Oreobot-Design

The name of the robot with which we, the Orion team, decided to participate is Oreobot 1.1. This is a sports car kit called OSOYO SPORT CAR V1.0 from, effectively, the brand OSOYOO. Detailed information about our robot can be found at <https://osoyoo.com/2021/04/09/sg90-servo-steering-robot-car-kit/>, which is the official website of the producing company. Here you can find all the components and tutorials on how to assemble it.

You may wonder why it is version 1.1. We simply decided to call it this way because it is an appropriate name for the robot after making some changes to its structure to avoid unnecessary damage to the tracking sensors of our robot while we were practicing with it. However, we decided to leave the pillars supporting the previously mentioned sensor so that the robot's wheels would not be damaged in case of encountering an obstacle lower than the robot's upper acrylic plate. Also, the HC module and the ESP8266 Wi-Fi Shield weren’t used as one works with Bluetooth connection and the other one with Wi-Fi connection, but the competition demands the robot to be completely autonomous. Unfortunately, being a "ready to use" robot, it has fixed specifications, and it becomes complicated to play with the components while we also had the time factor against us, but now that the code is a little more ready, we can focus on further optimizing the design of it.

Now, let's go to what we came for, the materials and structure of the robot.

On the components side, they are the following:

* OSOYOO Basic Board fir Arduino
* OSOYOO MOTOR Shield V1.1
* MG90S Servo Motor
* Voltage Meter
* Tracking Sensor (which was the part we removed from the robot, but was part from the kit)
* Ultrasonic Sensor
* Servo Motor
* Mount Holder for Ultrasonic Sensor
* ESP8266 Wi-Fi Shield (Which wasn’t used for the same reasons as the HC module
* HC module (which we didn’t use as it would be against the rules to use Bluetooth connection during the trials)
* Car Chassis
* Motor with wires
* 4 Wheels
* 9V Battery box
* 9V Rechargeable battery
* Phillips Screwdriver
* Hex Screwdriver
* L type Wrench
* 20pin 15cm Female to Female Cable
* 7pin 25cm Female to Female Cable
* 3pin 15cm Female to Female Cable
* 2 Steering Cups

Those are all the components involved in the construction of the robot, and of course, there is also a guide online that shows the step-by-step process of the assembly of the robot. Here is the link: <https://www.youtube.com/watch?v=-bi1iFsd1q4>. Of course, there are way more elements involved in the construction of the robot, such as the nuts, screws, and iron bars that in the end helps to join the “joints” of our robot.

Now let’s go over the use of the parts of our robot:

To begin with, both chassis are going to be the base of the robot, and everything we build on it will be directly involved in the performance of the robot,

The OSOYOO board is the one used to directly connect the robot’s board with our Arduino IDE and program it, while the OSOYOO motor is the one in charge of sending the electrical impulses that necessary for the motor to function.

Then we have de MG90S Servo Motor, which is attached to an iron bar that connects the frontal wheels which were also attached to a steering cup and a small acrylic plate that joined the entire turning system. The function of this motor is to rotate the robots to different directions to avoid obstacles and move freely. On the other hand, the rear wheels are fixed and are attached to the motor which wires which is the one in charge of moving the entire robot. In our case, we tried to look for a substitute for this motor as we wanted something with more power, however, due to the specific measurements of the kit it had been hard to find a good replacement.

The power source of the robot is a 9V lithium rechargeable battery that is attached to its respective battery box. A troublesome issue with this is that the battery constantly discharges and leaves the motor with less power, which then influences negatively in the movement of the robot as turns become rougher. For this reason, we decided to look in internet for another set of rechargeable batteries, but for the moment, we will use normal 9V batteries in case of any power emergency. The only problem with this alternative is that those 9V batteries run out of energy extremely fast due to the amount of power the robot’s system demands.

For the Servo Motor, its use was to join the ultrasonic sensor, which was covered by the mount holder for ultrasonic sensors. The reason why we wanted it to turn was for the robot to move its “head” or ultrasonic sensor to identify the objects it has at its front and sides.

This would be the overall structure of our robot, however throughout the process of the competition we will be making observations on our robot and do the hardware chances necessary for its success.

Here are some pictures of our robot and team:

