Student Report

ARDUBOTICS WORKSHOP

Esparx, JNTUK

Workshop Description

Learn to build and program robots using Arduino, sensors, and motors by having hands-on sessions with real-world applications and live projects.

Day 1(14-03-2025)

The first day of the workshop was filled with curiosity and enthusiasm. It began with a warm welcome and a grand inauguration by **Esparx, JNTUK**, in collaboration with **Zeekers Pvt. Ltd.** The trainers from Zeekers Pvt. Ltd. delivered highly engaging and interactive sessions, transforming the learning experience from mere lectures into dynamic and immersive discussions.

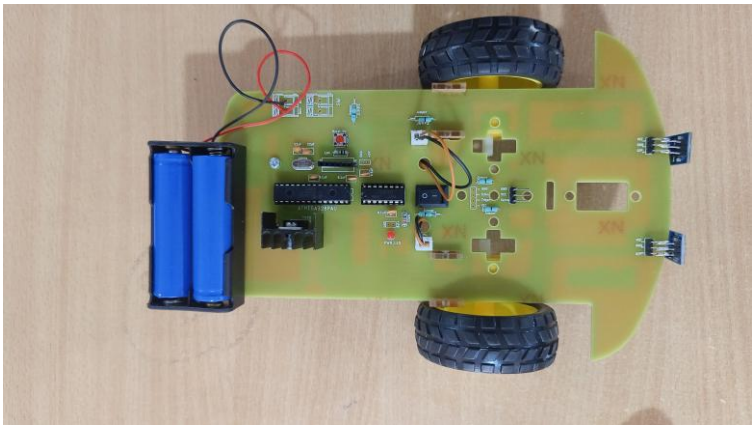
The trainers from **Zeekers Pvt. Ltd.** began with a theoretical session on **Industry 4.0** and **robotics**, covering the essential rules for building a robot. They also explained the circuitry involved in constructing a **line follower robot**, using **visual presentations** to enhance understanding.

The day also included **hands-on activities**, where students identified the **hardware components** required for building a **line follower robot**. Under the guidance of the trainers, we soldered essential components such as **jumpers, switches, and voltage regulators** onto the **Arduino board**, gaining practical experience in assembling the circuit.

Day 2(15-03-2025)

The second day of the workshop focused on **building the complete circuitry** of the **line follower robot**. We assembled the **hardware body** by soldering key components such as the **Microcontroller ATmega328, L293D motor driver IC, and IR sensors**, bringing the robot to life.

After assembling the **hardware**, we moved on to the **software implementation** of the robot. We downloaded **Arduino IDE 1.8.5** to develop the program for the **line follower robot**. To upload the code, we used a **USB-to-TTL serial converter adapter module**, ensuring seamless communication between the computer and the robot.

