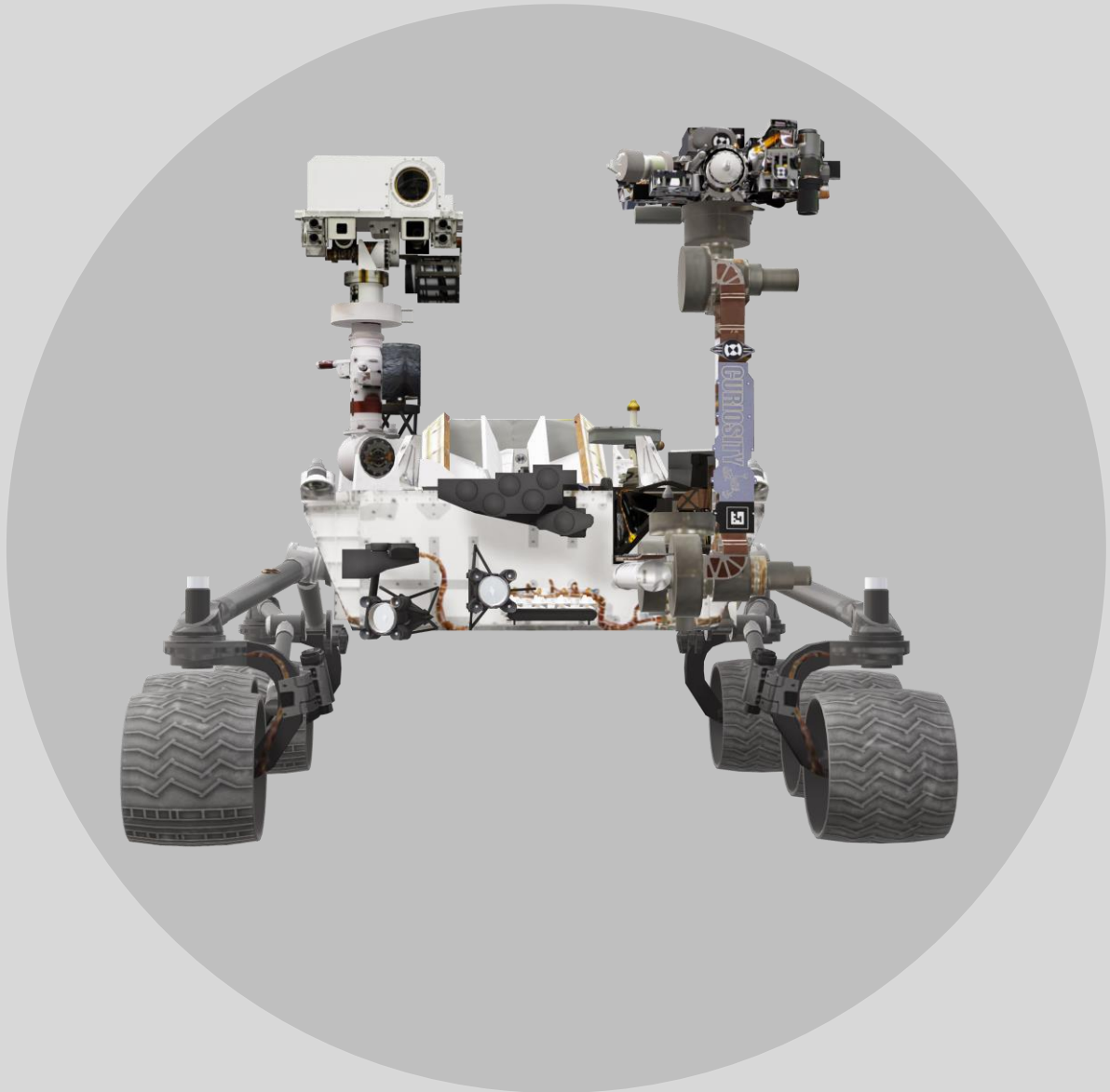


Team Alfred

OBSTACLES AVOIDING LINE FOLLOWING ROBOT



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