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EECE 5554

Lab 2 Report

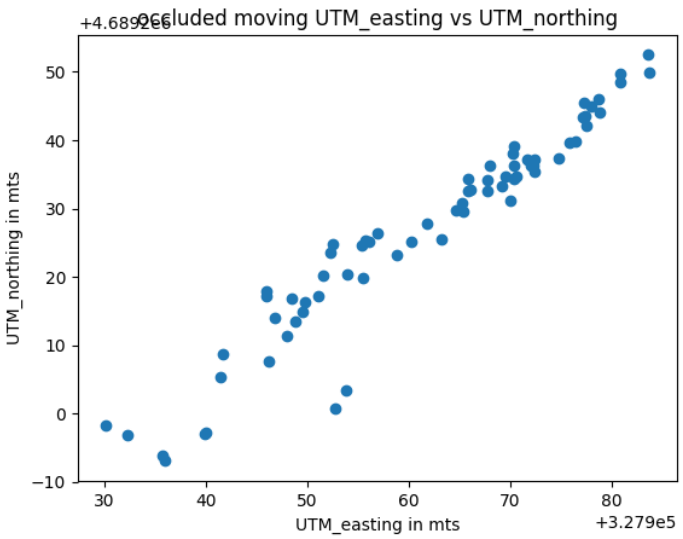
RTK GPS

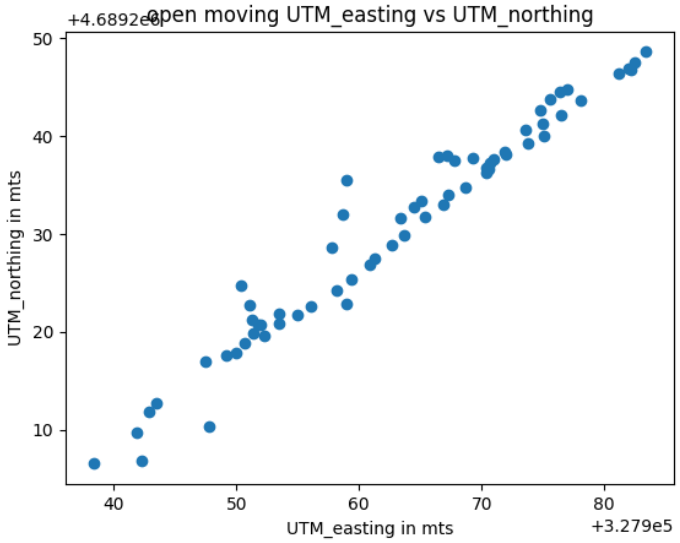
a) The error or deviation in RTK GNSS navigation indicates the accuracy and precision of the system, while the use of a "true" position can highlight the level of accuracy. In contrast, GNSS without RTK can result in less accurate and precise positioning, with deviations from the true position being more common. RTK GNSS provides highly accurate and precise positioning by using a fixed base station to correct for errors in satellite signals. In contrast, GNSS without RTK relies solely on satellite signals, which can result in less accurate positioning.

b) Analyzing the distribution of noise in GNSS positioning is important. A scatterplot of the GNSS measurements can reveal the presence of noise, such as clustering or outliers, and help identify patterns or trends for noise reduction and improving accuracy.

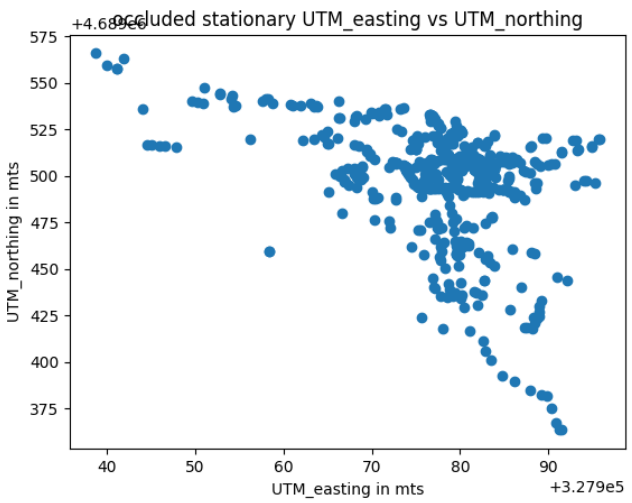
c) While in the Lab-1 GPS puck we got the Mean error of stationary open easting as 0.27733 and Mean error of stationary open northing as 0.20293. While the RMSE of lab 2 easting is 123.71 and northing as 66.601. The distributions difference can be different due to various factors such as different sources of error, sampling rates, data processing methods, or different types of data. It's important to carefully consider these factors and perform statistical tests to compare the distributions to determine if they are statistically different.

