

## Shortest Path Follower Robot

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**Abstract** - Communication is a part of recent development. So we are determined to work on robotics and reduce the day-to-day routine of humans and increase their prosperity in life. It studies the design, production, processing and application of robots, as well as computer systems for their control. The proposed follower robot is an electronic system that can detect the shortest path and follow the line. Typically the line specifies a predefined path that can be seen using a IR array sensor on a white surface with a high contrast color as a black line. This robot is used to determine the shortest path on the other side of the journey. This project identifies the perfect path to solve a single source shortest path problem. A proximity sensor has been added to the robot so that it can detect any obstacle in its path.

**Key Words:** Robotics, Shortest path, IR array sensor, Proximity Sensor.

### 1. INTRODUCTION

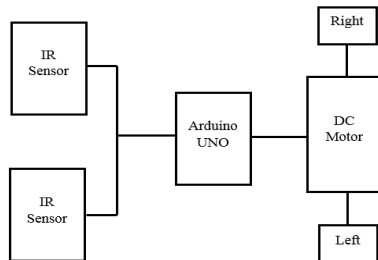
Line Follower Robot is basically a robot created by the user to follow a 'line' or path that has already been created. This path can be straight as a white line on the floor. Identifying and Avoiding Obstacles Robots can perform desired tasks in impossible environments by constantly finding and overcoming obstacles in their path without human guidance. The Bellman-Ford algorithm calculates the shortest path from one source to another destination in the weight diagram. The two wheels balancing robots with the following wheel capabilities focus on the development of line follower algorithms for two wheels balanced robots. In this project, ATMEGA 32 is selected to react to the data received from the balance processor chip to monitor climate change through two infra-red distance sensors to solve tilt angle problems. Therefore, the system will immediately restore to the set point (balance position) through the implementation of the PID algorithm within the balance board [1]. A white surface may look like a black line or vice versa, or it may disappear like a magnetic field [2]. The line follower's design and production robot can follow a path. It is a combined design from the knowledge of mechanical, electrical and computer engineering. This paper produces a fabrication design of the 9W LDR sensor based line follower robot weighing 700 grams, which is always pointed with black marks on the white surface [3]. A non-contact proximity sensor is used that can measure surface distances and directions in a range of four to five centimetres [4]. This

system has a motor dedicated to each back wheel while the front wheel is free to rotate. The microcontroller controls the robot's two DC motors to transmit its path. Mechanical construction design and circuitry interfacing with the robot's microcontroller are presented. Several ongoing tests are performed on the robot to verify the ability to follow the line by achieving the goal position by choosing the right path [5]. The design and implementation of an IR based line follower robot for cooperative task sharing is characterized by a relay race of robots. This race is the same for a human relay race. Each robot is designed using a microcontroller P89V51RD2 that has specific addresses. These robots are Line Followers and are capable of interacting with IR sensors that use one another [6]. The light dependent resistor sensor is connected to the robot whose resistance varies with the intensity of the light. The routing protocol is responsible for finding the route from the source to the destination via the packet. For MANET, there are a variety of protocols available, and we can use any one, if needed. Each protocol has its own criteria for locating the source to the destination. Some researchers have explored the concept of the shortest route to ad hoc network [7]. The shortest path problem (SPA) is the most fundamental and important of the connective problems. SPA is an important issue of graphic theory and has applications in communication, transportation and electronics issues [8].

This project deals with robotics. In this fast-growing world, there is a need for a robot that makes human life luxurious and easy. Manufacturing is replaced by robots and machines in industries and factories that deliver faster and more productivity with less effort. It is related to industries. These robots are used to transport sweet treats from one place to another in less time and less time. The shortest route finder problem is one of the most interesting and popular topics. In this project the robot will find the shortest and fastest way out of the given metrics. The robot captures inputs like source and destination points using the keypad and display panel that are embedded on the robot, then scans the robot source and destination point and finds all possible paths to the destination. After ensuring all possible paths, the robot decides which route is the shortest and fastest using the algorithm. In this algorithm the fastest path is determined by the nodes in each path. Using this strategy, we can quickly determine the shortest and fastest route. Furthermore, once the route is determined, the robot will automatically approach the destination in the shortest and fastest way.

## 2. SYSTEM ARCHITECTURE

This smart and intelligent line following the robot based shortest path detection system is divided into several sections like IR sensor, Motor, Arduino UNO.



**Fig -1:** System Architecture

An infrared (IR) sensor is used to detect obstacles in front of robots or to differentiate colors according to the configuration of the sensor. An IR emitter emits an IR light and gives a signal when the reflected light is detected. The IR sensor consists of an emitter, detector and associated circuitry. The circuit required to make an IR sensor consists of two parts; Emitter circuit and receiver circuit. The emitter is just an IR LED (light emitting diode) and the detector is just an IR photodiode sensitive to the IR wavelength of the same wavelength emitted by an IR LED.

Relays are electromechanical switches that can switch between two circuits. When the voltage is applied here, say 'S' input, this relay will go to ground VCC which applies voltage to the left DC motor and finds the ground through other relay. So using a relay based driver circuit gives the motors very little resistance. The relay provides more current to the motors than the semiconductor driver circuits. This circuit builds in dynamic motor braking capabilities which is very important for a line follower to take a quick turn.

The project is the main moderator of Arduino UNO. The sensor's data (IR sensor) will be fed to Arduino and it gives the corresponding signal to the motor driver IC.

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