MEDICARE ROBOT (MBOT)

PREPARED BY:-

MINAL PANDEY (2020BTechCSE048)

MRIDUL GOYAL (2020BTechCSE051)

MOHAMMAD ASAD (2020BTechCSE050)

MITAPALLY SAI CHARAN (2020BTechCSE091)

MRIDUL GUPTA (2020BTechCSE052)

FACULTY GUIDES *:-*

Prof. TANMOY DEBOY

Prof. BHARGAV PRAJWAL

Prof. RAJLAKSHMI NAYAK

Institute of Engineering and Technology (IET)

JK Lakshmipat University

FEBUARY 2021

CERTIFICATE

This is to certify that the project work entitled “Medicare Robot” submitted by Minal Pandey (2020BTechCSE048), Mridul Goyal (2020BTechCSE051), Mohammad Asad (2020BTechCSE050), Mittapally Sai Charan (2020BTechCSE091) and Mridul Gupta (2020BTechCSE052), towards the partial fulfillment of the requirements for the degree of Bachelor of Technology in Engineering of JK Lakshmipat University Jaipur is the record of work carried out by them under my supervision and guidance. In my opinion, the submitted work has reached a level required for being accepted.

Dr. Bhargav Prjawal
Assistant Professor
Department of Mechanical Engineering
Institute of Engineering & Technology (IET)
JK Lakshmipat University Jaipur

Dr. Tanmoy Kumar Deb
Assistant Professor
Department of Civil Engineering
Institute of Engineering & Technology (IET)
JK Lakshmipat University Jaipur

Date of Submission: 15/02/2021

ACKNOWLEDGEMENTS :-

We are very thankful to our teachers Bhargav Prajwal sir, Rajlaxmi Nayak Ma'am, Tanmoy kumar Deb sir, Dhruv Saxena sir and all the people who contributed in successfully completion of this report.

Sincerely yours :-

MINAL PANDEY (2020BTechCSE048)

MRIDUL GOYAL (2020BTechCSE051)

MOHAMMAD ASAD (2020BTechCSE050)

MITAPALLY SAI CHARAN (2020BTechCSE091)

MRIDUL GUPTA (2020BTechCSE052)

OBJECTIVE

- To help frontline COVID-19 Warriors (Doctor, Nurses and other healthcare workers).
- To deliver food and medicine to Corona affected patients.
- To provide video calling facilities to the healthcare workers so that they can easily communicate with the COVID affected patients without being exposed to corona virus.

TABLE OF CONTENTS :-

Contents

INTRODUCTION :-

The COVID-19 pandemic, also known as the coronavirus pandemic, is an ongoing pandemic of coronavirus disease 2019 caused by severe acute respiratory syndrome coronavirus. Doctors and health care workers are working hard to cure the affected patient. So after seeing that doctors, nurses and other healthcare workers are getting infected due to Corona Positive patients while treating them. Our group M6 come up with an idea of robot name “Medicare Robot” (MBOT).

Medicare Robot or MBOT is a robot which can distribute food and medicine to corona patient inside a COVID ward. This robot can help frontline COVID -19 warriors like doctors, nurses and other health care staff to avoid direct contact with patient and being exposed to the virus.

The robot can connects to a smart phone so that doctors and other staff members can easily video chat with a patient through a camera fixed on the top of the robot, in order to monitor their health. All the electronics will be contained in the base so that other things can be carried as well. It will also provide with the feature of touchless hand sanitizer, so that they can sanitize themselves before collecting anything. Hospital can be divided in GREEN ZONE (for doctors, other staff and Non-COVID positive people) and RED ZONE (for corona patient). Because of this robot doctors and health staff can concentrate on caring of patient, rather than worrying about missing medicine and supplies.

