

# **WALL FOLLOWER ROBOT**

**by**

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## **ABSTRACT**

In this project, our objective was making a robot which can finish the path avoiding from walls and make convenient commands according to colors. Firstly, we had many research about the robots, sensors and arduino and we learnt how to use and combine them. Then, we determine a methodology. Firstly, our robot had to identify colors and measure the distance from walls. Afterwards, we made the robot and began the tests. We used Arduino desktop application. In the beginning, we had many problems with coding arduino. We solve all problems step by step with research. As a result, we got a lot of information about making robots and coding arduino.

*Keywords:* Wall, Color, Distance, Arduino, Robot, Path, Sensor, Coding

# **1. INTRODUCTION**

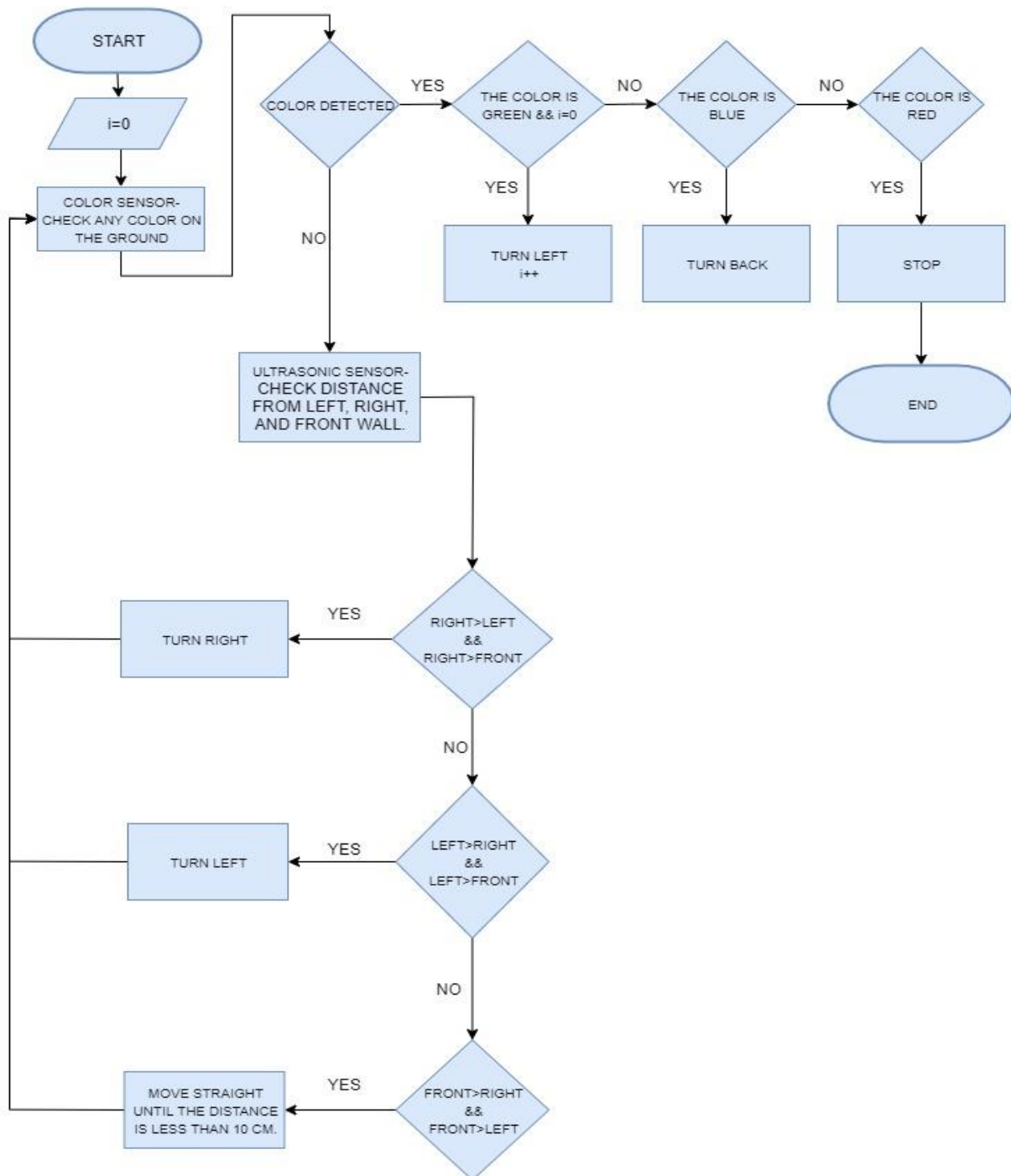
The main objective of our project is accomplish the selected path without any mistakes and as fast as possible. In daily life, people can use our project in modern industry for carrying or transfer something to anywhere.

