

Abstract

We developed an algorithm to increase the accuracy of GPS data collected near obstructions. The algorithm stacks data collected by each GPS units into separate queues. Then, for each data point in the queue, we check if the data multi-path by testing them with various statistical tests. Finally, if the data meets the tests' requirements, the data is marked as good and displayed to the user. We were able to field test the algorithm and collect accurate results.

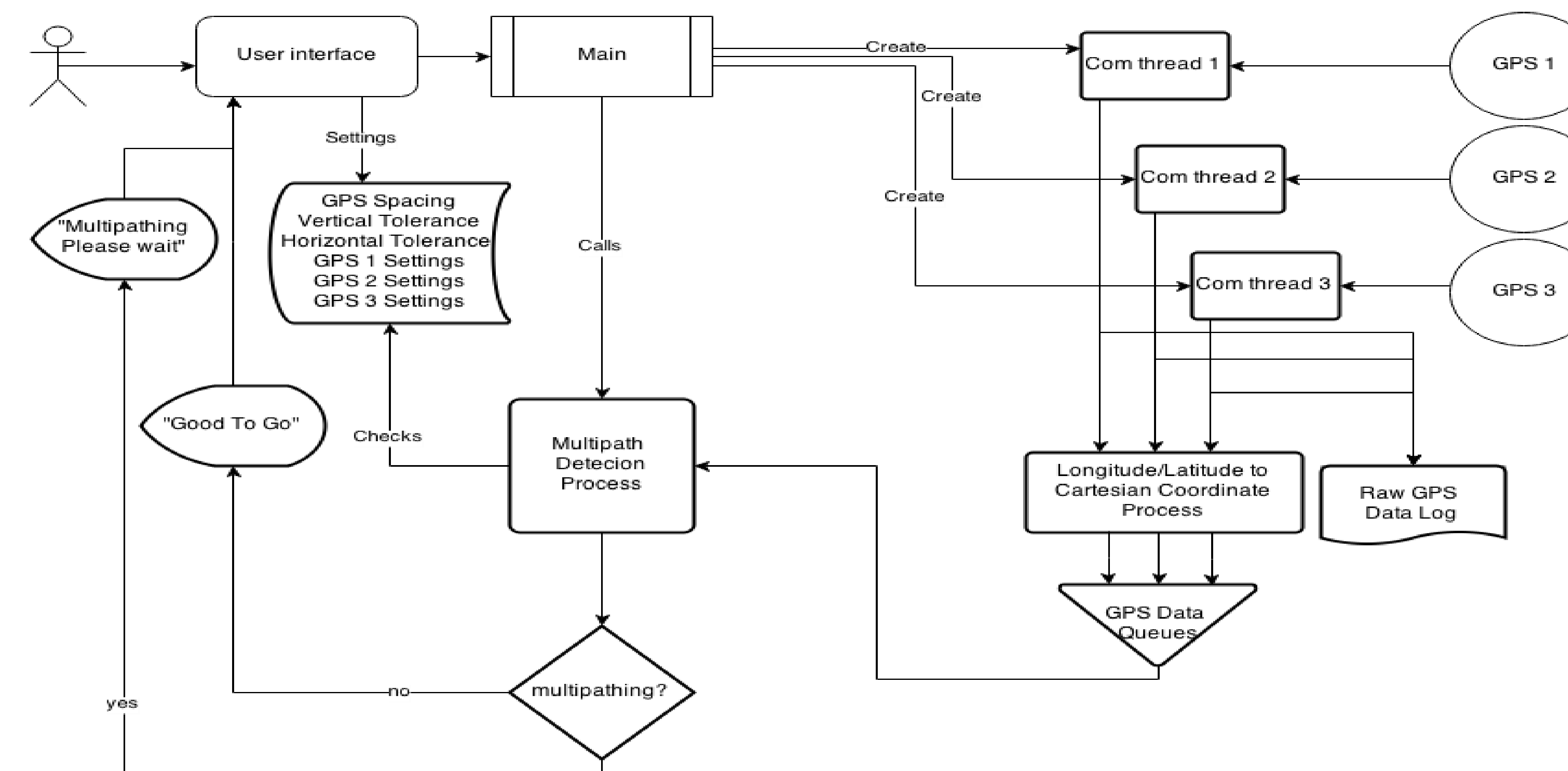
Background

- Obstructions can reflect GPS signals away from the surveyors. We call this phenomenal multi-pathing. This can cause problems to the quality of the data collected.
- Currently, if there are multi-pathing in the data, surveyors need to throw away the entire set of data and recollect them again.
- Currently, there are no existing methods that can solve this problem.
- The goal of this project is to solve the problem of multi-pathing.

TRIDENT : A NOVEL SOLUTION TO MULTI-PATHING GPS SIGNALS

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Algorithm Flowchart



Results

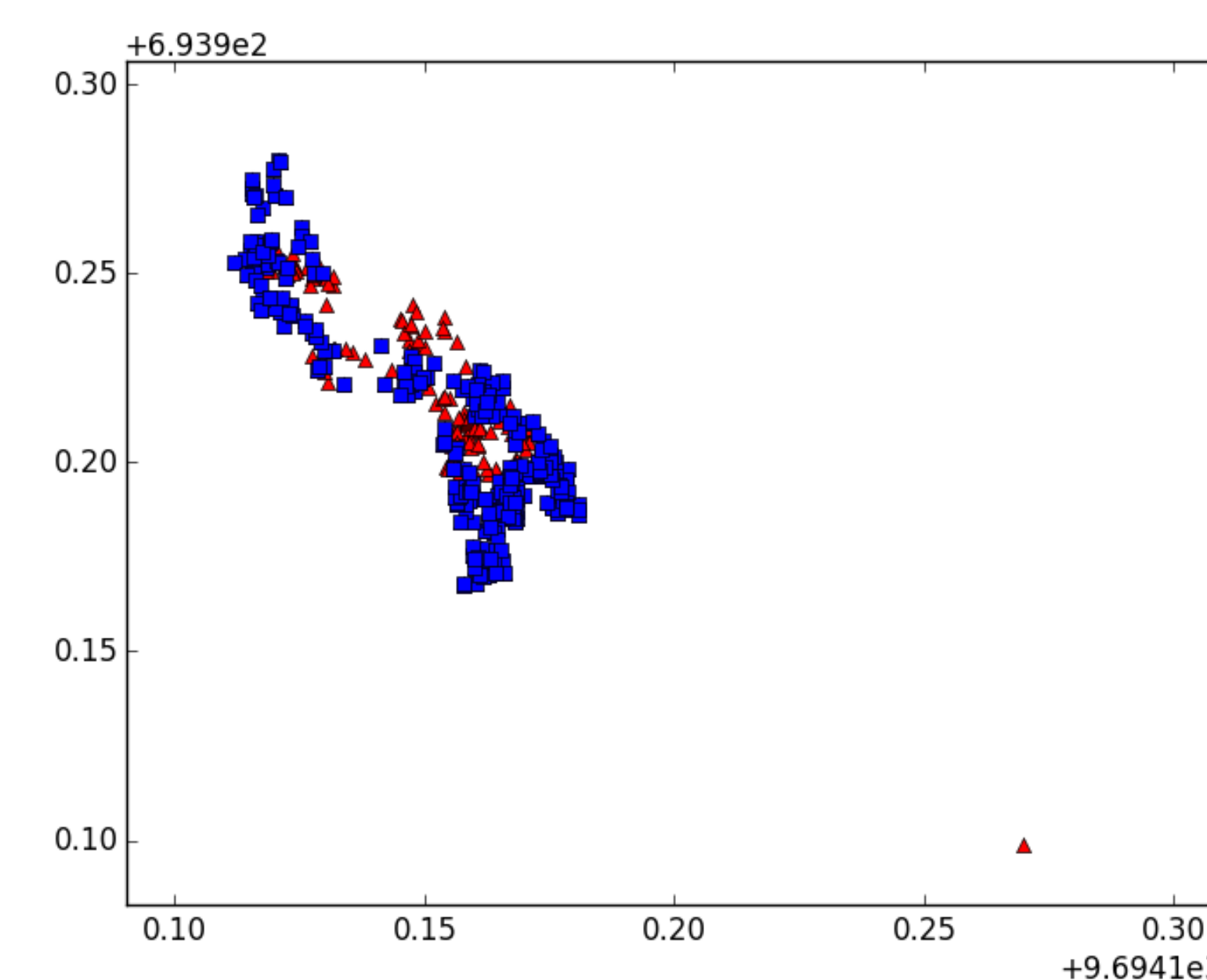


Figure 4. Unanalyzed Data (Red) overlaid by analyzed Data (Blue)

