

Requirement Document for Tea Plantation Analysis Using Geospatial Data

Objective:

The primary goal of this project is to analyze high-resolution geotiff imagery of a tea plantation, captured via drone, for the purpose of automating tea leaf harvesting. The specific objectives include:

1. Classification of Vegetation: Identify and classify vegetation regions within the tea plantation as polygons.
2. Area Estimation: Calculate the area of each classified polygon.
3. Width Analysis: Determine the width of plantation rows and highlight regions where the bush width significantly deviates from the standard range.
4. Navigation Aid for Tea Rover: The output data(georeferenced) will assist an automated tea rover designed to maneuver through the plantation for efficient and precise tea leaf harvesting.

[Input Data](#) (Link to data)

Highly accurate data:

- Geotiff Image: High-resolution drone imagery of the tea plantation.

Less accurate data (photogrammetry points)

- Digital Terrain Model (DTM): Elevation data that represents the bare ground surface without any objects like plants and buildings.
- Digital Surface Model (DSM): Elevation data including trees, buildings, and other objects.
- Digital Elevation Model (DEM): A 3D representation of the terrain's surface.

Expected Output

- Vegetation Polygons (.shp format): Classified vegetation regions in the shapefile format, outlining the extents of each vegetation area.
- Area Estimation: Attribute dataset containing the area of each classified polygon.

- **Width Analysis Report:** A detailed report highlighting the width of each plantation row and identifying regions where the bush width exceeds 1.2 meters.
- **Navigation Map for Tea Rover:** A map (as long as path) to assist the tea rover in navigating the plantation, focusing on areas that require special attention due to varying bush widths.

Submission Format:

- Place the output images in a google drive.
- Source code in github or in google drive
- Accompanying documentation outlining the approach, experimentation results, and observations.

Appendix: Use Case for Tea Rover

The rover is designed to have a width of 1.5 meters.

It navigates such that its left wheel follows one path and the right wheel follows another, with the machine itself positioned over the plantation to cut leaves.

Areas where the plantation width exceeds 1.2 meters are critical, as they might pose navigational challenges or require manual intervention.

Sample output:

