

MAZE SOLVING AND OBJECT DETECTING ROBOT

Sindhu Naik¹, Soumya², Srushti G Nayak³, Pooja R Ingalahalli⁴, Soubhagyalaxmi C Hiremath⁵,

Dr. Jagadeesh Pujari⁶

¹Sindhu Naik, Student, Information Science and Engineering, SDMCET, Dharwad

²Soumya, Student, Information Science and Engineering, SDMCET, Dharwad

³Srushti G Nayak, Student, Information Science and Engineering, SDMCET, Dharwad

⁴Pooja R Ingalahalli, Student, Information Science and Engineering, SDMCET, Dharwad

⁵Soubhagyalaxmi C Hiremath, Student, Information Science and Engineering, SDMCET, Dharwad

⁶Dr. Jagadeesh Pujari, Professor, Information Science and Engineering, SDMCET, Dharwad

Abstract- A quick development of innovation moves us to plan the best choice for an accurate mission. Numerous automated innovations are intimated in the lives of individuals making their work much easier. It has been seen that automated vehicles are presented so far, with shrewd abilities after enormous measures of cash spent yearly on the examination. Dense network of city streets, disaster prone regions and war torn environments have common navigational difficulties. These shortcomings range from navigating through obstruction or wreckage on a possible route, navigating around dead ends to figuring out new and complex paths. Specific missions, hazardous surroundings, inhabitable conditions serve as reason for the shift to autonomous technology and decision oriented mechatronics. Another reason to opt for autonomous technology or unmanned vehicles is that these introduce conservative ways or rescue of survivors due to its impeccable, refined and numerous reviewed decision making and being able to enter a scene or an environment, locate objectives and exit the quickest and most effective way possible whilst eliminating obstructions.

Key Words: Maze, Maze Solving, Object Detection, Robot, Arduino UNO.

1. INTRODUCTION

A maze is a network of paths, typically from an entrance to exit. Now a days, maze solving problem is an important field of robotics. It is based on one of the most important areas of robot, which is “Decision Making Algorithm”. Since, the robot will be placed in unknown place, and it requires to have a good decision making capability. The project explains the existing and proposed system, objectives, tools required, methodology, experimental results, conclusion and references.

A. EXISTING SYSTEM

In the existing system, the robot that was designed is capable of solving the maze . Along with solving the maze there are other features like object avoidance technique that were implemented in some of the maze solving robots to avoid the obstacles that are present in the path of the robot.

B. PROPOSED SYSTEM

The robot can be made more efficient by attaching a camera module onto it that captures images from which objects can be detected. The main objective of the proposed system is to build a robot that can solve the maze in shortest time possible. Perform smooth movement to provide a good interaction between microcontroller and other mechanical elements. To ensure software efficiency. It can be used as a guide for fire fighters, can be used to solve navigation problems, can be used in military search and rescue operations and can be also be used by archaeologist. Thus making it more efficient.

II DESIGN AND DEVELOPMENT

A. Objectives

- To design an efficient robot to solve the maze.
- Perform smooth movement.
- To provide a good interaction between microcontroller and other mechanical elements.
- To ensure software efficiency.

B. Tools used

- Arduino UNO
- Ultrasonic sensors with sensor stands
- Infrared sensors
- Motor Driver
- DC Motors with wheels
- Breadboard
- Chassis(body of the robot)
- Batteries
- Connecting wires
- Arduino IDE(software)

C. Methodology

The methodology begins by building the robot, compiling and burning its code onto the Arduino fitted on the robot body. Later the robot is placed in a position where maze has its entry, thus maze solving begins. It follows the Wall Follower Algorithm to move across the maze. If any objects are present in the path, the IR sensor recognizes and sends signal, thus object detection takes place. Hence the robot exits the maze.

