sdmay19-37: Are Cross Country Courses Avoiding Hills?

Week 3 Report
September 23 - September 29

Team Members

Connor Smith — *Ground Truth Engineer*
Thomas Chambers — *Ground Truth Engineer*
Ryan Hilby — *Data Handling Engineer*
Jacob Feldman — *Data Handling Engineer*
David Kirshenbaum — *Data Analysis Engineer*
Andrew Mumm — *Data Analysis Engineer*

Summary of Progress this Report

We conducted a second site survey this week utilizing our differential GPS system on a variety of different tests, and the ground truth team also began working with the GNSS Solutions software to handle the differential GPS data. We also began to work on the creation of the app that will help users enter their cross-country course routes and receive elevation data on it, and we experimented with converting the “bare earth” LIDAR data from the Iowa DNR in to a more useful point cloud format.

Pending Issues

We need track down the necessary accessories for the differential GPS unit before we’ll be able to view and analyze the results of this week’s survey. We also need to reach out to additional faculty resources or possibly find some contacts at the Iowa DNR for advice on raster-point cloud data conversion.

Past Week Accomplishments

- Connor
  - Orchestrated second site survey around the Iowa State campus
    - Figured out how to use differential GPS device along with Garmin GPS and phone GPS
  - Familiarized with GNSS Solutions software for use with differential GPS unit
- David
  - Wrote a tool using Google Maps API that lets the users draw lines on a map to trace their cross country courses and saves the lat and long values. It is very close to being done.
- Andrew
  - Worked with Jacob to learn about tools for modify and filtering the data to have custom point clouds.
- Thomas
  - Performed second site survey
  - Discovery regarding geodetic points
- Ryan
  - Added general milestones/todos to Gitlab
- Jacob

- Tried to convert from a raster to a point cloud in a way that can be automated, but I basically found it can't be done and doesn't really make sense in the first place.
- Started on trying to compare the point cloud of the Ames XC course to our other dataset

Plans for Upcoming Reporting Period

- Connor
  - Configure GNSS Solutions software to work with the Promark2 differential GPS and deliver all survey #2 data to the data handling engineers.
- David
  - I hope to gather feedback and get suggested improvements for the tracing tool
  - Possibly begin working on communication between the tracing tool and Andrew and Jacobs LIDAR reading program.
- Andrew
  - Continue working on filtering and modifying the point cloud data to learn how to limit the area to only be that of a course or some other specifically defined area.
- Thomas
  - Plan third survey, determine viability of differential GPS device
- Ryan
  - Help with extracting elevation/coordinates from img to point cloud
- Jacob
  - Write a script to compare the point cloud of the Ames XC course to our other datasets, i.e. GPS data from multiple different sources and from Google Maps

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Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Connor Smith	Site survey	6.5	20.5
Thomas Chambers	Site survey and geodetic points exploration	7	16
Ryan Hilby	Gitlab updates	2	13
Jacob Feldman	Raster point cloud conversions/comparisons	9	13.5
David Kirshenbaum	Tracing tool	8	13
Andrew Mumm	Point cloud filtering	4	10

Gitlab Activity Summary

Nothing to report.