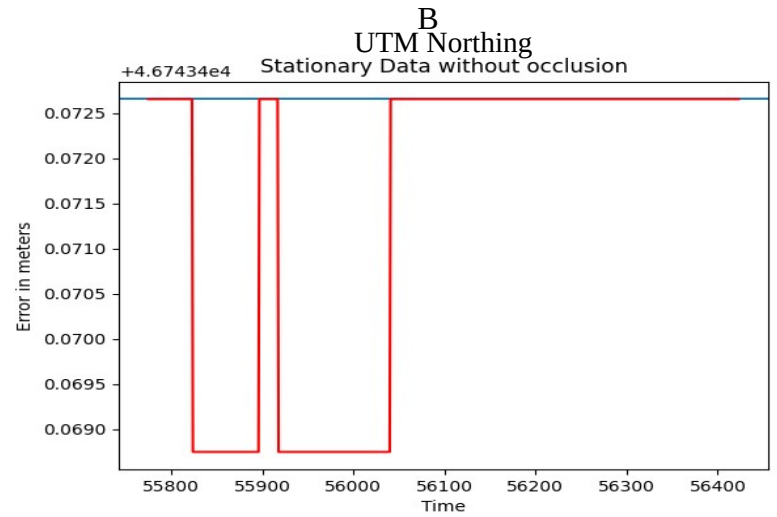
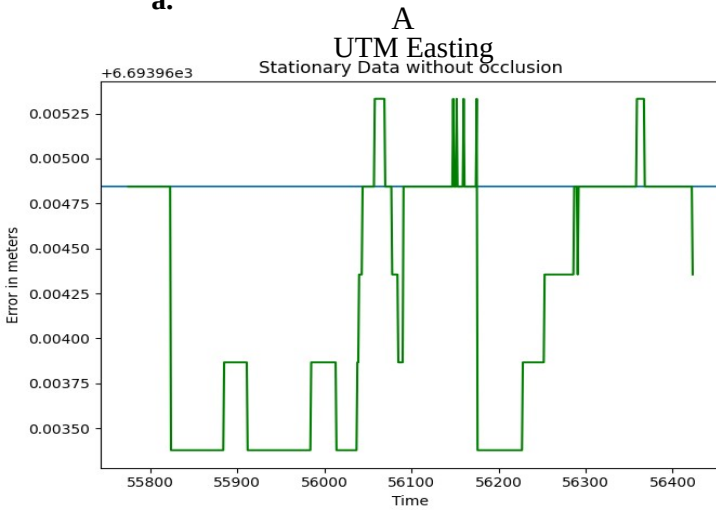
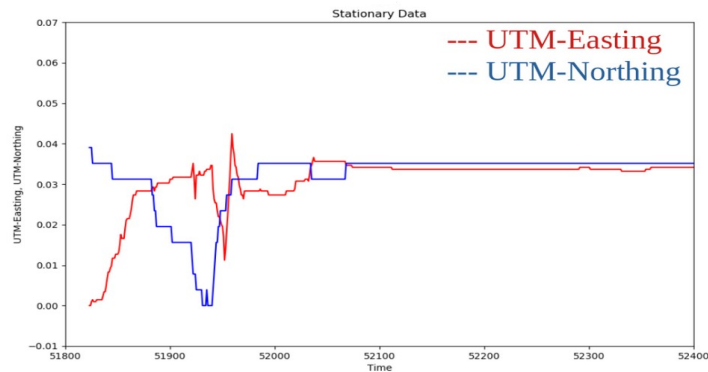


