Required Functions - Simple Description

ELEC3848 – Integrated Project Design (F5-C)

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Introduction

This document will encapsulate a simple description of each function required in order to control the Automated Guided Vehicle (AGV) to park in accordance with a set of instructions. It will not go into detail about the pre-existing code already provided for in Moodle.

Measurement Components Used

The following table will summarize the components used and the function name to invoke from to obtain said readings.

Table 1 Measurement Components used

Component	Function Name	Description
2 Light Dependent Resistor (LDR)	Light_Reading()	Obtains the reading of each LDR, subject to initial calibration and calculates light intensity.
Inertial Measurement Unit (IMU)	IMU_reading()	Gyroscope reading, X, Y and Z angles, respectively.
2 HC-SR04 Ultrasonic Sensor	ultrasonic_reading()	Obtaining the distances measured from each US, subject to averaging for stability.

Functions Used to Achieve Required Functions

The following functions will summarize the actions undertaken within each function to achieve that particular function named as specified in its name.

Align_with_wall()

- Align vehicle perpendicular to the wall;
- Uses difference between L/R ultrasonic sensor as reference (tolerance of 1 cm);

Advance_until_distance(int dis)

- Advances the vehicle until specified distance as given as input argument, dis.
- Iteratively moves until either ultrasonic reads satisfied distance.

Align_with_light_source()

- Aligns vehicle towards the light source using brightness difference between L/R LDRs.
- Tolerance of 10 units difference allowed for better alignment
- Moves vehicle left or right to reduce brightness difference, then stops

Rotate_CW(int degree) & Rotate_CCW(int degree)

- Rotation of vehicle to target degree and uses AngleZ as reference (from IMU_reading());
- Offset set to stop vehicle earlier & prevent inaccurate rotation degree due to car momentum;
- Degree should be greater than offset.