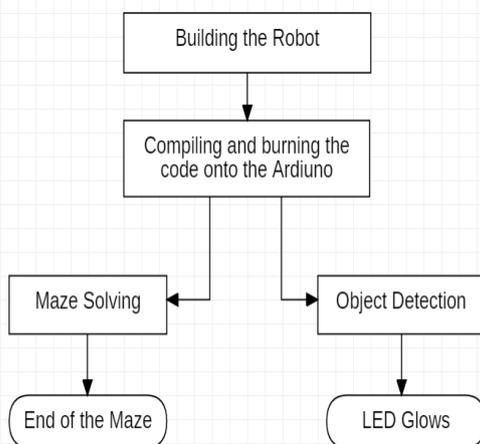


Fig -1: Methodology

III EXPERIMENTAL RESULTS

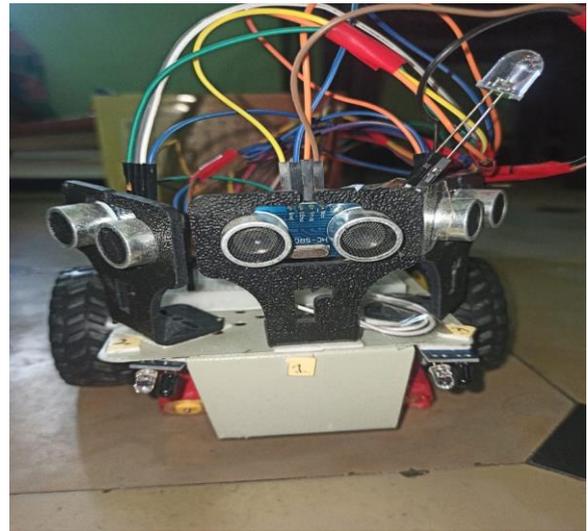


Fig -2: Front View of the Robot

The front view includes Three Ultrasonic sensors placed on ultrasonic sensor stands which are fitted onto Chassis. They are named as Front, Left and Right sensors. They are used for Wall Detection Below the ultrasonic sensors, two Infrared sensors are placed. They are used for Object Detection. A white LED is placed beside front and right sensor. The LED blinks whenever an object is detected.

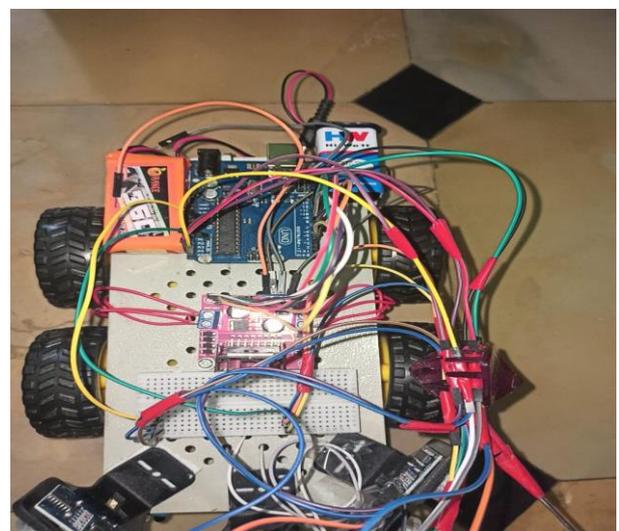


Fig -3: Top View of the Robot

The top view of the robot has a Motor driver fixed on the Chassis. It helps in controlling the speed of the motors. Behind driver Arduino UNO 1 is placed. This microcontroller provides interface to ultrasonic sensors and the motor driver. The Arduino is placed between two batteries, each for two Arduino Uno. It also contains breadboard for connecting components to complete the circuit.

V REFERENCES

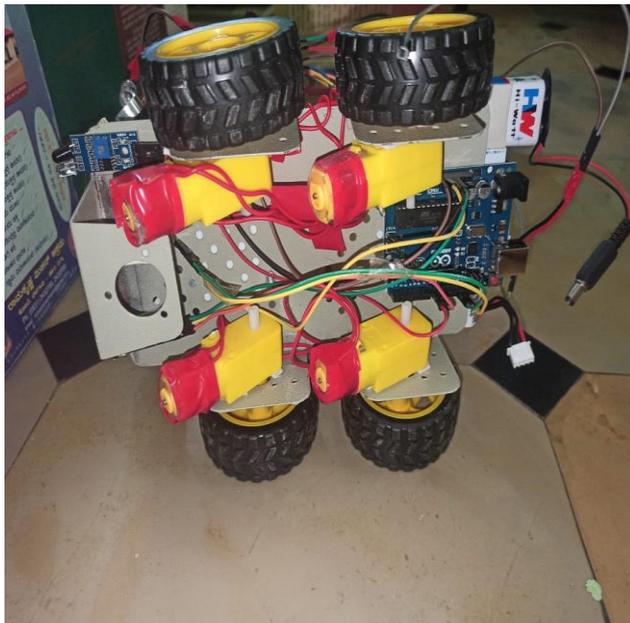


Fig -4: Back View of the Robot

The back view of the robot has Arduino UNO 2 to which the IR sensors, white colored LED and 9Volt battery are connected. Four DC motors are fitted to the chassis and their ends are connected to four wheels. The motors are connected to motor driver. They help in movement of the robot.

IV CONCLUSION

A perfectly working maze solving robot has been built which solves the maze along with detecting the objects which are present on its way. This will be achieved by using appropriate tools like ultrasonic sensors for wall detection, motors for movement, motor driver for controlling the speed of motors, infrared sensors for object sensing and camera module for capturing images. All these tools are interfaced with Arduino UNO connected to a power source via Arduino IDE. It helps in analyzing the puzzled area(maze) where human cannot intervene, thus providing appropriate information. This robot in real time application can be of great use for the mankind. It proves to be a useful tool for society.

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