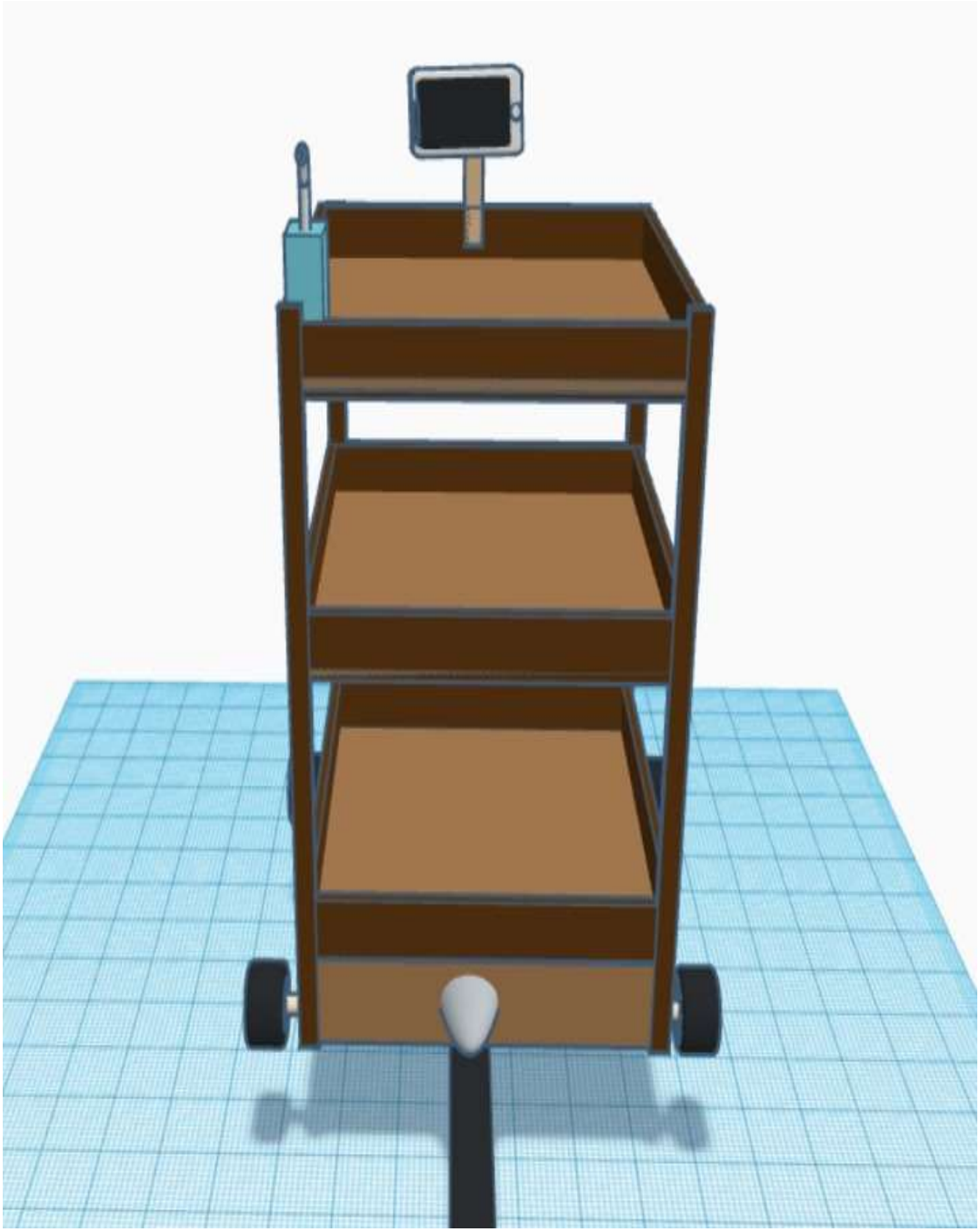


Fig 1 :- this is the 3d diagram of our “medicare robot” (MBOT).

METHODOLOGY: -

At first we all think that what we make in our project so that it helps the peoples who are suffering from this coronavirus pandemic. Then we discuss about our target users who are doctors, nurses, patients and other healthcare workers. Then we all come up with our initial ideas and these are as follows: -

Idea of Mohammad Asad: -

He had a idea of a device attached in the hand of a patient if he want anything patient have to move his hand. The device send call message to doctor or patient.

Idea of Minal Pandey: -

She had a idea of door guard. It is a type of a door which detects the temperature of any person who is entering in any room. If the person entering the room have the symptoms of coronavirus like high temperature then door will click the photograph of that person and siren rings so that he or she will stop entering that room.

Idea of Mridul Goyal: -

He had a idea of making a robot type structure which helps in delivering food, medicines etc. to coronavirus affected patients inside a COVID ward. So the doctors and nurses don't go in that ward again and again.

Now after this we all have a discussion on our ideas that which idea is better for helping our targeted peoples and also that which one have an animation, after a long discussion and research on our ideas, we finalized Mridul Goyal's idea of making a such type of robot that helps our targeted peoples. Later on, we also did some small modification his idea. After finalizing our idea we started working on that, and we firstly decide the name of our group which is M6 and name of our robot that is "MEDICARE ROBOT" (M-BOT) and then we thinked about how to make it . We started discussing about materials which we need to make our robot like motors, batteries, body of our M-BOT, etc. We started searching our materials on online websites like amazon, flipkart and also the prices of our robot. Our group leader distributed the work to all the group members and all the group members actively done their work. Then we made our.