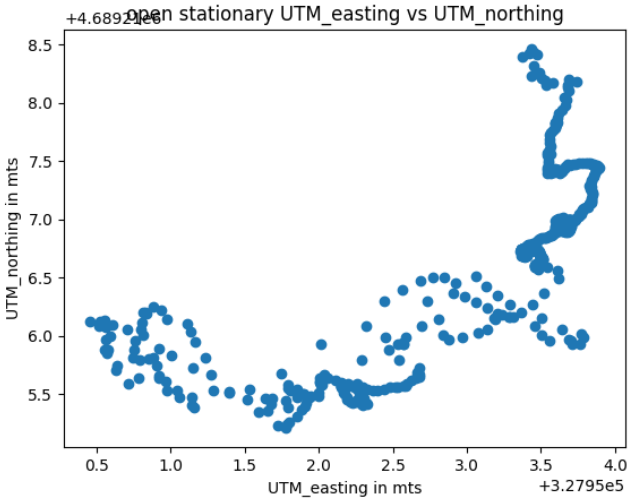
d)The quality of moving data in GNSS positioning can differ in open and occluded environments due to the impact of obstructions on GNSS fix quality. Open environments typically have higher GNSS fix quality, resulting in more accurate and precise positioning, while occluded environments have lower GNSS fix quality, resulting in less accurate and precise positioning.

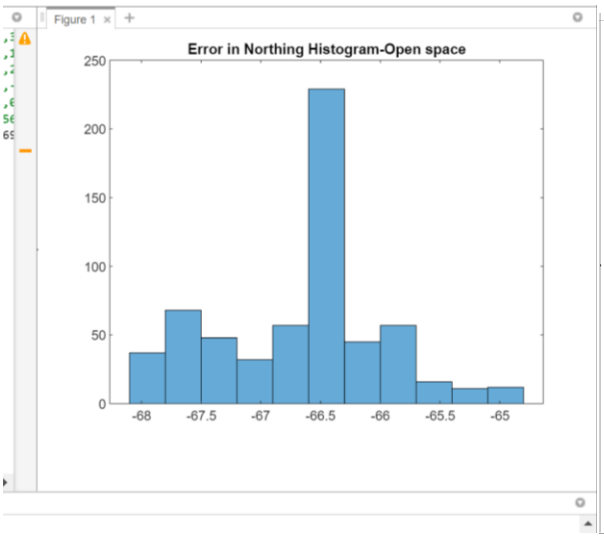


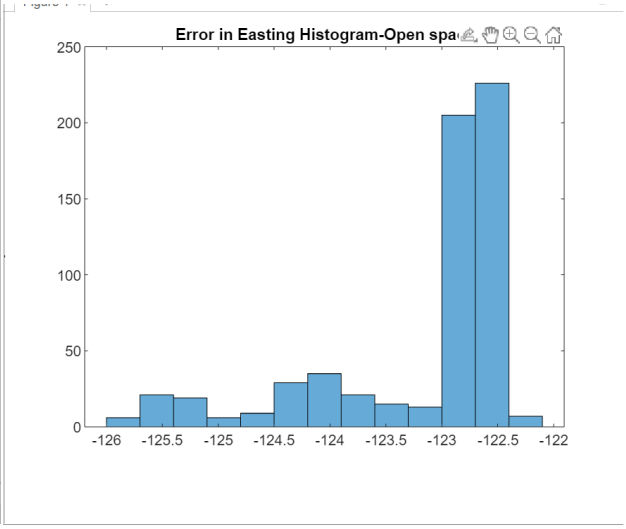


e) The quality of stationary data in GNSS positioning can differ in open and occluded environments, like moving data. Open environments typically have higher GNSS fix quality, resulting in more accurate and precise positioning, while occluded environments have lower GNSS fix quality, resulting in less accurate and precise positioning.










```
    double mse = sum / size;
    double rmse = sqrt(mse);
    return rmse;
}

int main() {
    // Sample predicted and actual data
    double predicted[] = {4689218.399,4689218.426,4689218.461,4689218.43,4689218.413,4689218.314,4689218.235,4689218.247,4689218.2
    double actual[] = {4689283.29,4689283.29,4689283.29,4689283.29,4689283.29,4689283.29,4689283.29,4689283.29,4689283.29,4689283.
    int size = sizeof(predicted) / sizeof(predicted[0]);

    // Calculate RMSE
    double rmse = RMSE(predicted, actual, size);
    std::cout << "Root mean square error of northing: " << rmse << std::endl;

    return 0;
}
```

RMSE calculation code of northing