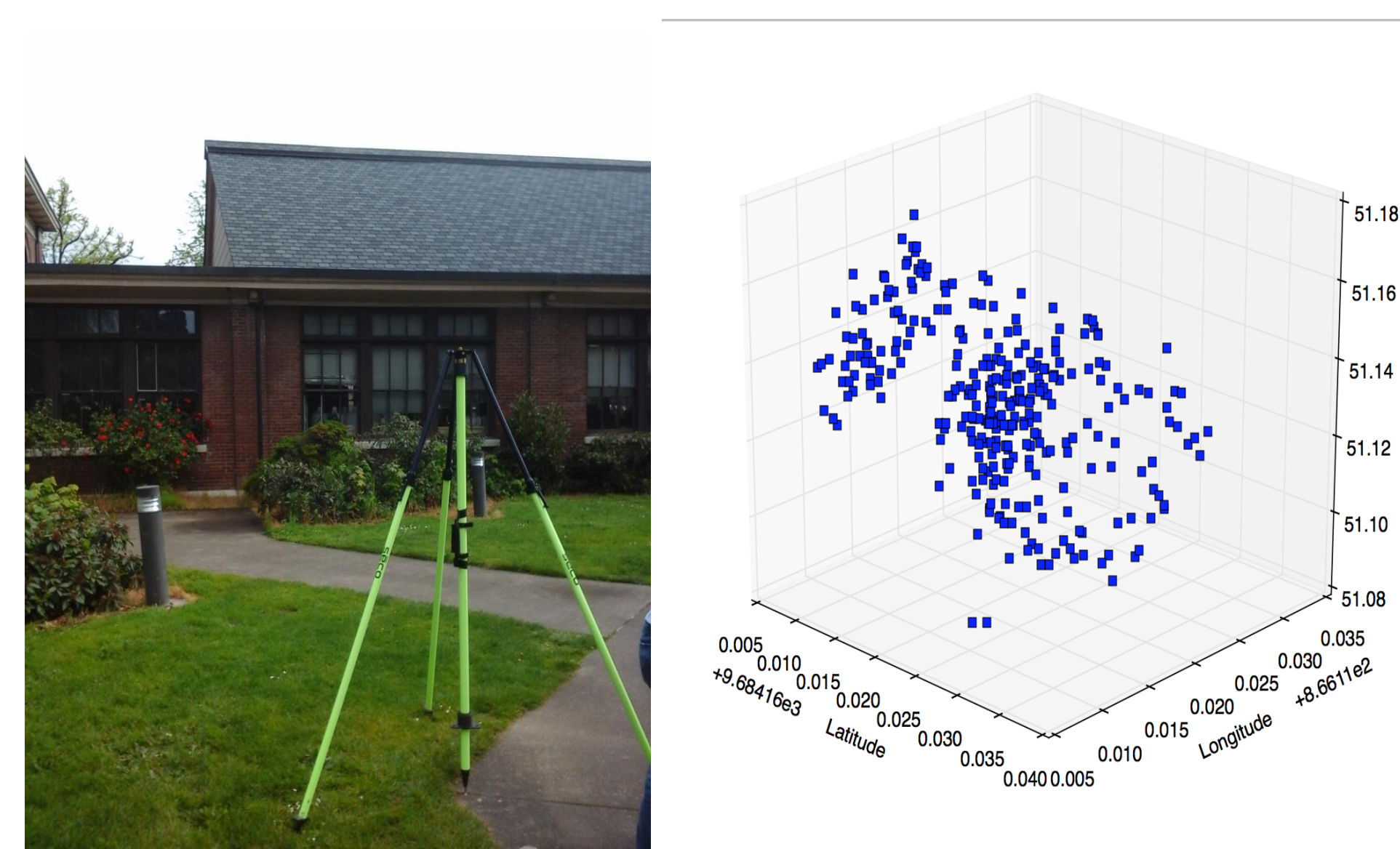


Figure on the left shows control point 1. This point is known to contain very little multi-pathing signals. Figure on the right are non-multipathing signals detected by the algorithm.

