EEL 5666 IMDL

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Special Sensor Report

Instructor: Dr Arroyo, Dr Schwartz

Student: Justin Seabrook

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Abstract

In this report is the outline of the sensors used for the Path Clearing Platform Leveling Robot. The sensors used will be two bump switches, line tracking, infer red, and the platform leveling. The platform leveling will be accomplished using two gyros and two accelerometers in the XY plane defined as front to back and side to side.

Introduction

The three main sections of the report will be an outline of the sensors on board. The next section will be an in depth outline of the special sensor, and finally a section on the current status of each sensor.

Sensors

Bump Switches

There are two bump switches located on the front of the robot to sense contact with any object. They are oriented on the right and left of the front of the robot. This will allow me to obtain to create obstacle avoidances that can make a logical distinction on the best way to proceed to overcome the object.

Line Tracking

There is a plate mounted on the front of the robot with three LEDs and three photoreceptors. They are oriented to follow a 1.5” black line on white paper. This will allow me to define a path for the robot to follow

Inferred Sight

In the path of the line described above I am planning on putting cheakers on the line. To detect these checkers there will be Infer Red cells and a detector on the front bar to detect its approach and activate the swing bar to clear the path.

Platform Leveling

A platform will be constructed in the middle of my current base. On this platform will be four servos positioned at each corner. These will be used to actuate each corner up and down to keep level. On this platform will be two gyros and two accelerometers oriented in the XY direction. XY will be defined as forward and back and side to side on the robot. The gyros selected are ADRXS300 from Analog Devices. The gyros will sense the tilt angle and respond accordingly. The accelerometer selected is a dual axis ADXL311 from Analog Devices. The accelerometers are used as a filter and backup system for the gyros. Gyros are not extremely fast with there reaction times to sudden launches, stops, vibration, or impacts. However accelerometers are very good in detecting the above conditions. SO by using them in a algorithm comparing the two outputs a logical and effective outcome should be produced to actuate the servos and keep the platform level. Level will be gauged by two methods. First a bubble level will be affixed to the platform to give a accurate reading in relation to gravity, and a small object with a high moment of inertia will be used as a physical demonstration.

Current Status

The bump switches are installed on the robot and connected to my MEKVAR128. The line tracking and inferred is assembled and ready to be installed. The platform

leveling is in the works, but has been put on hold until the rest of the items are functional. The main item holding me back is code. I am having a lot of trouble e learning how to program in C. There are no clearly defined tutorials, learning aids, websites, or documentation to aid in the learning of the syntax and structure of code specific to the Atmel28 and robotics. It has been very difficult to catch on to the programming along with the learning of concepts such a decimal to hex to binary has proven difficult.

Conclusion

The project is coming along well in regards to the physical platform. Sensors are built wires connected and lights glowing, but with out code none will function independently. That is an hurtle that must be concurred before a sensor or special sensor can be implemented in any useful fashion. That is the main focus of my time right now.