The University of Western Australia
Dept. of Electrical & Electronic Engineering
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Intelligent Robotics

ENGT4311

Lab Double Assignment - Outdoor Navigation

Lab Assignment G3 Group Assignment (3 weeks) Due: week 12

Not so Grand Challenge

As a group project, implement a robot navigation system that solves the following requirements:

- The robot reads a given set of GPS way points at initialization
- The robot will follow the GPS way points in the given order up to a certain proximity (e.g. 10m), then continue driving to the next way point
- Each way point is marked with a box of distinctive color. Use image processing to identify each box. Considering the previous and next way point, pass the box on the outside track. Always avoid collision with a box.
- During each run, the robot will maintain a data structure that plots its driving path (at least one entry per second). Upon completion of the task, the robot will write this data structure to a text file, which can be then converted to a graphics plot (e.g. using Excel) and has to be included in the lab report.

Note: First solve this problem with input from GPS and shaft encoders (odometry) alone. Only after this works satisfactorily, add the image processing (box detection).

Bonus point: Avoid stationary and moving obstacles, such as buildings, walls, trees, and people with the help of image processing.

Lab report: A lab report has to be submitted by each group that includes the following information:

- Split of assignment tasks between group members
- Time spent on each task per group member
- Written assignment documentation, describing design choices and solution path
- Well-documented source code
- Full set of measurements and graphs
- CD-ROM (or other media) with drive video