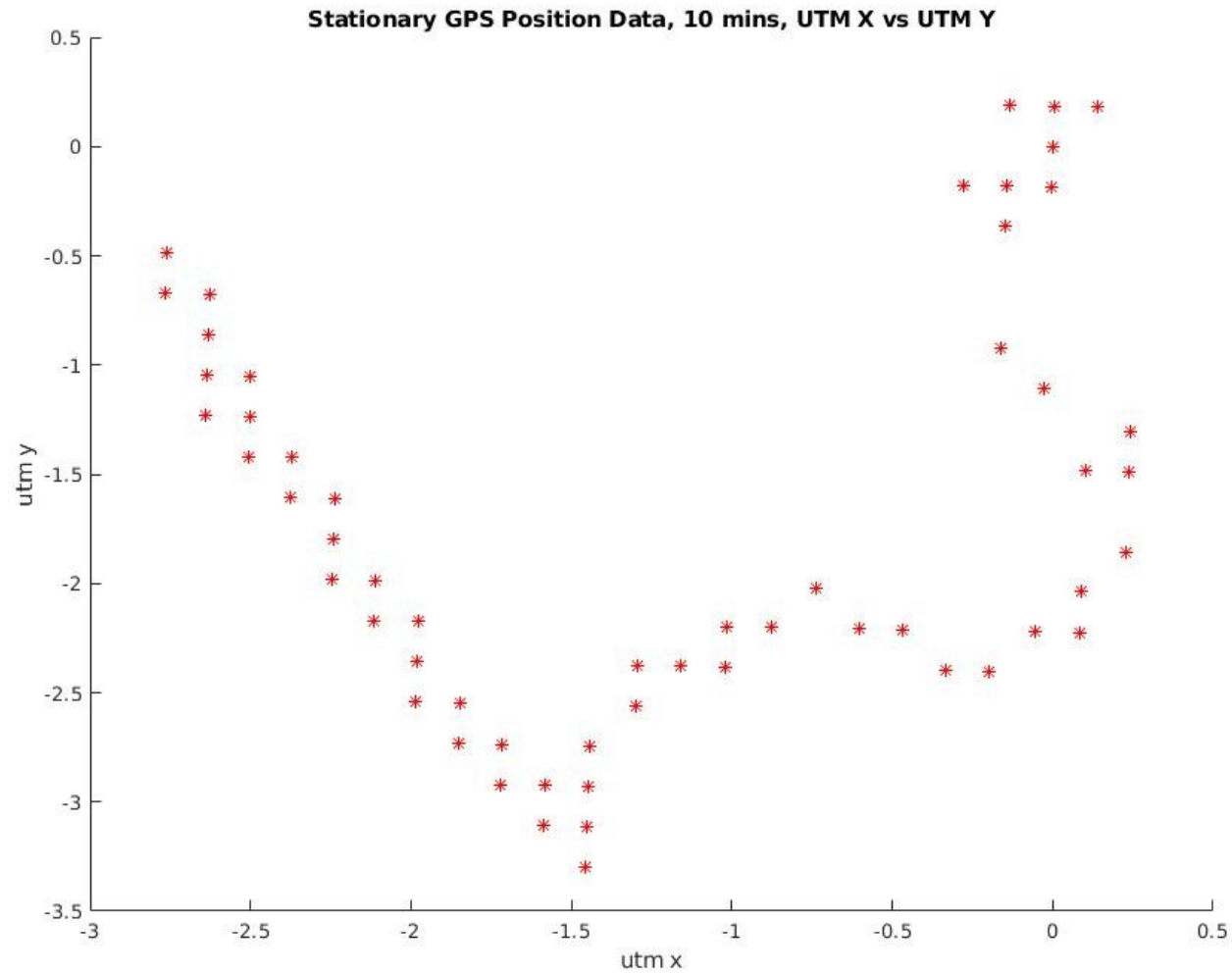


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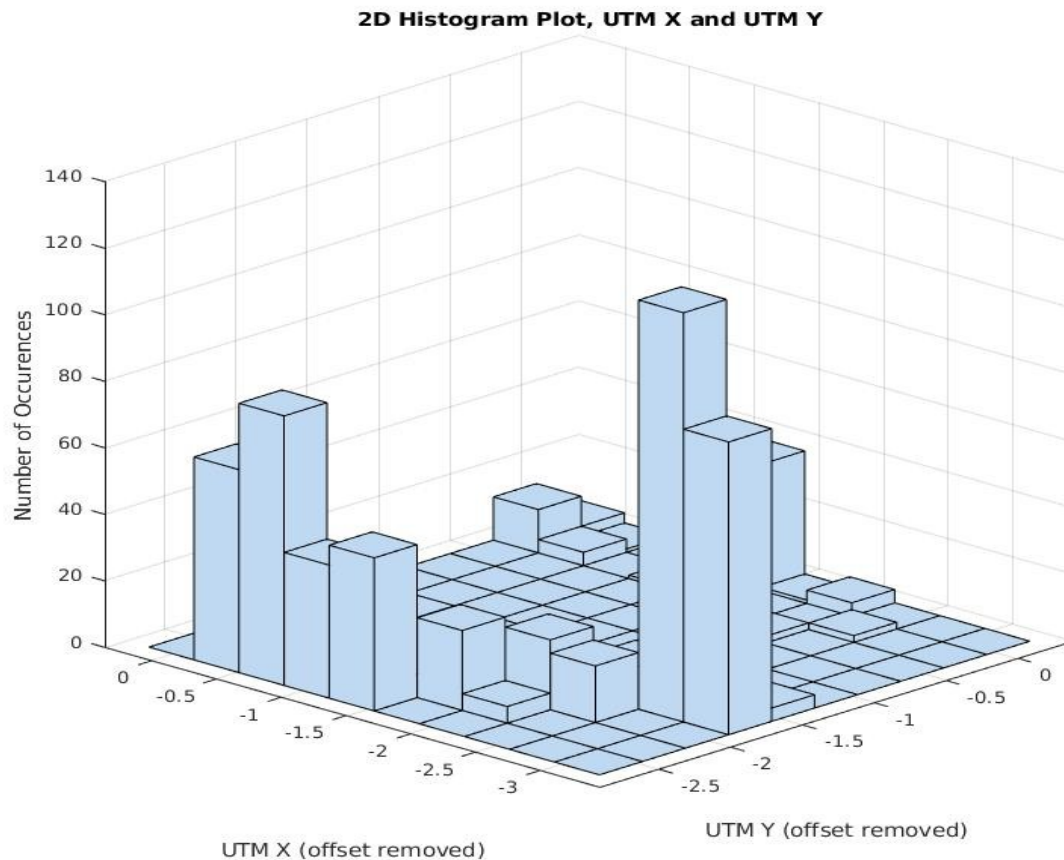
Lab 1

Nathaniel Hartwig

10 Minutes of Stationary GPS Data



Noise Characterization of 10 Minutes of Stationary GPS Data

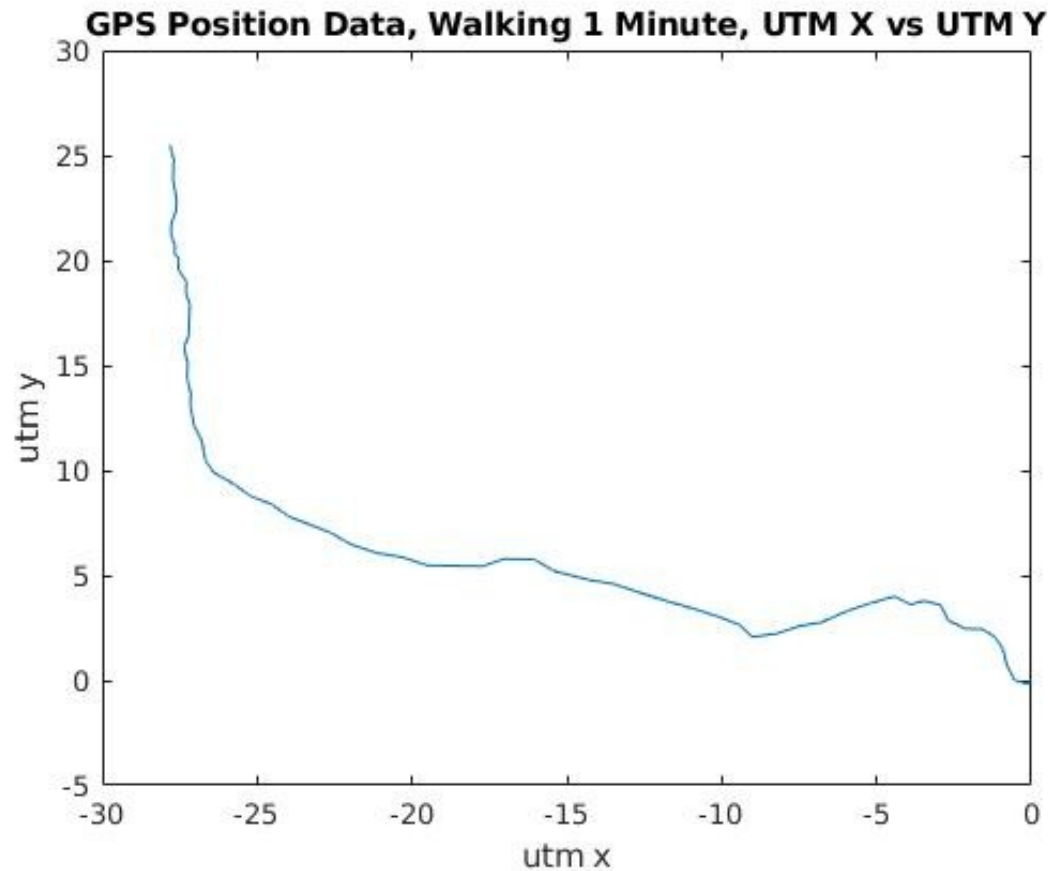


- From the 2D histogram at left, it can be seen that both UTM X and UTM Y data do not resemble a Gaussian distribution.
- The noise in the stationary data is changing and is not normally distributed.
- This means that the standard deviation cannot be used to produce error estimates, and another method must be used.
- To this point, the root mean square error was used.

Error Estimates for 10 Minutes of Stationary GPS Data

- Using the root mean square error estimate for UTM X with the offset removed, the error was found to be 0.8362 meters.
- Using the same method for UTM Y with the offset removed, the calculated error was 1.0335 meters.

1 Minute of GPS Data while Walking



- The chart at left shows GPS data collected while walking for 1 minute. The path taken was the corridor from Robinson Hall towards East Village.
- The path is skewed upward around utm x = -27. At this point in the walk, the corridor narrowed and both sides of the path were walled off by buildings on either side.
- The skewing could possibly be attributed to GPS signal reflection off the buildings.

Conclusions

- I improved my knowledge of USB serial comms, LCM, and GPS protocols.
- Parsing the GPS data with Matlab was fun.
- Performing a histogram plot revealed that the GPS data collected while stationary was not normally distributed, so I used RMS to find error.
- The error estimate for UTM X was 0.8326 meters
- The error estimate for UTM Y was 1.0335 meters.