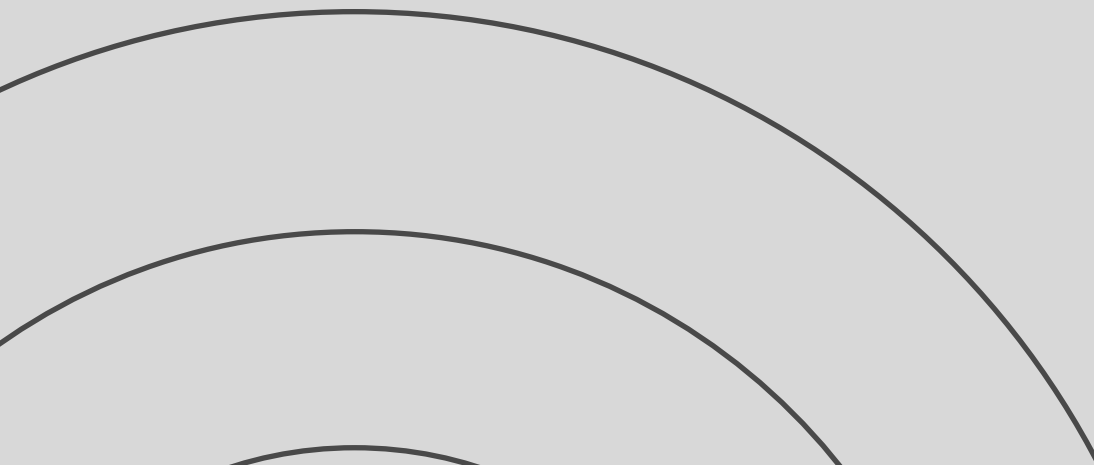
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