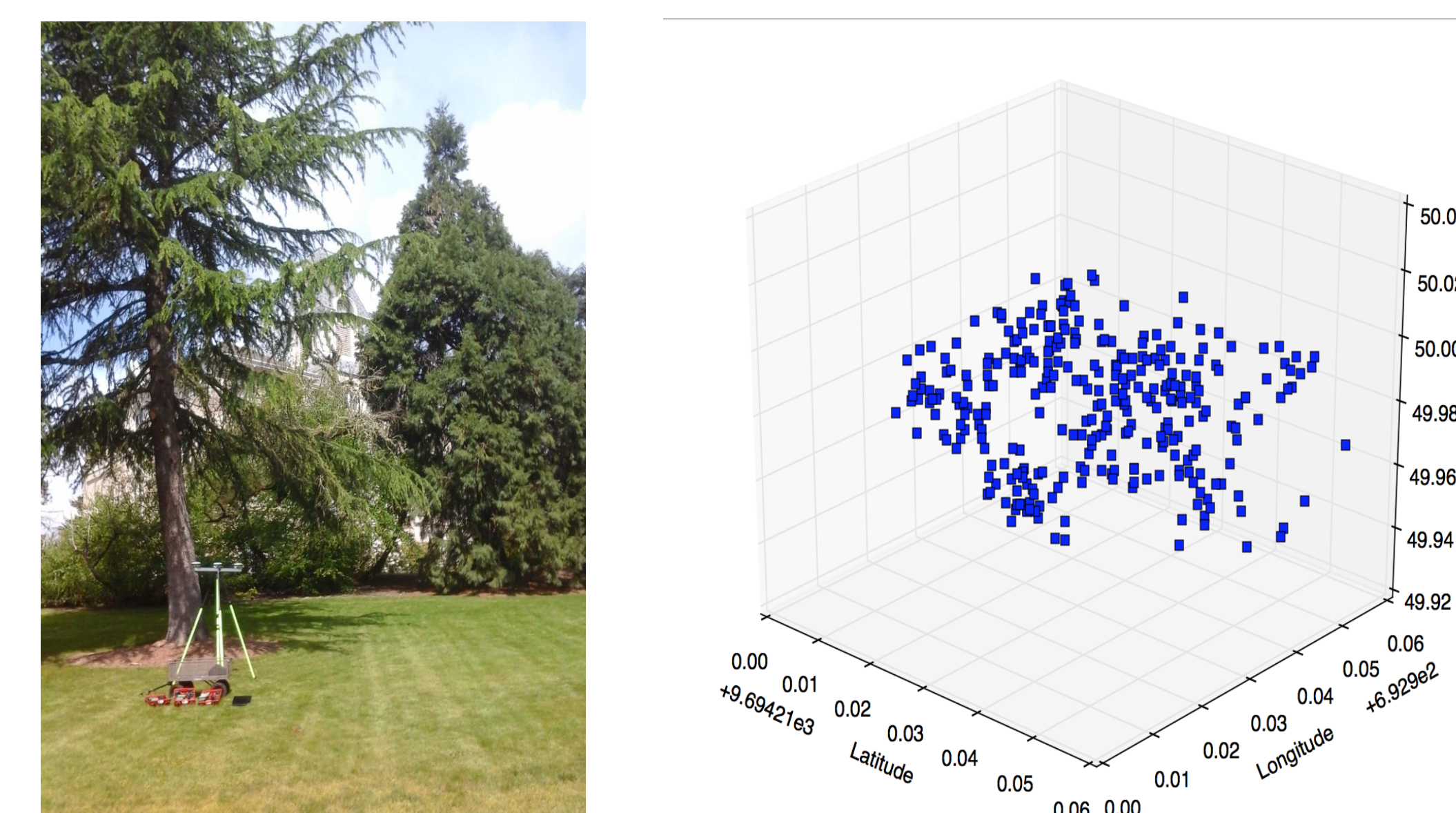


Figure on the left is control point 2, where it contains a mixture of multi-pathing and non-multipathing signals. The number of clean data points we have in our graph is less than control point 1.