REPORT

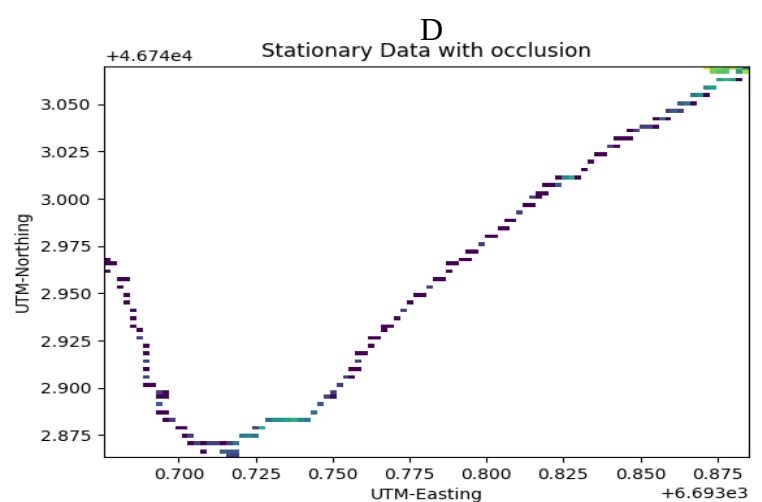
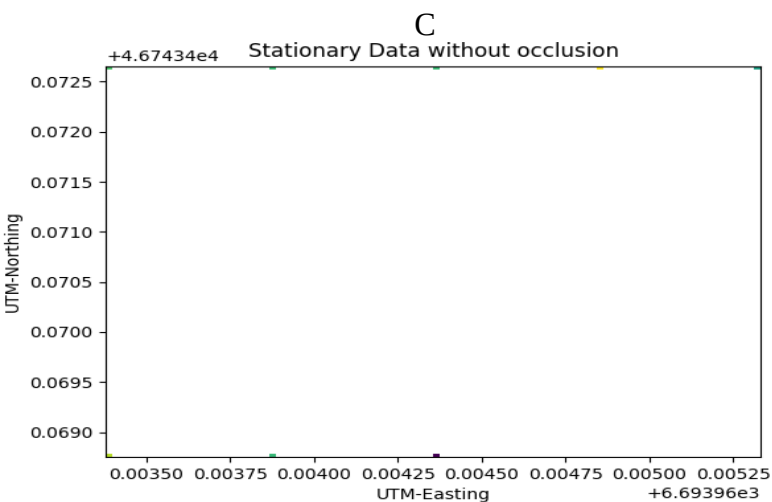
a.



A and B plot displays graph of utm-easting and utm-northing coordinates for stationary GPS puck against time. Ideally the graph should plot a constant value but the plot shows some fluctuations the GPS RTK driver has received. The blue line marked in both plots shows the ideal values that the GPS RTK receiver should receive. The error component received from the GPS puck is extremely low within the range of 0.00350 meters (3.5mm) to 0.00525 meter (5.2mm) i.e. about 2mm error deviation for utm-easting values. For utm-northing values, the error ranges between 0.069 meters (69mm) to 0.0725 meters (72.5mm) i.e. about 4 mm error deviations. For GNSS without RTK, the range of error used to vary approximately about 40mm. An image for GNSS without RTK plot is attached below displaying range of error.



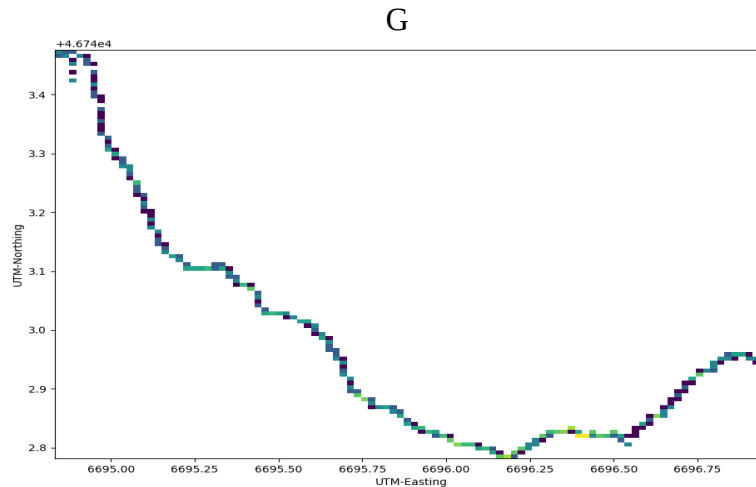
b.



C and D plots are 2d histogram of data collected in both open field and occluded space respectively.

Looking at the above 2 plots above, the GPS puck in open field space (without occlusion) receives much accurate data with negligible error component. The stationary GPS puck remains constant with minimum deviation in both utm easting and northing co-ordinates of approximately 3 mm and 5 mm respectively whereas for GPS puck placed in occluded space receives an error component of about 20 cm in both utm easting and northing co-ordinates as inferred from plot D.