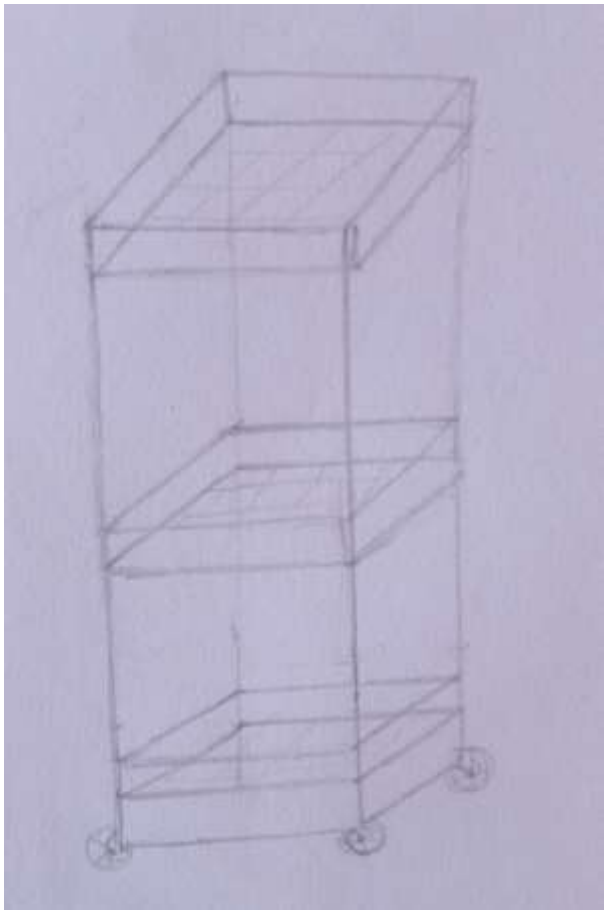


Figure (2).first sketch of M-BOT

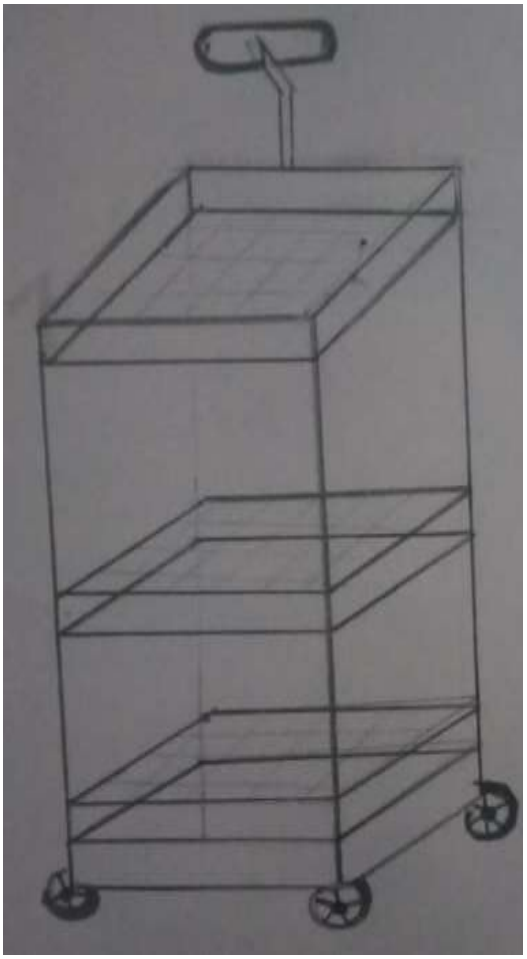


Figure.(3)

Then we try to modify our idea and sketch and our final sketch is this.

