Project Guide: Self-Driving Car

Introduction

Welcome to the project guide for the Self-Driving Car. This guide provides instructions on how to assemble, operate, and use the included software for your project.

Essential Components

To get started with the project, you will need the following:

Raspberry Pi with Raspbian OS installed.
DC motor and servo motor.
Ultrasonic distance sensors.
Pi Camera.
OpenCV and NumPy software libraries.

Hardware Setup

Motor Connections

Connect the DC motor and servo motor to the specified GPIO pins (motor_pin1 and motor_pin2).
Adjust the position of the servo motor (servo motor) using the variables left_position and right_position.

Ultrasonic Sensors Installation

Connect the ultrasonic sensors to the appropriate ports (ECHOS).
Adjust DISTANCE_THRESHOLD according to the desired avoidance distance.

Pi Camera Installation

Connect the Pi Camera and ensure it is correctly detected by the system.
Install OpenCV and NumPy on the Raspberry Pi.

Color Sensor Installation

Connect the color sensor and adjust the appropriate parameters.

Running the Software

Controlling Motion

Operate the car using the `move_forward()` and `stop()` functions to control forward movement and stop the car.

Steering Control

Use the servo motor to control direction using the `turn_right()` and `turn_left()` functions.

Avoiding Obstacles

Program obstacle avoidance using the ultrasonic distance sensors and the `run_distance()` functions.

Color Detection

Utilize the Pi Camera to detect colors and control the car using the appropriate tools.

Project Utilization

You can customize this project for various purposes, such as autonomous driving or remote control. Explore more possibilities and expand the project to meet your needs.

Conclusion

We hope this guide has helped you kickstart your Self-Driving Car project. Enjoy developing your skills and make the most of your project.