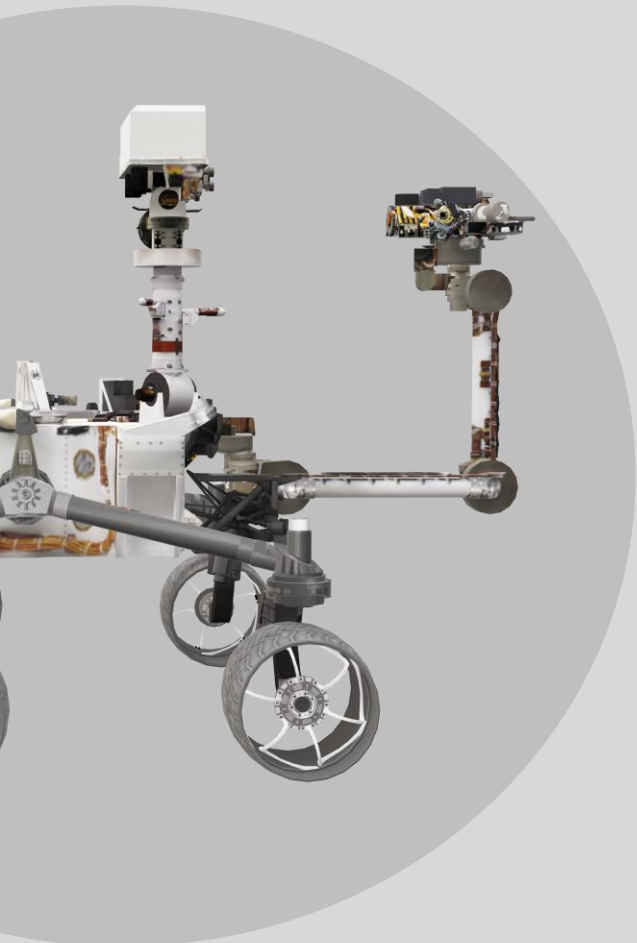
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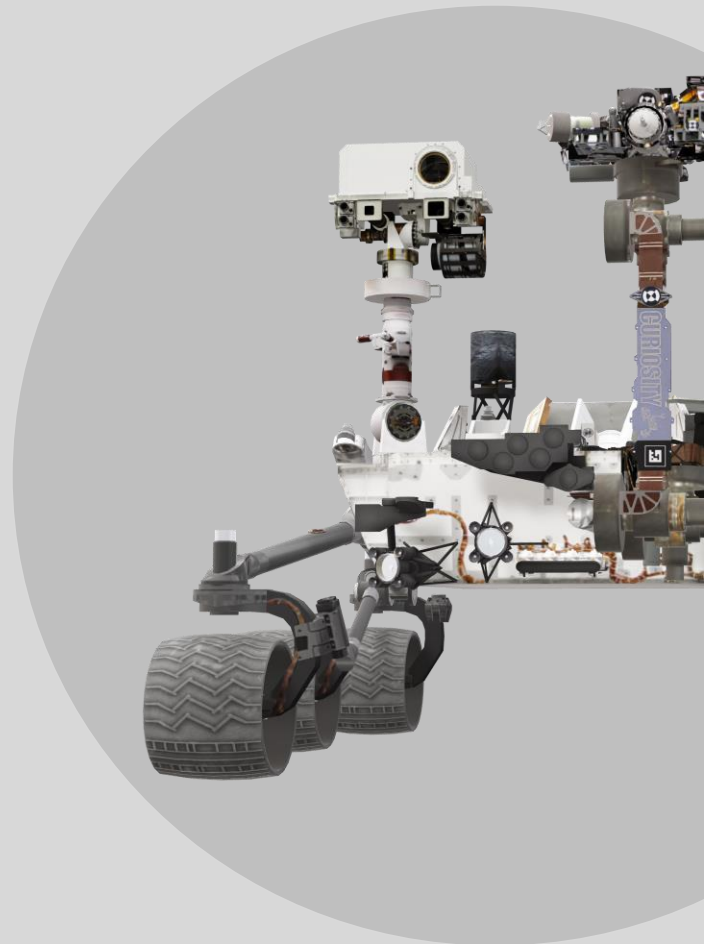
Introduction

