PSG COLLEGE OF TECHNOLOGY
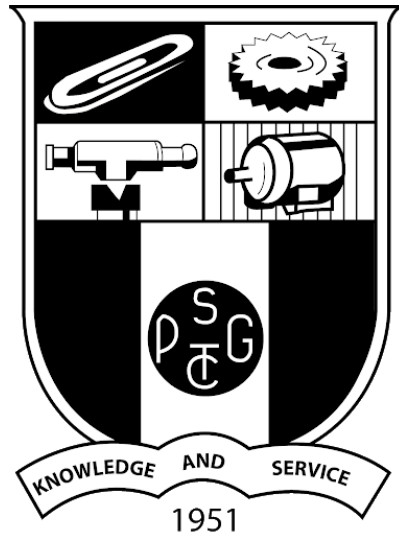# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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PROJECT REPORT
SUBMITTED TOWARDS

15Z610
EMBEDDED SYSTEMS LABORATORY

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INTRODUCTION:

As technology becomes increasingly important in today's world, it is invaluable to not only learn how to use technology, but also to understand the basics behind it in order to create new technology. Being an engineer, one should have the ability to observe nature to arrive at unconventional solutions for existing real world problems.

One of the most puzzling phenomena of nature is how ants always seem to follow an invisible path when in search of food. This path of theirs is very rarely disturbed even when encountered with unprecedented obstacles. This intriguing nature of ants can prove to be a solution for many problems in the fields of :
1. Industrial automated equipment carriers
2. Entertainment and small household applications.
3. Tour guides in museums and other similar applications.
4. Second wave reconnaissance operations.

PROBLEM STATEMENT:

Places of entertainment such as amusement parks, museums and art galleries attract huge crowds. Separate personnel are allocated in such areas to guide the people throughout the parks or museums since newcomers would find it difficult to navigate through such large establishments. Such guides usually follow a preset path, repeating it countless times throughout the day, rarely deviating. Such mundane tasks don't require the intelligence level of humans. If automated, these personnel can be shifted to other responsibilities for the betterment of the establishment.

In industries, manually operated carts are used to carry products from one manufacturing plant to another which are usually in different buildings or blocks spread over a wide area. Since it depends on the competence of the personnel involved, this can prove to be unreliable and inefficient.

This project aims to automate such tasks, using carts programmed to follow a line instead of the conventional method of laying railway tracks and allocating separate personnel which can both be costly and an inconvenience.

COMPONENTS REQUIRED:

1. 1 X Arduino Uno
2. 2 X IR Sensor
3. 1 X Motor Shield
4. 2 X DC Motor
5. 4 X 1.5 V Battery
6. 1 X Battery Holder
7. Jumpers
8. 1 X Switch

SCHEMATIC DIAGRAM:
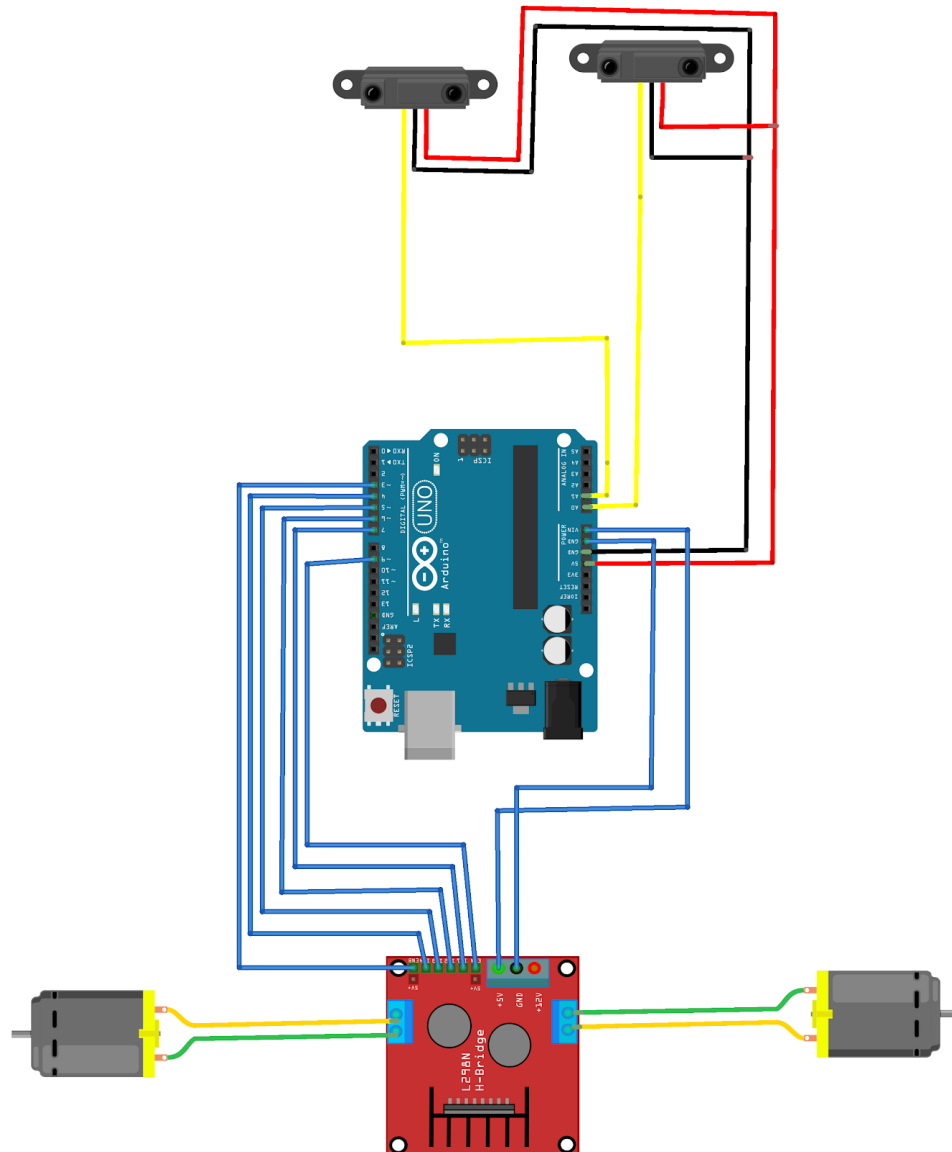
1.IR SENSOR
2.IR SENSOR
3.ARDUINO UNO
4.MOTOR SHIELD
5.DC MOTOR
6.DC MOTOR