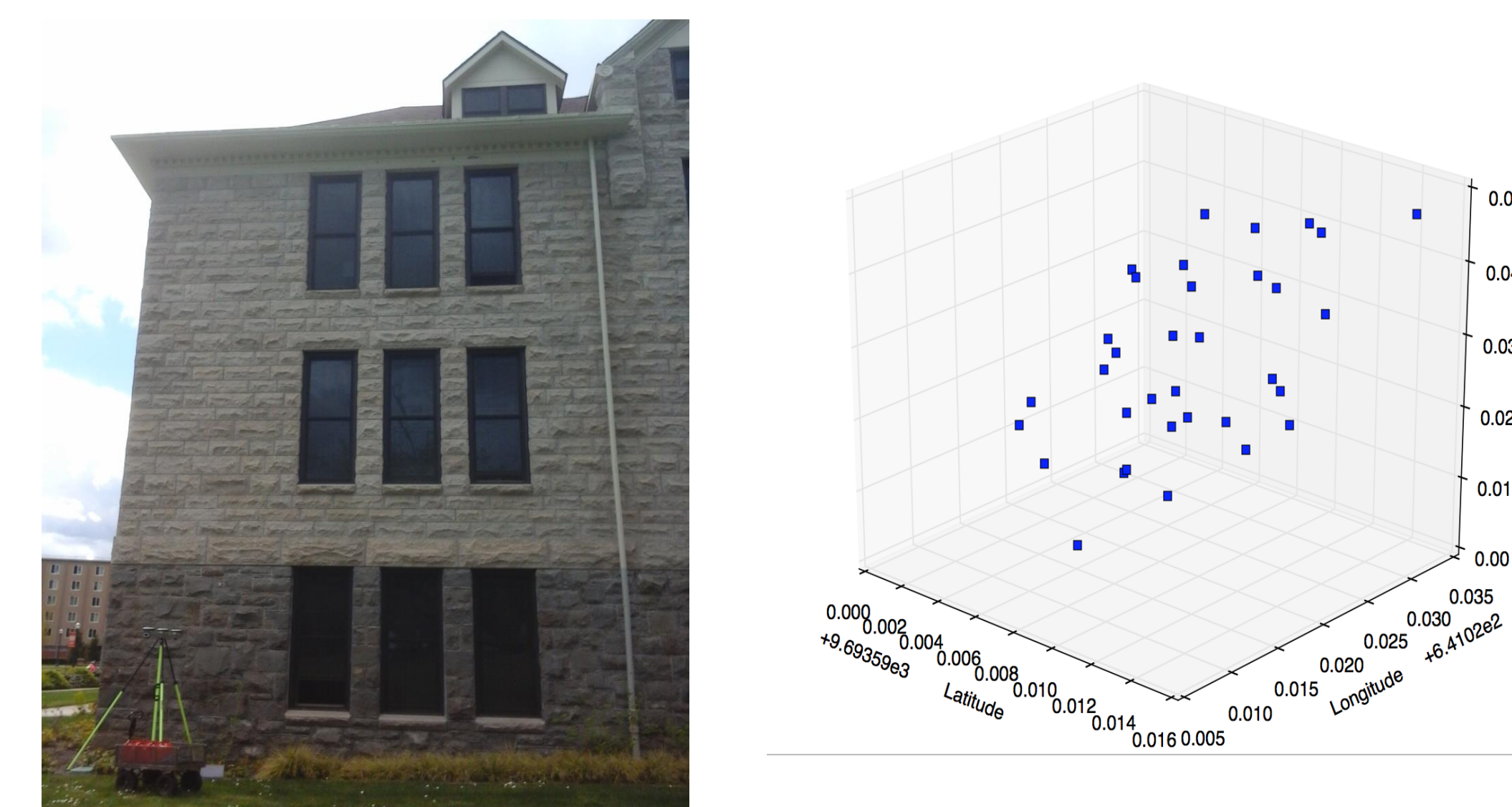


Figure 3 is control point 3, where there are lots of multipathing signals and very little clean data point. Our algorithm is able to filter through multiple multi-pathing signals.