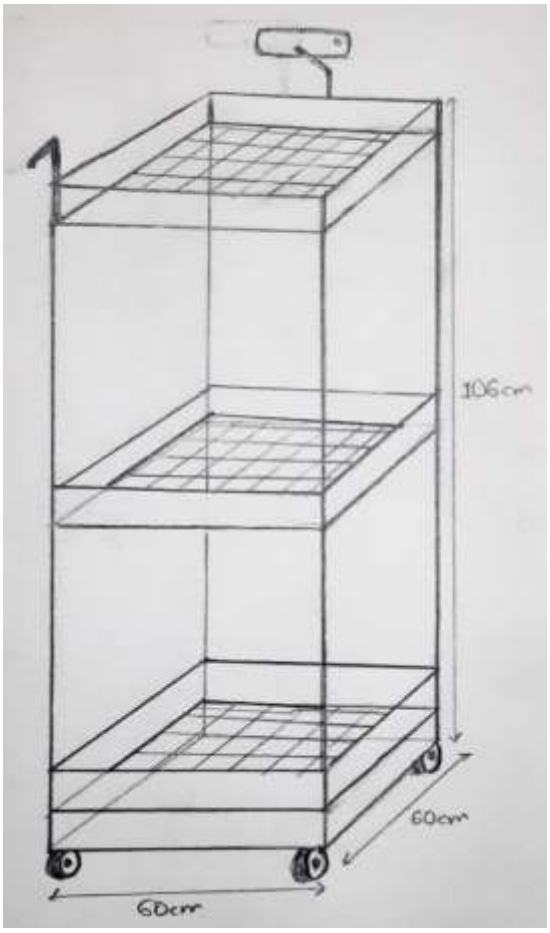


Figure.(4)

and after making final sketch of our mbot we made orthographic projection looks like this

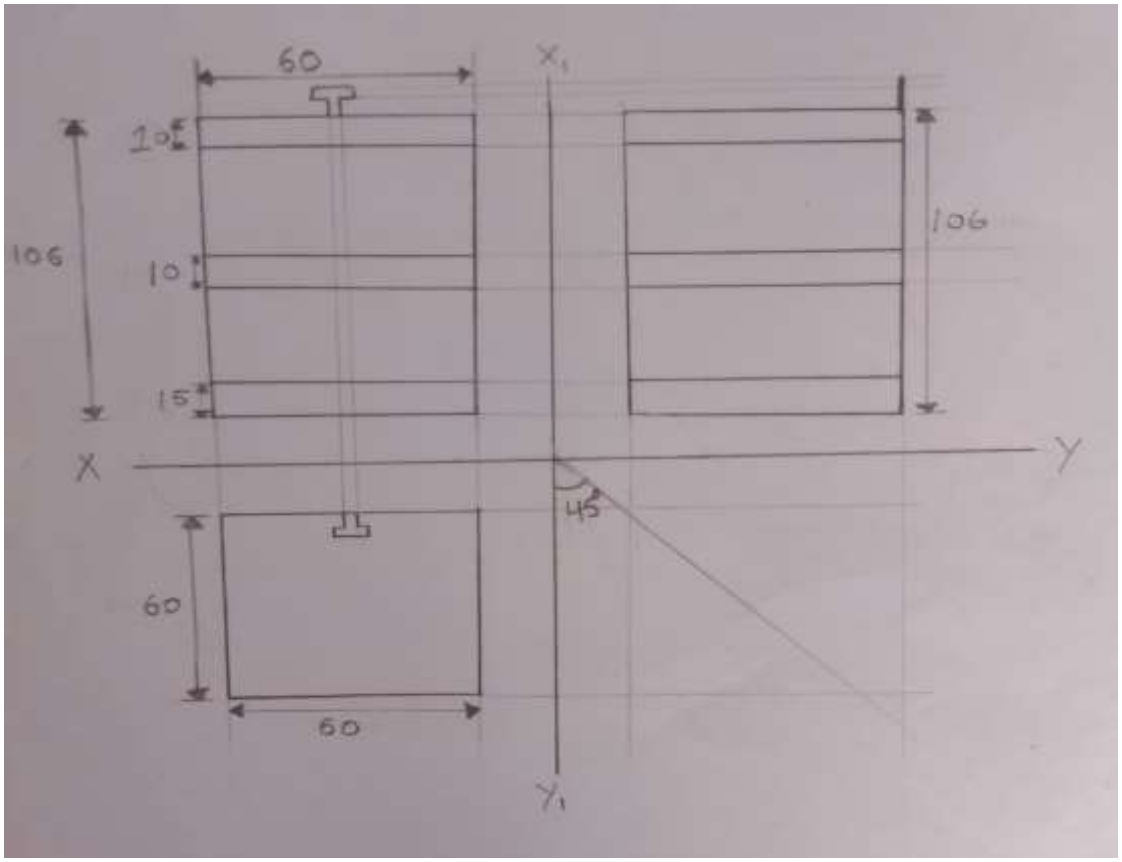


Figure.5

Now after all this we found some materials which we are going to use in our robot and these are as follows:

Figure. 6 ARDUINO UNO

Figure.7 IR SENSOR & FEMALE JUMPER WIRE

Figure.8 MOTOR

Figure.9 WHEELS

Figure.10 WIRES

Figure.11 DC POWER SWITCH

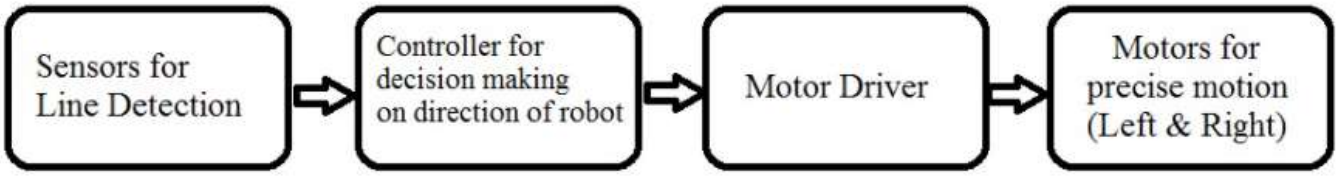
Figure.12 SMARTPHONE

Line Following Method: -

Line following method can defined as, a robot which follows a particular path or trajectory and decides its own course of action which interact with obstacle. The path can be black line on the white floor. The workings of the line follower robot is pretty straightforward. This robots will have the capability to detect a black or dark line on a lighter surface depending on the contrast. It will use an array of IR (infrared) sensors in order to calculate the reflectance of the surface beneath them. For this method we are using the line following

sensor is an add-on for our Robot that gives our robot the ability to detect lines or nearby objects. The sensor works by detecting reflected light coming from its own infrared LED.

Block Level Diagram :-



Block Diagram for Line Follower Robot

Description of Components-

DC Motors (Geared Motors):-

We have used four geared motors in the of the line follower robot. These motors provide more torque than normal motors and can be used for carrying some load as well.

Arduino UNO: -

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

Sensors:-

Sensors are required to detect position of the line to be followed with respect to the robot's position. Most widely used sensors for the line follower robot are PHOTOSENSERS. They are based on the basic observation that "The white surface reflects the light and the black surface absorbs it".

Photosensors

IR or VISIBLE light is emitted from the emitter (IR light is mostly preferred to avoid interference from the visible light which is generally around the robot. However IR light is also present in atmosphere but its intensity is much less than that of visible light, so IR light can give much reliable output. For better accuracy of the sensors, they must be covered properly for the isolation from the surrounding.)

This emitted light strikes the surface and gets reflected back. If the surface is white, more intensity of light gets reflected and for black surface very less intensity of light is reflected.

Photo detector is used to detect the intensity of light reflected. The corresponding analog voltage is induced based on the intensity of reflected light. This voltage is compared with the fixed reference voltage in comparator circuit and hence it is converted into logic 0 or logic 1 which can be used by the controller.

Motor Driver (Controller) :-

It is the most important part of the line follower robot. It reads the sensor's output and based on it, drives the motor's motion.

Li – ion Batter

A Lithium Ion (Li-Ion) battery is a rechargeable battery with twice the energy capacity of a Nickel-Cadmium battery and greater stability and safety. LiIon batteries use a liquid lithium-based material for one of their electrodes.

Working of Arduino Line Follower Robot

In this project, we have designed an Arduino based Line Follower Robot. The working of the project is pretty simple, it detect the black line on the surface and move along that line. The detailed working is explained here.

As mentioned in the block diagram, we need sensors to detect the line. For line detection logic, we used two IR Sensors, which consists of IR LED and Photodiode. They are placed in a reflective way i.e. side – by – side so that whenever they come in to proximity of a reflective surface, the light emitted by IR LED will be detected by Photo diode.

The following image shows the working of a typical IR Sensor (IR LED – Photodiode pair) in front of a light coloured surface and a black surface. As the reflectance of the light coloured surface is high, the infrared light emitted by IR LED will be maximum reflected and will be detected by the Photodiode.