CODE:

```
int EnaA = 9; //setting speed of the motors
int EnaB = 3;
int MotA1 = 7; //setting high or low for the motors
int MotA2 = 6;
int MotB1 = 5;
int MotB2 = 4; /


int Right = A0; //getting input from sensors
int Left = A1;

void setup() {

pinMode(EnaA, OUTPUT);
pinMode(EnaB, OUTPUT);
pinMode(MotA1, OUTPUT);
pinMode(MotA2, OUTPUT);
pinMode(MotB1, OUTPUT);
pinMode(MotB2, OUTPUT);
pinMode(Right, INPUT);
pinMode(Left, INPUT);

}

void loop() {

if (analogRead(RI)<=35 && analogRead(LF)<=35) //checking threshold for white color
{
```

```
  analogWrite(EnaA, 100);
  analogWrite(EnaB, 100);

  digitalWrite(MotA1, LOW);
  digitalWrite(MotA2, HIGH);
  digitalWrite(MotB1, HIGH);
  digitalWrite(MotB2, LOW);
}
else if (analogRead(RI)<=35 && !analogRead(LF)<=35)
{

  analogWrite(EnaA, 255);
  analogWrite(EnaB, 255);

  digitalWrite(MotA1, LOW);
  digitalWrite(MotA2, HIGH);

  digitalWrite(MotB1, LOW);
  digitalWrite(MotB2, HIGH);
}
else if (!analogRead(RI)<=35 && analogRead(LF)<=35)
{

  analogWrite(EnaA, 255); //set right motors speed
  analogWrite(EnaB, 255); //set left motors speed

  digitalWrite(MotA1, HIGH);
  digitalWrite(MotA2, LOW);
  digitalWrite(MotB1, HIGH);
```

```
  digitalWrite(MotB2, LOW);

}

else if (!analogRead(RI)<=35 && !analogRead(LF)<=35)

{


  analogWrite(EnaA, 0);

  analogWrite(EnaB, 0);

  digitalWrite(MotA1, LOW);

  digitalWrite(MotA2, LOW);

  digitalWrite(MotB1, LOW);

  digitalWrite(MotB2, LOW);

 }

}
```

CHALLENGES FACED:

1. The path to be followed by the cart should be even and obstacle free.
2. Not all curves are recognised by the sensors.
3. Calibration is difficult which makes navigating the curves difficult.
4. Getting to know about a few components such as the motor shield.

CONTRIBUTION OF TEAM MEMBERS:

Balaji U : Coding segment
Harish Kumar R : Coding Segment
Bala Surya S : Hardware Assembly

All team members were actively involved in all aspects of the project and the contribution of each member is ineludible.

REFERENCE:

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2. https://www.instructables.com/id/Maze-Solver-Robot-Using-Artificial-Intelligence-Wi/