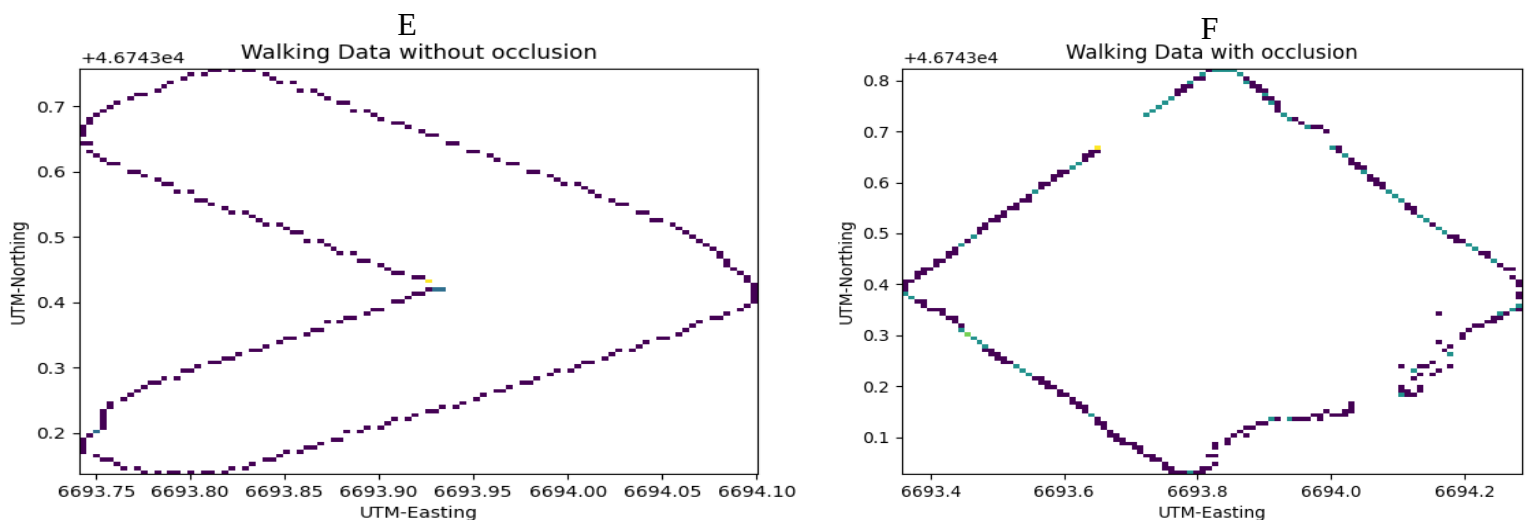
c.



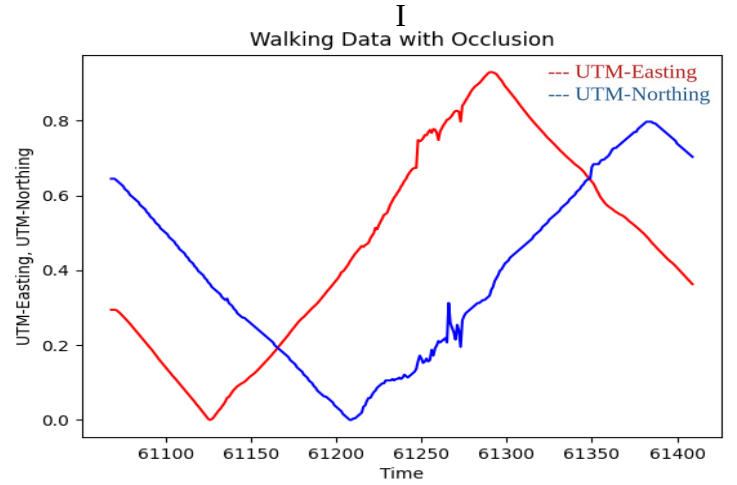
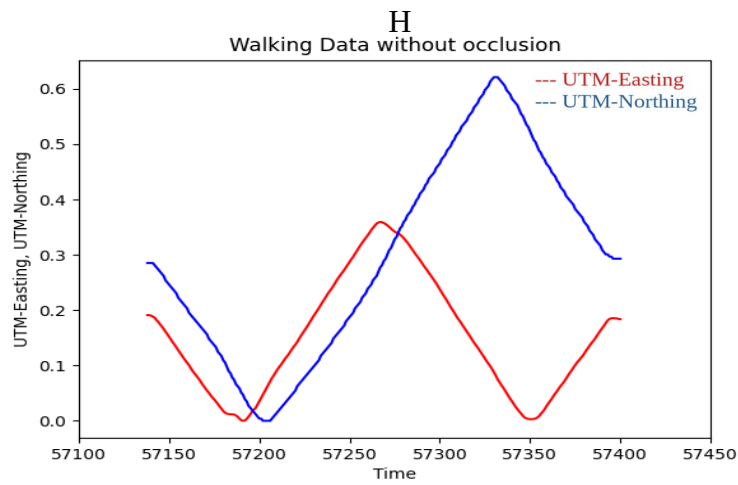
The G plot show 2d histogram of walking data collected for LAB 1 assignment.