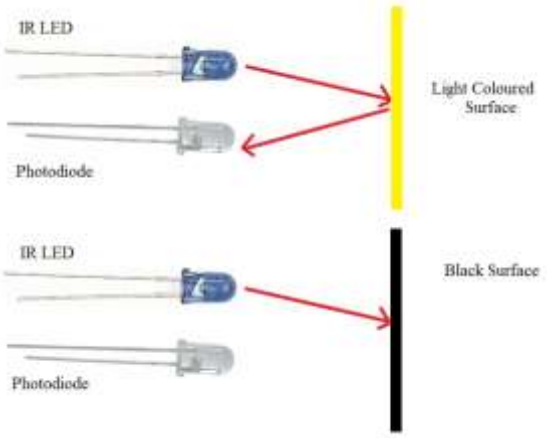


Figure. 13

In case of black surface, which has a low reflectance, the light gets completely absorbed by the black surface and doesn't reach the photodiode.

Using the same principle, we will setup the IR Sensors on the Line Follower Robot such that the two IR Sensors are on the either side of the black line on the floor. The setup is shown below.

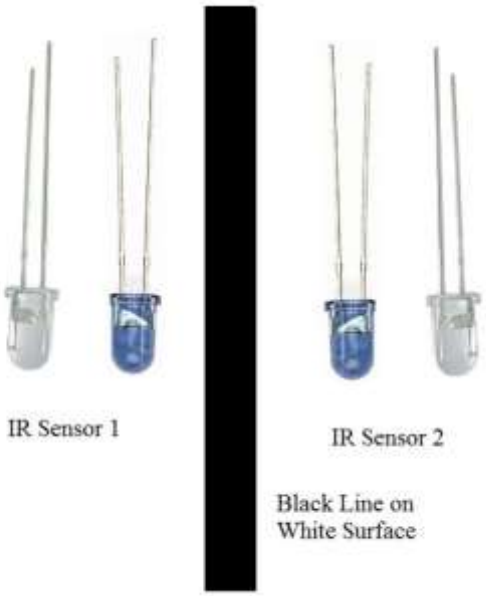


Figure 14

When the robot moves forward, both the sensors wait for the line to be detected. For example, if the IR Sensor 1 in the above image detects the black line, it means that there is a right curve (or turn) ahead.

Arduino UNO detects this change and sends signal to motor driver accordingly. In order to turn right, the motor on the right side of the robot is slowed down using PWM, while the motor on the left side is run at normal speed.

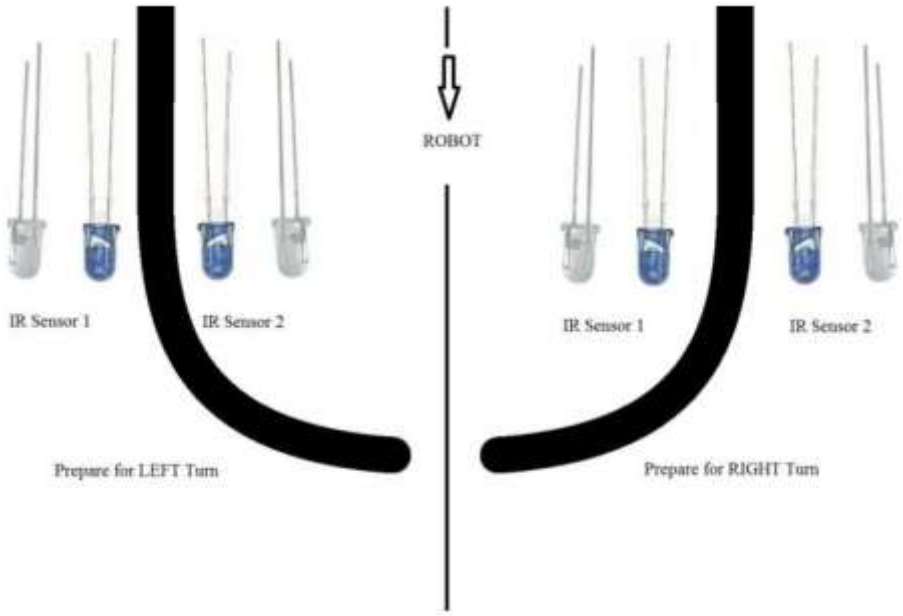


Figure 15

Similarly, when the IR Sensor 2 detects the black line first, it means that there is a left curve ahead and the robot has to turn left. For the robot to turn left, the motor on the left side of the robot is slowed down (or can be stopped completely or can be rotated in opposite direction) and the motor on the right side is run at normal speed.

Arduino UNO continuously monitors the data from both the sensors and turns the robot as per the line detected by them.

