NUI Galway
OÉ Gaillimh

College of Engineering and Informatics

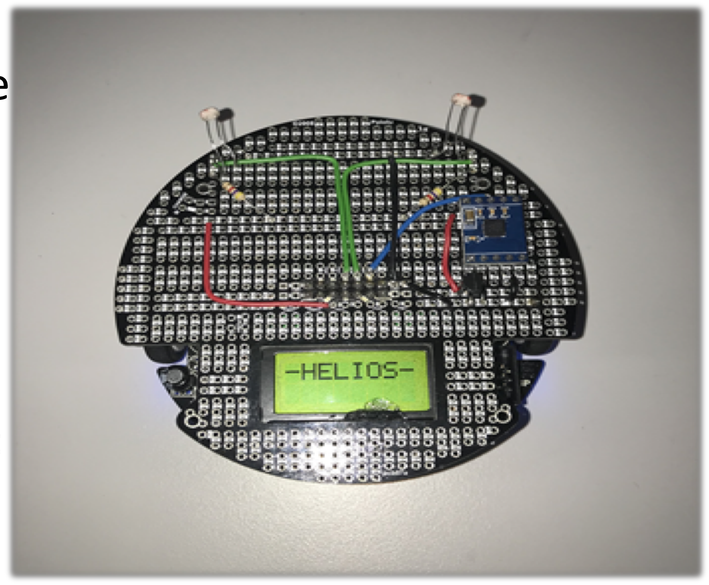
ROBOTICS CHALLENGE PROJECT

Lauren Boyd, Abishek Bupathi, Michael Concannon

Group 5

INTRODUCTION

The robot used was Pololu 3pi, which is a complete high performance mobile platform with 2 geared motors, IR emitters and receivers, LCD display, buzzer, pushbuttons connected to a C programmable ATmega 328 microcontroller. Analog Sensors such as LDRs and an accelerometer necessary for this challenge were soldered onto the prototype that was connected to the robot. The challenge was to make the robot perform 3 different tasks - light follow, line following and balance on a seesaw with automatic transitions in between each task.



ROBOT SENSORS

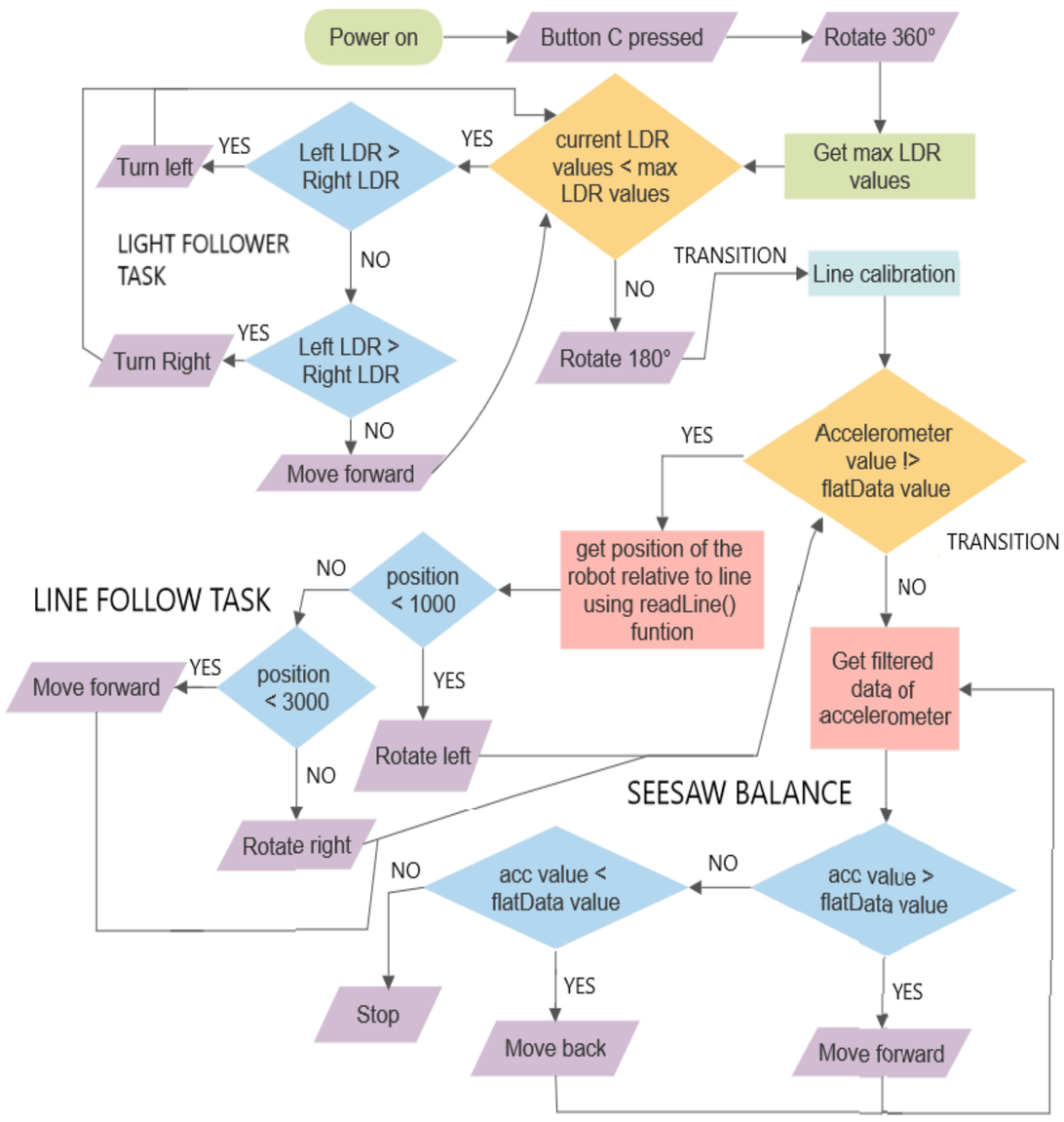
The three main sensors that were used in this project were Light Dependant Resistors (LDRs), an Accelerometer and an IR Emitter/Receiver.

SENSOR	PURPOSE
LDRs	Used in light detection task
IR Emitter/Receiver	Used in line follower task
Accelerometer	Used in See-saw task

- An LDR is a variable resistor. This means that the resistance value on the LDR decreases when the light intensity incident on the robot decreases. This was perfect for the light detection task as the robot could detect when it came in close contact with the light source and stop.
- The accelerometer could sense when the robot was at a tilt due to its orientation. A flat surface value was recorded off the accelerometer and if the robot exceeded that value it moved forward and if it fell below the flat surface value, it moved backwards.
- The IR emitter has a light emitting diode which emitted infrared light in a specific pattern. The IR receiver then picked up that signal and turned it into instructions for the robot.

SOFTWARE DESIGN

The program for the robot was designed to be efficient with a wide use of functions. After testing various methods, the final method/algorithm chosen was based on the performance of the robot. The following is a overview of the method that worked best for specific tasks of the challenge.



RESULTS

In the final test the robot achieved full marks of 20/20. The track was completed in a time of 44 seconds, with 60 seconds being the maximum time allocated. The team were very impressed with this result as after all the hard work put in, the robot performed perfectly securing 4th place overall.

Below is a breakdown of the allocation of the marks.

Max Score	Light	Transition	Line	Transition	See-saw	Time Bonus
20	5	3	3	3	4	2

ACKNOWLEDGEMENT

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