

Electronic Parts

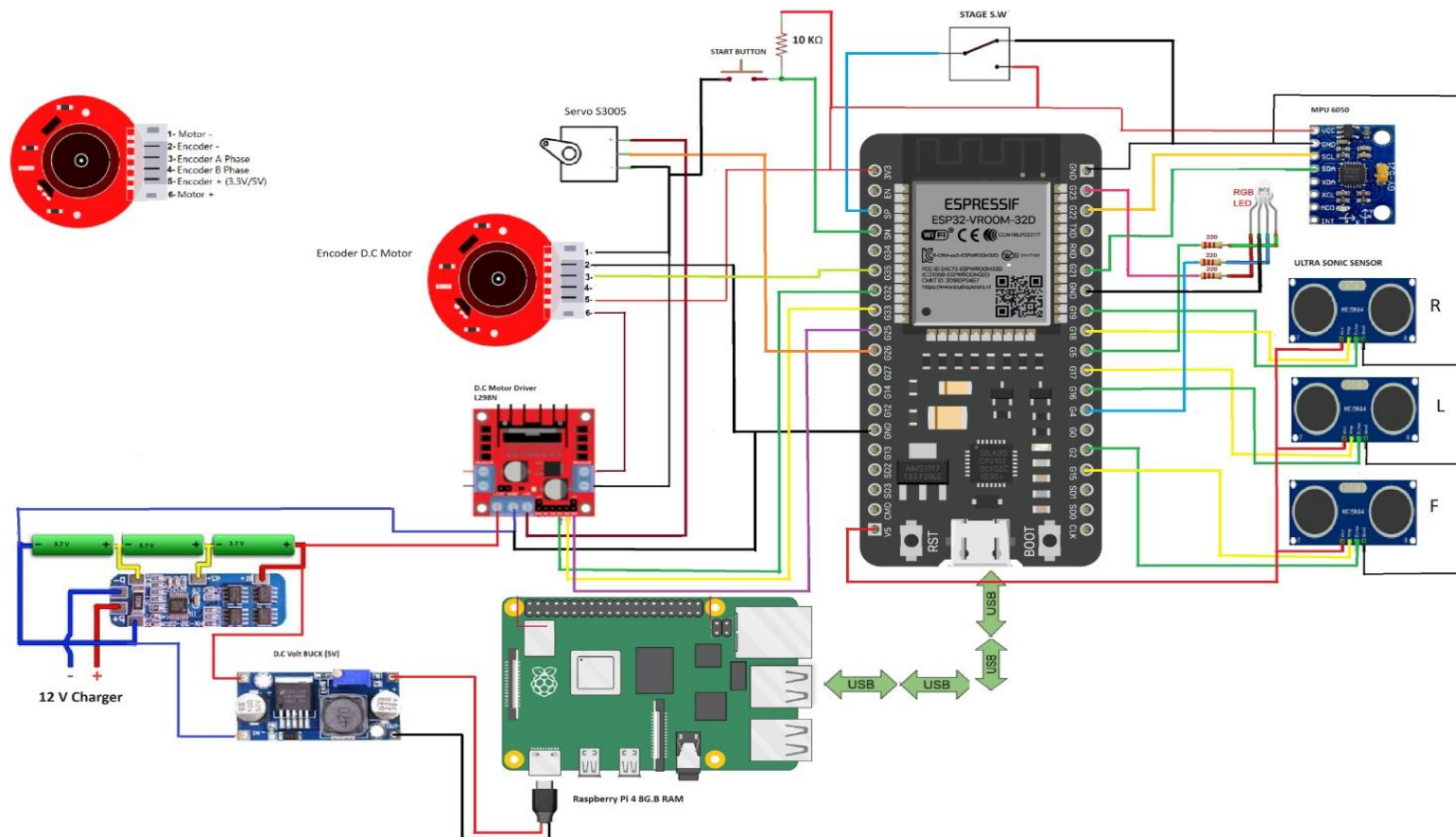
KANAAN TEAM

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Main Diagram

The electronic diagram illustrates the interconnection mechanism between the controllers and how the ESP32 controller is linked to the Ultrasonic sensors and motor driver. The motor driver is responsible for governing both the DC motor and the servo.



