Stages of making a CAESAR

ENG.AHMAD

HISHAM

MAJD

KANAAN Team

Introduction

WRO Future Engineers -Selft Driving car

selft driving car

When we talk about competitions that are concerned with the field of robotics, we must talk about The World Robot Olympiad (WRO) , which was launched for the youth category. China, Japan and Singapore, and these four countries are the founding countries of this Olympiad (now known as the WRO Advisory Board).

Problems

Our Competition:

We are competing in this competition in the Future Engineers category It revolves around designing a self-driving robot that can overcome the obstacles and problems it encounters in the least possible time, based on artificial intelligence and machine learning.

Contest idea:

The environment of this competition consists of a circuit surrounded by an external wall, inside which there is an internal wall. As for the competition, it consists of one stage in which the robot runs at a rate of 3 laps that it must complete in .3 minutes as a maximum

Stage 1:

Stage 2:

Hypotheses

During our work and the manufacture of the robot, we encountered many problems, and it is normal for such matters to happen in this field. They must be resolved with patience, effort, research, and the use of time to find an accurate solution.

Hypotheses and questions:

How to identify the appropriate electronics and employ them properly?

How can machine learning be employed in the work of a robot?

How can you complete the race and avoid mistakes?

How can a software algorithm be found to make the performance professional?

How to find solutions to all possible possibilities?

can the robot turn the path and overtake the obstacle under the rules it adheres to?

Methodology

The design phase of the robot was divided into 2 parts namely:

1. Hardware and 3D design

2. Software

First, the electronics were selected according to the "WRO" competition.

Secondly, we start creating 3D designs to be placed on most electronic pieces to install or otherwise.

Thirdly, we start installing the 3D designs of electronics on the robot and conducting a preliminary test for it.

Finally, we start writing the software code and employing these electronics in it.

The Electronics

Use Electronics:

- ESP32 DEVKIT V1
- Raspberry Pi 4
- L298N Motor Driver
- MPU6050
- DC voltage Buck
- DC Encoder Motor
- Servo Motor
- Battery
- Ultrasonic Distance sensor x(4)
- Wires
- Wheels

Raspberry Pi 4 Computer:

Processor: Broadcom BCM2711, quad-core Cortex A72 (ARM v8) 64-bit SoC @ 1.5GHz.

Memory: 1GB, 2GB or 4GB LPDDR4

Connectivity: 2.4 GHz and 5.0 GHz IEEE

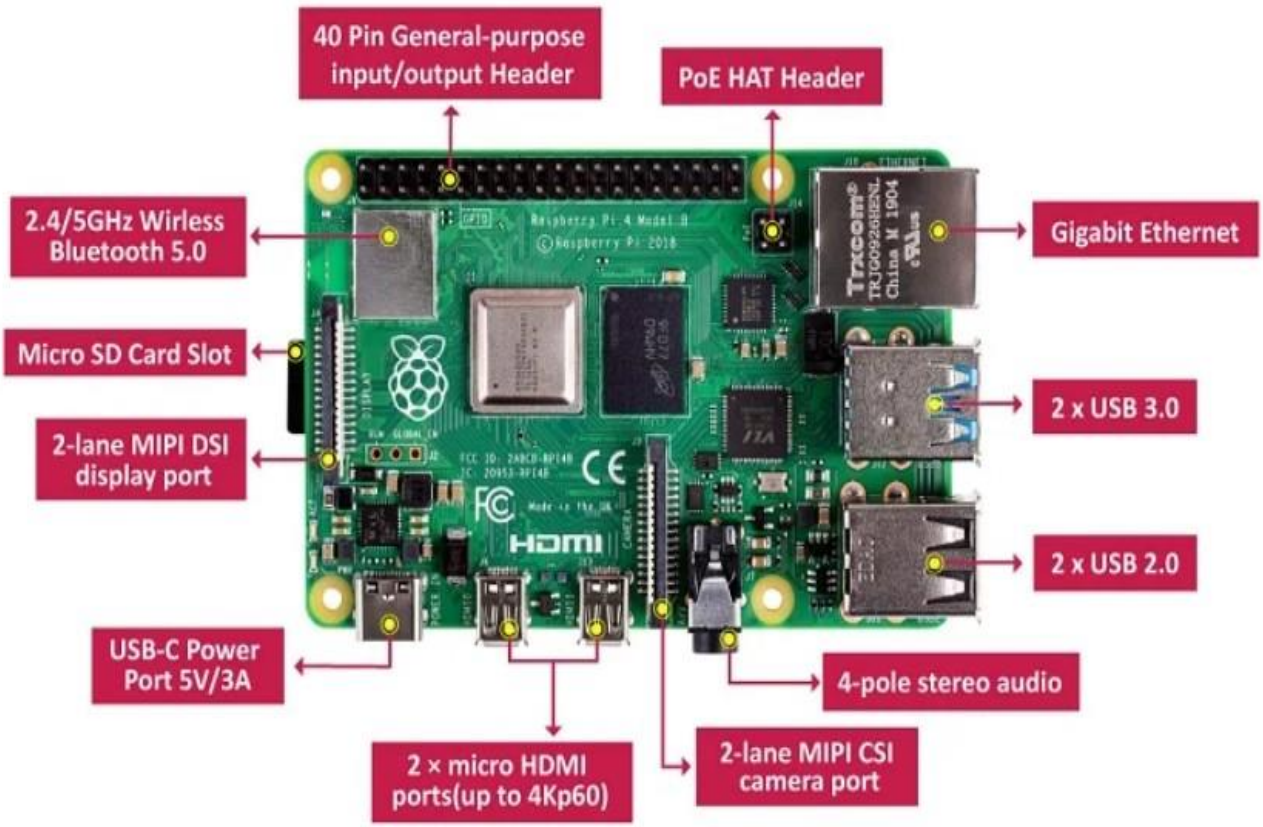
802.11b/g/n/ac wireless LAN, Gigabit Ethernet

2 × USB 3.0 ports

2 × USB 2.0 ports

GPIO: Standard 40-pin GPIO header.

Input power: 5V DC via USB-C connector (minimum3A) 5V DC via GPIO header (minimum 3A) Power over Ethernet (PoE)–enabled



ESP32 DEVKIT V1:

INPUT VOLTAGE (LIMIT): 3.3v

Microcontroller: System-on-Chip

Flash Memory: 4MB

Analog In Pin: 18

Digital I/O Pins: 28

Weight: 30g