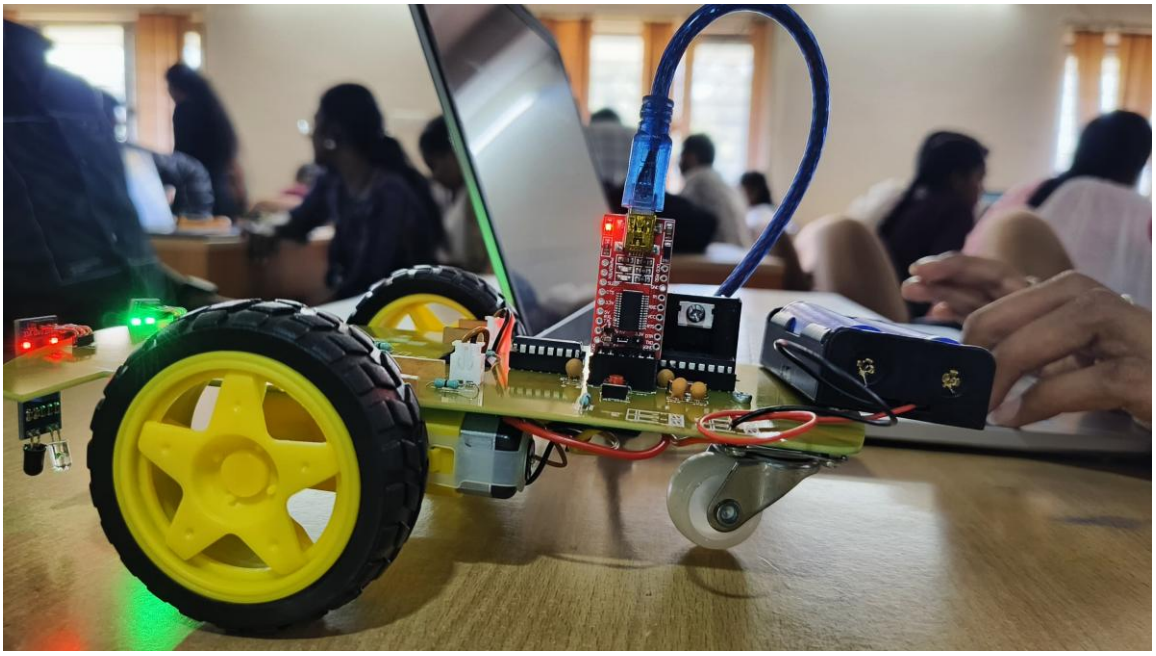


Day 3(16-03-2025)

The third day of the workshop was entirely focused on **coding the robot**. We programmed the robot to move **forward, backward, right, and left** based on the **LOW and HIGH** signals sent to its motors. Through hands-on testing, we observed how the robot responded to different input signals, refining our understanding of its functionality.

After configuring the inputs for **forward, right, and left movements**, we wrote the **final code** and uploaded it to the **line follower robot** using a **USB-to-TTL serial converter adapter module**. We successfully observed the robot's mobility, confirming that it responded accurately to the programmed instructions.

In the **final step** of building the robot, the trainer explained the **IR sensor code**, which enables the robot to detect and measure **infrared radiation**. We successfully uploaded the IR sensor code to the **line follower robot**, completing the project and achieving a fully functional robot.



The final day of the workshop concluded with the **successful completion** of the **line follower robot**. At the end of the three-day session, participants received a **certificate of completion**, awarded by **Esparx, JNTUK** in recognition of their efforts and learning.

Arduino code for line-follower robot:

```
#define enA 10
#define in1 9
#define in2 8
#define in3 7
#define in4 6
#define enB 5
#define left_IR A0
#define right_IR A1

void setup() {
  Serial.begin(9600);
  pinMode(enA,OUTPUT);
  pinMode(in1,OUTPUT);
  pinMode(in2,OUTPUT);
  pinMode(in3,OUTPUT);
  pinMode(in4,OUTPUT);
  pinMode(enB,OUTPUT);
  pinMode(left_IR, INPUT);
  pinMode(right_IR, INPUT);
  analogWrite(enA,120);
  analogWrite(enB,140);
}

void loop() {
  int left_value= digitalRead(left_IR);
  int right_value= digitalRead(right_IR);

  if(left_value==1 && right_value == 0){
    right();
    }
  else if(right_value==1 && left_value ==  0){
    left();
```

```
  }
  else if(right_value==0 && left_value==0){
   forward();
   }
   else if(right_value==1 && left_value== 1){
        STOP();
   }
 else{
   STOP();
   }

}

  void right(){
  digitalWrite(in1,LOW);
  digitalWrite(in2,HIGH);
  digitalWrite(in3,LOW);
  digitalWrite(in4,HIGH);
  }

  void left(){
  digitalWrite(in1,HIGH);
  digitalWrite(in2,LOW);
  digitalWrite(in3,HIGH);
  digitalWrite(in4,LOW);
  }

  void STOP(){
  digitalWrite(in1,LOW);
  digitalWrite(in2,LOW);
  digitalWrite(in3,LOW);
  digitalWrite(in4,LOW);
  }
```

```
void forward(){
 digitalWrite(in1,HIGH);
 digitalWrite(in2,LOW);
 digitalWrite(in3,LOW);
 digitalWrite(in4,HIGH);
 }
```

The line-follower robot's software is implemented using this Arduino code, which is written and dumped into the robot using Arduino IDE 1.8.5 . The positive and negative terminals supplied to the motors determine the LOW and HIGH inputs that are given to the motor for forward, backward, right, and left movement.

Project Video links:

Link1:

https://drive.google.com/file/d/1U1U0USihnqO0-vsMsb2RHyNI4mw-tjxb/view?usp=sharing

Link2:

https://drive.google.com/file/d/1BHB_gPRUpsYaS5u8NYwRIVQVcbwF1PH9/view?usp=sharing

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