Our target is to design a robot that comes in its path and can avoid obstacles. The Line following robot can follow its own line. This robot is introduced because in many of the industries we have seen that many heavy components which they have to move from one place to another place which is not possible without the help of machines. With this, we got an idea and we design the robot named “Line Following and Obstacles avoiding robot” because this robot can allow robots to navigate in unknown environments by avoiding collisions also. And it is one of the most important aspects of mobile robotics. This robot senses obstacles in the path avoid them and resumes its running. We have made use of sensors to achieve this objective. This robot can listen to a command received by the serial to start or stop the route. Obstacle avoiding and line-following robots can be used in mobile robot navigation systems, can be used for household work like automatic vacuum cleaning, and can be used in dangerous environments, where human penetration could be fatal. The reason for using BO motors consumes less power supply and can work properly on a 9-volt battery. The construction of the robot circuit is easy and small. The main component behind this robot is the Arduino Uno microcontroller, which is the brain of this robot. The best part of our project is that if any obstacle is encountered by the robot.



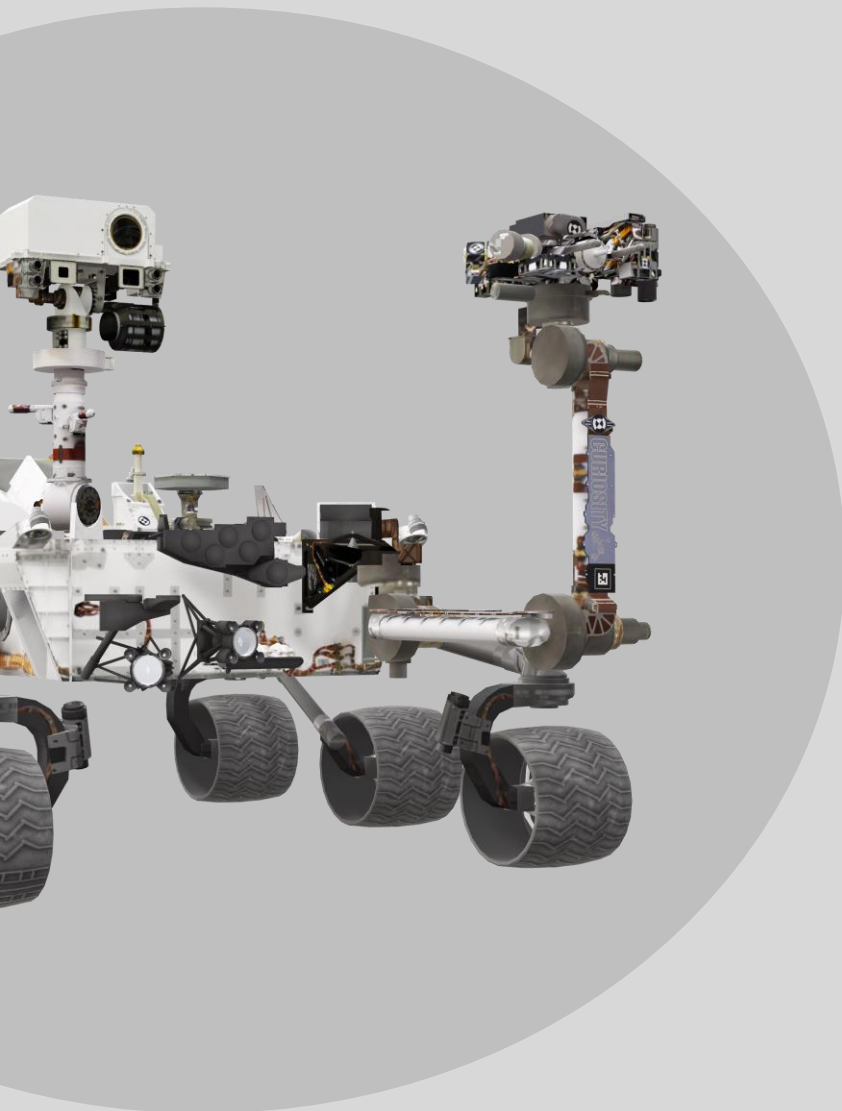
Goal

- The Obstacle avoiding line following robot is currently in great demand in the global market and if this design is further developed, a large investment can be made and by developing this design at a high cost, a higher price can be obtained in the market.
- This robot can be pointed out as a design that is very helpful for hospital systems, restaurants, shops and many more work places. It is our hope to improve our design and make it more familiar to the public.
- Basically, this is a project for our Technology Challenge Module and therefore our main goal is to get a good grade by activating this robot and we hope to make the most of this robot to get the attention of the outside world.



OBJECTIVES

- The world today is in a situation where doctors are afraid to even go near patients because of the corona epidemic.
- And with the advancement of technology, the assistance of robots is now widely used.
- Therefore, our main objective is to introduce this product to the global market as a timely and successful solution to adapt to the epidemic situation as well as global technological advances.