Graphical User Interface



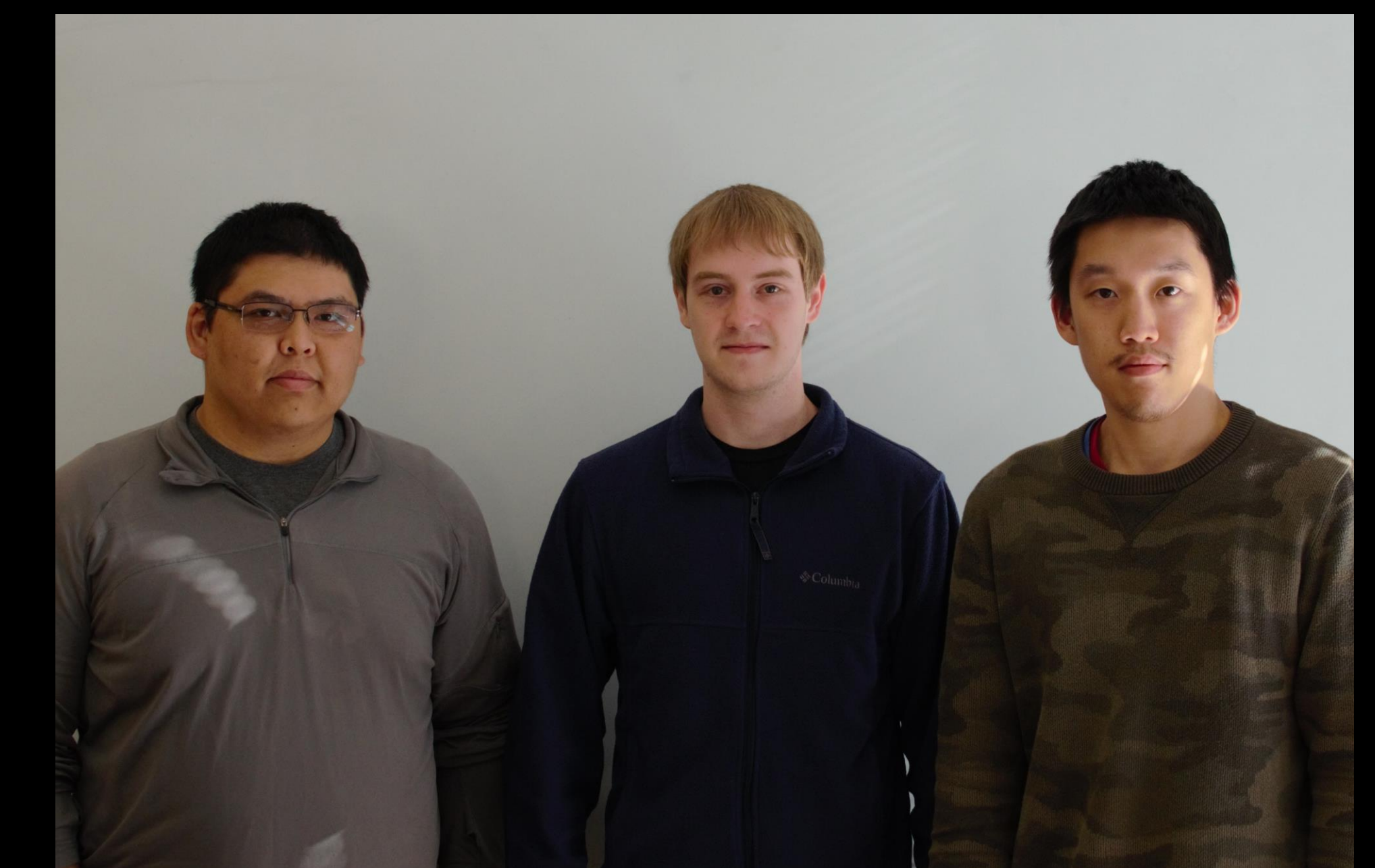
Conclusion

- Our algorithm is able to filter multi-pathing signals through our algorithm
- Future works includes further testing of the algorithm to increase accuracy
- More extensive field tests to get more feedback from surveyors.

Our Client

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Meet the team



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