G plot should ideally plot a straight line but the graph shows great deviations. Comparing the plot of C, D and G, we can say that C plot shows accurate range and shape of the path traveled by the GPS puck with RTK. D plot show slight deviations caused due to occlusions and reflections from the surroundings but still manage to provide somewhat accurate data. However the G plot shows great range of error component and the shape of the plot also does not matches the path that was traveled by the GPS puck without RTK.

d.



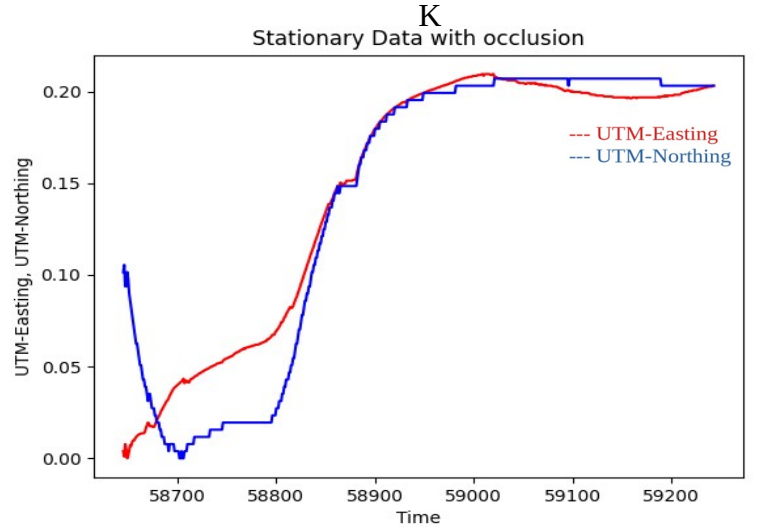
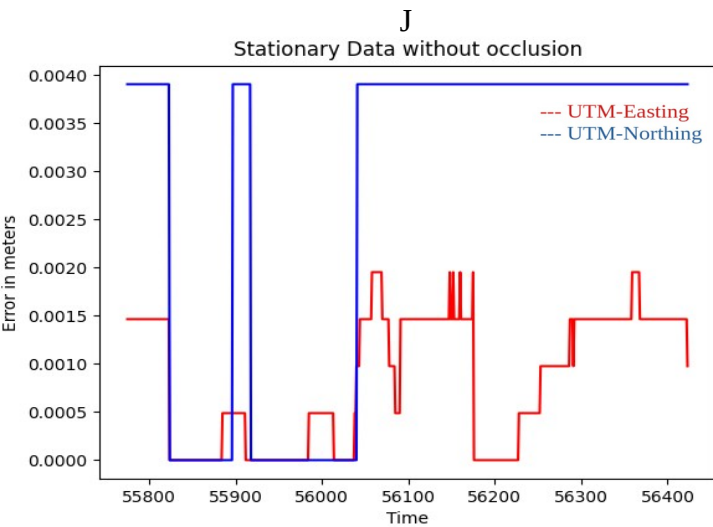
The E and F plot displays shape of the path the GPS puck was traveled along on the field. E plot shows the accurate co-ordinates and the path GPS puck was traveled along. However, in the F plot we can see there are some deviations and missing data in the northwest and southeast path. They are due to the occlusions and reflected signals received from the buildings by the GPS puck.



H and I plot shows utm easting and utm nothing data with respect to time.

We can see that H plot has smooth line with negligible deviations as compared to I plot. The I plot shows minor deviations between the range of 0.2 to 0.3 i.e. about 10 cm (maximum error deviation). The error may occur even due to RTK data quality received by the puck. Puck receives data in majorly in two quality, fix quality and float quality. Fix quality provides precise data and float quality provides a lesser accurate data compared to fix quality. For walking data, rtk received the data in float quality which is less accurate and therefore may display some error component. Therefore, by looking at the graph we can conclude that GPS puck is susceptible to reflections and occlusions from the surroundings and provides accurate data in open field without any occlusions.

e.



Plot J and I shows utm easting vs northing graphs with respect to time.

In the above plot, as we compare, we can see that the error component in stationary data without occlusion is exceedingly small (~4mm) as compared to error component present in data with occlusion. The error component in data with gps puck placed in occluded space ranges for about 20 cm. While collecting the data for gps puck in open space, data was collected in fix quality and thus it provides correct data with deviations upto 4mm whereas data collected for gps puck between occluded space was float quality resulting in a less accurate data. There might be a case that the error component may occur due to rtk data quality received by the GPS puck

Note: For plot H, I, J and K the utm co-ordinates value has been scaled down for analysis purpose.