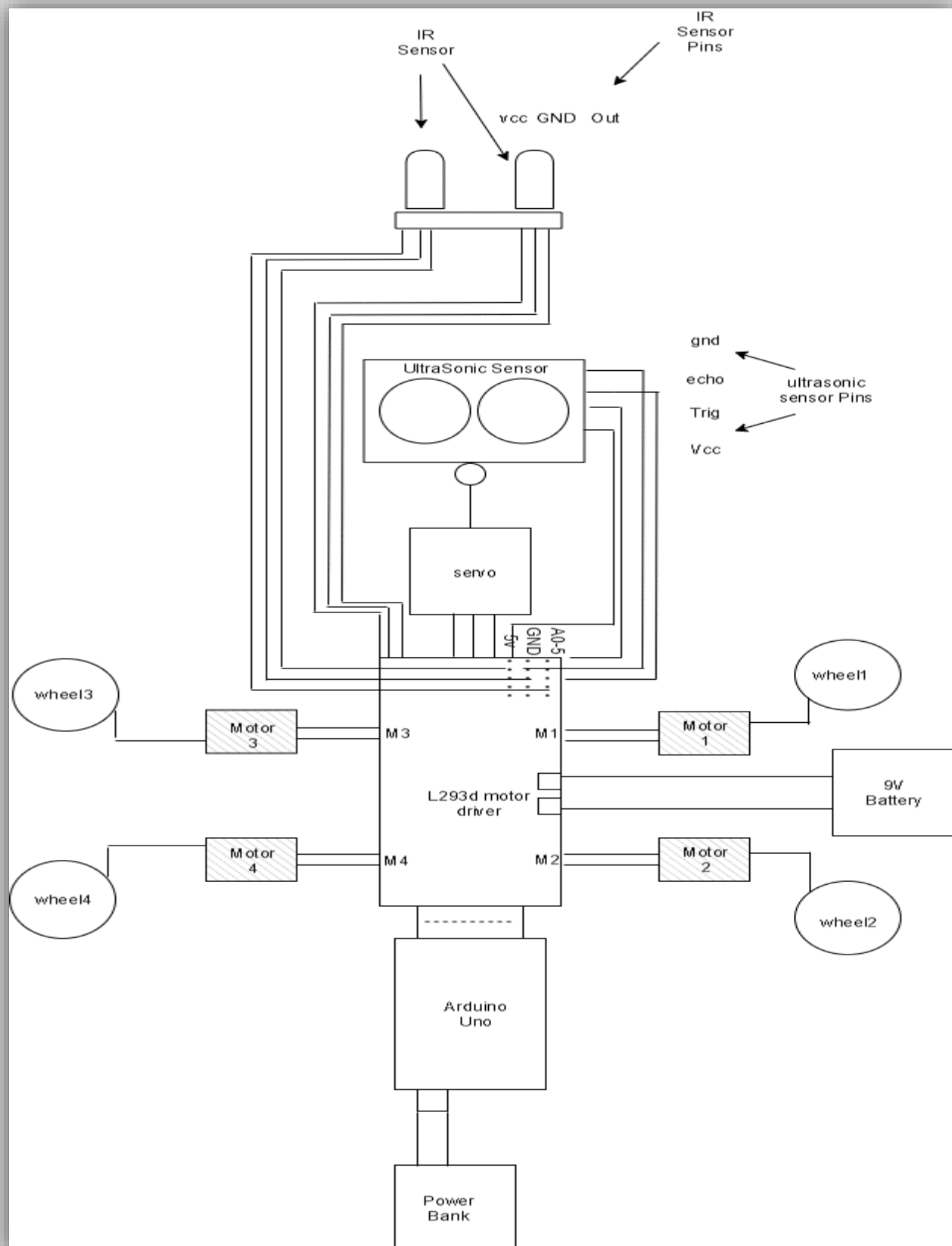
Methodology

Basically, we are planning to use Arduino Programming Language is based on a very simple hardware programming language that is similar to the C Language.

We hope to use Arduino IDE to run this program. To control the robot, we hope to use IoT (Internet of things) technology.

- When creating our project mainly Obstacle avoidance and line following Robot is designed in order to navigate the robot in an unknown environment by avoiding collisions. Obstacle avoiding line following robot senses obstacles in the path, avoid it and resumes its running. There are some very popular methods for robot navigation but here we hope to use the line following. We are using IR sensors to detect the line and moving forward through the line. In this system, steering algorithm ensures that the robot does not have to stop in front of an obstacle during its navigation. The sonar system is used in HC-SR04/HCSR04 ultrasonic sensor to determine the distance to an object like bats do and it offers excellent non-contact range detection from about 2 cm to 400 cm or 1 foot to 13 feet. The ultrasonic sensor emits short and high-frequency signals. If they detect any object, then they reflect back echo signal. It is taken as input to the sensor through the Echo pin. When an obstacle is detected while the robot going through in the direction Echo pin will give input as high to the microcontroller. And we have to calculate the time of distance from obstacles. After determining the time, it converts into a distance. If the distance of the object is short, then the speed of the robot gets reduced and will turn in a backward direction and then can go in the left or right direction. The movement of the robot will be stopped whenever there is an obstacle is present on its path which can be detected by ultrasonic sensors. Ultrasonic sensors give time in length to the microcontroller.