Python Code for UNO

```
int
mot1=9;
      int mot2=6;
      int mot3=5;
      int mot4=3;

      int left=13;
      int right=12;

      int Left=0;
      int Right=0;
```

```
void LEFT (void);
void RIGHT (void);
void STOP (void);

void setup()
{
  pinMode(mot1,OUTPUT);
  pinMode(mot2,OUTPUT);
  pinMode(mot3,OUTPUT);
  pinMode(mot4,OUTPUT);

  pinMode(left,INPUT);
  pinMode(right,INPUT);

  digitalWrite(left,HIGH);
  digitalWrite(right,HIGH);



}

void loop()
{

analogWrite(mot1,255);
analogWrite(mot2,0);
analogWrite(mot3,255);
analogWrite(mot4,0);
```

```
while(1)
{
  Left=digitalRead(left);
  Right=digitalRead(right);

  if((Left==0 && Right==1)==1)
  LEFT();
  else if((Right==0 && Left==1)==1)
  RIGHT();
}
}

void LEFT (void)
{
   analogWrite(mot3,0);
   analogWrite(mot4,30);


   while(Left==0)
   {
    Left=digitalRead(left);
    Right=digitalRead(right);
    if(Right==0)
    {
      int lprev=Left;
      int rprev=Right;
      STOP();
```

```
        while(((lprev==Left)&&(rprev==Right))==1)
        {
           Left=digitalRead(left);
           Right=digitalRead(right);
        }
       }
       analogWrite(mot1,255);
       analogWrite(mot2,0);
      }
      analogWrite(mot3,255);
      analogWrite(mot4,0);
}

void RIGHT (void)
{
      analogWrite(mot1,0);
      analogWrite(mot2,30);

      while(Right==0)
      {
       Left=digitalRead(left);
       Right=digitalRead(right);
       if(Left==0)
       {
         int lprev=Left;
         int rprev=Right;
        STOP();
         while(((lprev==Left)&&(rprev==Right))==1)
```

```
        {
           Left=digitalRead(left);
           Right=digitalRead(right);
        }
      }
      analogWrite(mot3,255);
      analogWrite(mot4,0);
      }
     analogWrite(mot1,255);
     analogWrite(mot2,0);
}
void STOP (void)
{
analogWrite(mot1,0);
analogWrite(mot2,0);
analogWrite(mot3,0);
analogWrite(mot4,0);

}
```

Cost of Materials: -

MATERIALS	COST
Motor x 4	1000 Rs.
Arduino UNO	577 Rs.
IR Sensor x 2 & Female jumper wire	199 Rs.
Wheels x 4	300 Rs.
Motor Driver L239D	110 Rs.
Wires	100 Rs.
Li-on battery	850 Rs.
Body	500 Rs.
Phone	1300 Rs.
TOTAL	5000 Rs.

That's how we decided each and everything for our project.

Materials	Specifications
Motor	Geared Motor 6V -12V Torque – 5Kg-cm 500rpm DC power
Arduino UNO	It has 14 digital input/output pins. 6 analog inputs. A 16 MHz ceramic resonator. A USB connection. A power jack. An ICSP header. A reset button.
IR Sensor * 2 & Female jumper wire	detects a distance of 2 ~ 10cm. detection angle 35 °. Board size: 3.1CM x 1.5CM.
Wheels * 4	Diameter = 8 cm
Motor Driver	Generic 0826U40KLRA Q L293D
Li-on battery	Amptek 12v 1.3Ah 12 Volts 550 g
Body	Body will be made of ply wood.
Wires	Simple connection wires.
Phone	A simple smartphone with good quality camera.

APPLICATIONS OF AUTOCAD

AutoCAD is software for 2D and 3D computer-aided design. We had learned too much about this software that how we have to use this software, how we have to make our drawings, orthographic projections and many more things. Here are the few applications of the AutoCAD:

- Architectural drawing of all kinds.
- Work-flow charts and organizational diagrams.
- Graphs of all kinds.
- Drawings for electronic, chemical, civil, mechanical, automotive and aerospace engineering applications.