ESP32 DEVKIT V1

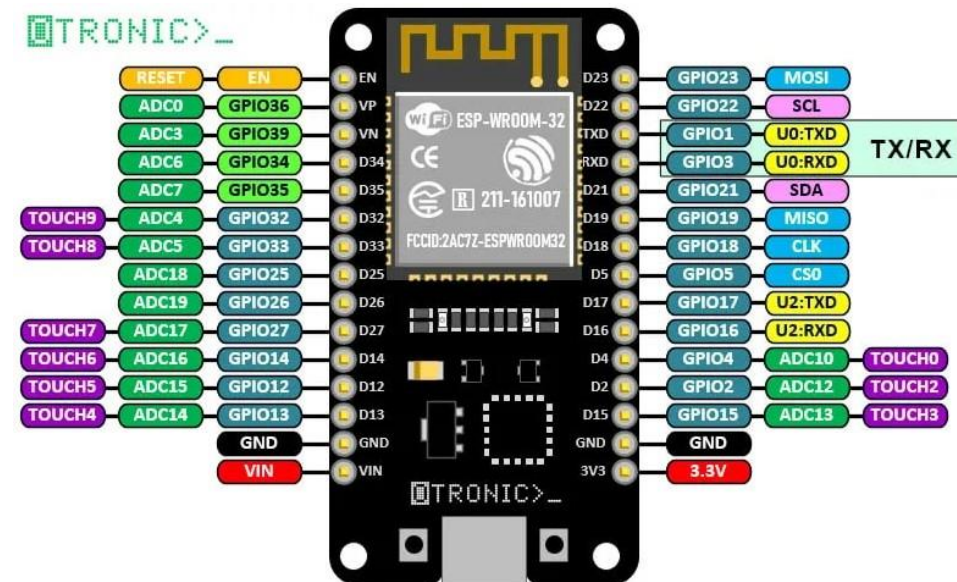
ESP32 DEVKIT V1 microcontroller assumes a central role in orchestrating various electronic components through the following processes:

Initially, it commands the servo motor and DC motor by transmitting precise directives to the motor driver.

Subsequently, it gathers distance measurements from the front, back, and side ultrasonic sensors.

Furthermore, it governs the RGB LEDs, enabling dynamic manipulation of their color output.

Lastly, it detects input from the push button to initiate the vehicle's functions. It is imperative to note that the ESP32 DEVKIT V1 has been selected over the Arduino Nano, as it provides distinct ports for each function without necessitating multiplexing. This configuration optimizes the utilization of PWM (Pulse Width Modulation) capabilities, enhancing overall efficiency. Additionally, the system monitors the switch input to facilitate seamless code adjustments.



Raspberry Pi 4

Firstly, it is utilized to program the ESP32 microcontroller. Secondly, it handles the task of reading and processing data from the camera, utilizing the Python language integrated into its operating system. Lastly, it is responsible for transmitting commands based on the camera's perception of pillars and their respective colors to the ESP32 controller.



L298N Motor Driver

The motor driver serves a dual purpose, enabling both speed control for the DC motor and facilitating forward and backward motion, while also governing the movement of the servo motor.

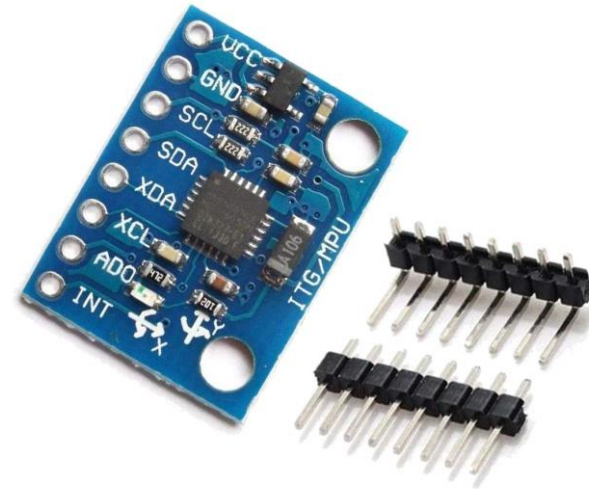


MPU6050

The MPU6050 is a popular sensor module that combines a 3-axis gyroscope and a 3-axis accelerometer into a single package. It is commonly used in projects involving motion tracking and orientation sensing. In our program, we integrated the MPU6050 to precisely calculate the rotation angles.

This sensor provides crucial data about the device's orientation and movement. The gyroscope measures angular velocity, which helps determine the rate of rotation around each axis. Meanwhile, the accelerometer measures linear acceleration, which is used to calculate the orientation of the device relative to the Earth's gravitational field.

By carefully processing the data from the MPU6050, we were able to obtain accurate and real-time information about the device's orientation in space. This information was then utilized for various purposes within our program, enhancing its functionality and enabling it to respond dynamically to changes in orientation. This capability proved particularly valuable in applications where precise orientation tracking was essential for proper operation.



Ultrasonic Sensors

A trio of sensors is employed, with one positioned at the front and two on the sides. These ultrasonic sensors play a crucial role in determining distances and the direction of the vehicle's movement, along with providing valuable insights into other pertinent aspects.



Battery

The vehicle relies on a battery to supply essential power. This battery configuration comprises three lithium batteries interconnected in series.



DC voltage Buck

The core of this circuit design lies in the incorporation of a DC voltage Buck. Specifically engineered for voltage regulation, the DC voltage Buck plays a pivotal role in mitigating the high voltage output from the 12-volt batteries. Its primary function is to efficiently step down the voltage, ensuring that the electronic components receive a stable and appropriate voltage level for optimal performance.



DC Encoder Motor

The DC motor is physically linked to the rear wheels, enabling the vehicle's motion.

The reason for using an Encoder is to monitor the motor's direction and movement, which proves instrumental in controlling the overall movement of the vehicle.



Servo Motor

The servo motor assumes the responsibility of directing the vehicle by manipulating the steering wheel.





THANK YOU

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