Block diagram of the project



Expecting tools and technologies

TOOLS

- Multimeter
- glue gun
- Electronic Bouth soldering
- Basic Electronic Tool Kit
- Laptop

Technology

- IOT
- Arduino

New areas for studies

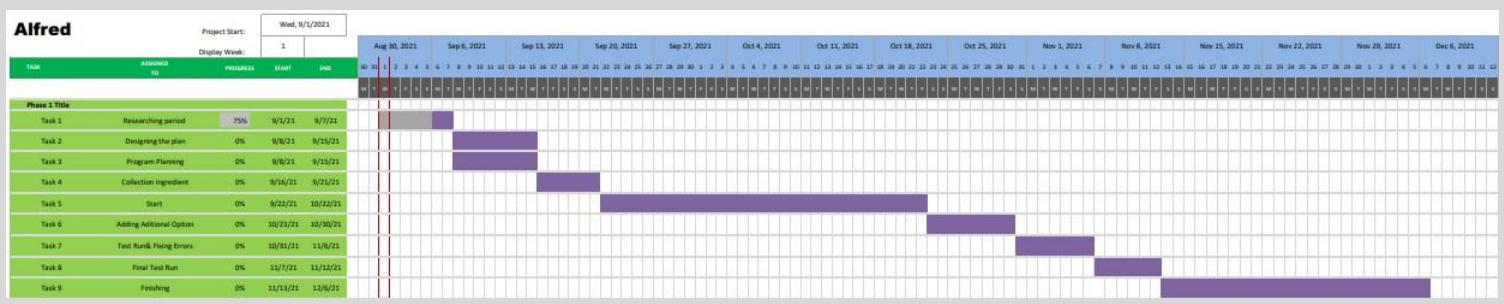
- The aspect of this project is to gain knowledge about the Arduino language and we are hoping to use study about Arduino language more deeply in future.

Budget Plan

Product	Quantity	Price
Arduino UNO R3 ATMEGA328P ATMEGA16U2 with cable.	01	Rs.1,740.00
L293D Motor Driver/Servo shield	01	Rs.380.00
Micro servo SG90G Servo Motor	01	Rs.290.00
40x1 Male Header SIL	01	Rs.20.00
4WD Smart Robot Car Chassis kit	01	Rs.1,490.00
Male to Male 10cm Jumper Wire	40	Rs.140.00
Male to Female 10cm Jumper Wire	40	Rs.140.00
Female to Female 10cm Jumper Wire	30	Rs.105.00
HCSR04 Ultrasonic Sensor	01	Rs.180.00
HC-SR05 Ultrasonic Sensor Bracket	01	Rs.80.00
Mini Rocket Switch (ON/OFF)	01	Rs.15.00
IR Sensor	02	Rs.714.00
9v Rechargeable Battery	01	RS.1000.00
SUBTOTAL:		Rs.6,294.00
SHIPPING:		Rs.280.00
PAYMENT METHOD:		BANK TRANSFER
TOTAL:		<u>6,574.00</u>

Time Allocation

Phase 1 Title				
Task 1	Researching period	75%	9/1/21	9/7/21
Task 2	Designing the plan	0%	9/8/21	9/15/21
Task 3	Program Planning	0%	9/8/21	9/15/21
Task 4	Collection Ingredient	0%	9/16/21	9/21/21
Task 5	Start	0%	9/22/21	10/22/21
Task 6	Adding Additional Option	0%	10/23/21	10/30/21
Task 7	Test Run& Fixing Errors	0%	10/31/21	11/6/21
Task 8	Final Test Run	0%	11/7/21	11/12/21
Task 9	Finishing	0%	11/13/21	12/6/21



Conclusion

This project developed an obstacle avoiding robot to detect and avoid obstacles in its path. The robot is built on the Arduino platform for data processing and Arduino IDE software counterpart helped to communicate with the robot to send parameters for guiding movement. And we hope to use Arduino programming language (which is similar to C) to run the program. For obstacle detection, one ultrasonic distance sensors were used that provided a wider field of detection. The robot is fully autonomous and after the initial loading of the code, it requires no user intervention during its operation. When placed in unknown environment with obstacles, it moved while avoiding all obstacles with considerable accuracy. In order to optimize the movement of the robot, we have many considerations for improvement. However, most of these ideas will cost more money and time as well. But we hope to use modern technologies we and tools to develop this product with the minimum budget allocation. IOT and embedded system are the main technologies we are going to use. This project will give so much of benefits to the industry and world as well. And this can be used as household work and so many other indoor applications.

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Thank You