We had also made some AutoCAD drawings which are as follows:

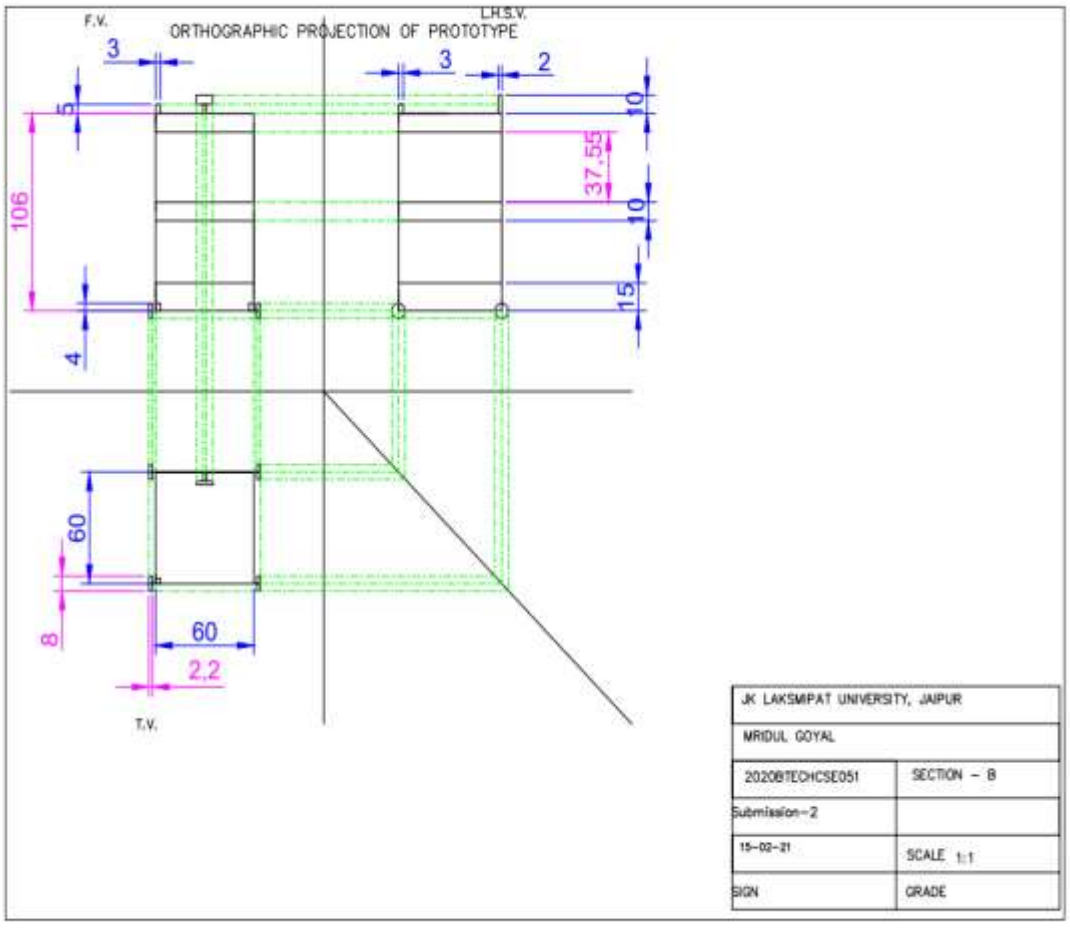


Figure 17 Autocad projection

LEARNINGS

We had learned so much from this report. Here is the list of what we have learned in this whole project:

- We learned how to work in a team.
- We learned the software AutoCAD.
- We learned deeply about Covid-19.
- We learned that to how to make orthographic projections of anything.
- We learned about different electronic materials like motor, batteries, sensors, etc.
- We also learned about the Design Thinking.
- We learned about different types of sensors and their works.

CONCLUSION

We are making and automated robot that is very useful for a Doctors , Nurses , COVID-19 -19 affected patient and all health care workers. It make their work easy and also decrease risk of life . We hope that by this robot the death of health care workers and Doctors decreases. We design the product in such way that any hospital in India or world can use this Robot they can make it by self even the hospital is not so much hi-tech. We also take care of the cost of our project (Nera Rs. 5000) so any hospital or NGOs can also use this in their Health Camps. Body design of our product is so simple that it can be transport easily.

REFERENCES

1. https://amzn.to/3rE5K3J
2. https://amzn.to/36VKLBB
3. https://amzn.to/3rF9UIv
4. Electronicspices Self Locking Switch, DC 260V 1.5 A Tactile Tact Switch 2Pin On Off Push Button Switch DIY Electronics Accessories - Pack of 5: Amazon.in: Industrial & Scientific
5. https://amzn.to/2Z6B3Ih
6. https://amzn.to/2MREobE
7. INVENTO 2pcs 6V - 12V 5 Kg-cm 500 rpm DC Motor Metal Geared Motor for Robot Car DIY: Amazon.in: Industrial & Scientific