## **2. COMPONENT LIST**

1. Arduino Uno R3: This component is the brain of our robot.
2. 9V Battery: We use this power supply for Arduino.
3. 12V Lithium Ion Batteries: We use this component for provide power.
4. Robot Chassis: We use this piece for keep components together.
5. 6V 250 RPM DC Motor x 4: We use it for convert the energy to power.
6. L298N Motor Driver Card: We use this component for conduct the motors separately and properly.
7. HC-SR04 Ultrasonic Distance Sensor: We use this component for get distance from obstacles and avoid them.
8. SG90 RC Mini Servo Motor: We use this component with distance sensor in a harmony for obtain accurate input.
9. TCS3200 Color Sensor: We use this component for identify the main three color Red Green and Blue.
10. 0.96 inch Oled Arduino Tft Lcd Display: We use this component to display some specific values. For example elapsed time from the starting point to finishing point.

### 3. METHODOLOGY

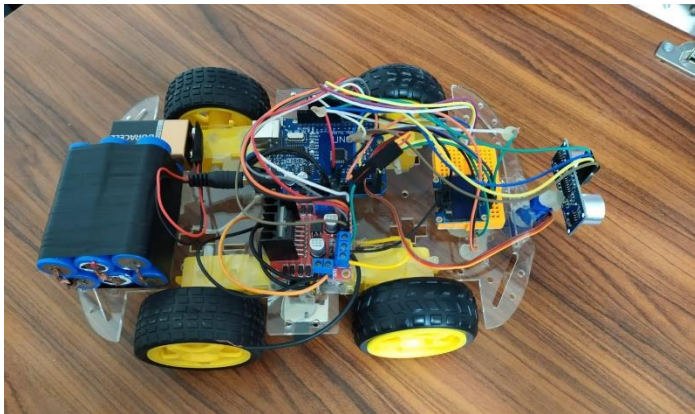
Our methodology begins with color sensor action. If there is not a color which is assigned a specific command, distance sensor get involved. Then, our robot chooses longest direction according to measurements of distance sensor and moves along the way. Until, color sensor identifies a specific color. There are three specific colors and their assignments. These are red, green and blue. When the color sensor sees red area, the robot stops. When the color sensor sees green area once, the robot turns left. At the second encounter with the color sensor and green area, the robot ignores the command and goes along the way. When the color sensor sees blue area, the robot turns back.



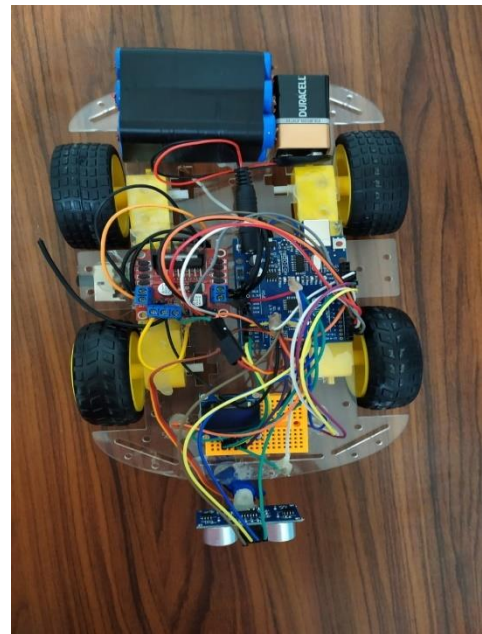
*Figure 1. Flowchart*

## 4. EXPERIMENTAL RESULTS

The robot that have more than one component must be made step by step. Within this project, working principle of each component must be learnt. Afterward, the program which is belong to component must be written and examined carefully for each component. In this project, we had research ultrasonic distance sensor, color sensor, motor driver card and servo motor then we examined all these components. End of examination phase, these components combined on the robot chassis by us. Besides, instructions of robot are sorted according to order of precedence. Algorithm of the robot generated temper to order of precedence. To sum up, intended results are achieved with tested basic instructions of robot on the project path. There are few problems that we encountered. Firstly, power supply. At the beginning our batteries running out quickly. Then, we used li-ion battery extra. 9V one for Arduino and 12V one for motor driver card. The other problem is could not get efficiency from used sensor. When we encountered with this problem, at the beginning we thought it is a kind of software problem. But we could not solve it, so we decided to change the sensor because that was a cheap sensor.



*Figure 2. Top View 1*



*Figure 3. Top View 2*

## 5. CONCLUSION

We have learnt a lot of things about coding arduino and combining many components for proper working project. There were a few components which is suitable for our project. We preferred the more appropriate and allowed ones. In our opinion, there are one aspects of our project that can be improved. That is power supply. It could be more economical. For instance solar power supply could be chosen.