

Car Controller



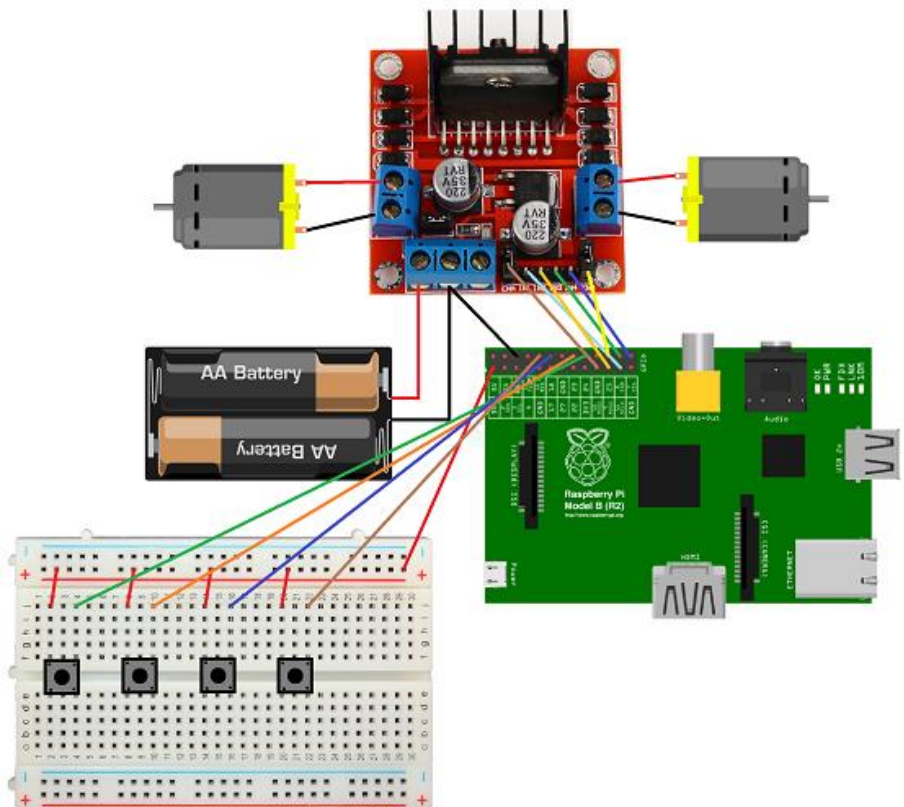
Introduction

This class allows you to control 2 independent motors using 4 buttons. Like the Car project this project will work best if you have a base and some wheels so you can create an actual Raspberry Pi car. As this project, once complete, doesn't need to be connected to a screen to drive the car, the Pi can be powered from the battery pack, by connecting the 5V connector on the L298N to the 5V pin on the Pi with a male to female jumper cable.

Assembly

Parts:

- 6x Female to female jumper cables
- 6x Male to female jumper cables
- 4x Male to male jumper cables
- 4x Tactile buttons
- Breadboard
- H-bridge L298N
- Batteries (with case)
- 2x Motor
- Raspberry Pi
- (Optional) A base
- (Optional) 2x Wheel (for the motors)
- (Optional) Stabilising wheel(s)



Build Instructions:

1. Power off the Pi completely.

2. Connect pins IN1, IN2, IN3, IN4, ENA and ENB on the H-bridge to pins 14, 13, 10, 11, 12 and 6 respectively on the Pi with female to female jumper cables.
3. Loosen the OUT 4 and OUT 3 screws (the two screws in the blue plastic on the right side of the board) and connect the motors power and ground wires their connectors respectively and secure them in place by tightening the screws.
4. Do the same for the second motor but with OUT 1 and OUT 2.
5. Loosen the 12V and GND screws (the two left most of the screws in the blue plastic at the bottom of the board) and connect the ground pin on the Pi to the GND connector, with a male to female jumper cable.
6. Connect the power wire from the battery pack to the 12V connector and the ground wire to the GND connector and tighten both screws. A red LED on the H-bridge should now light up.
7. Seat the four buttons into the breadboard.
8. Connect one side of each of the buttons to the power rail.
9. Connect the other side of the forwards, backwards, left and right buttons to pins 16, 1, 5, 4 respectively on the Pi with male to female jumper cables.
10. Connect the power rail to the 3.3V pin on the Pi.
11. (Optional) Attach wheels to the motors and the motors to either side of the base as well as any stabilizing wheels.

Exercises

Exercise 1: Fill out the main() method in class Controller. The purpose of this method is to check if any of the buttons are being pressed and if they are, to act on that input. This means that if the forwards button is being pressed the car should go forwards and if the right button is pressed the car should turn right etc. The car shouldn't move at all when none of the buttons are being pressed.

Notes

- Remember, Pi4J using something called WiringPi to manage GPIO pins. This means that the pin numbers do not actually correlate with what is written on the board. Use this website to convert:
<http://pi4j.com/pins/model-b-plus.html>

- Remember to comment your code.
- If your car isn't moving remember you have to set the speed of the motors.
- Have a go at adding buttons to speed up and so down the car.