

SPAZOR

Problem Statement

The bot has to traverse the arena . The bot has to start from the start point and by using line following mechanism, it has to reach at the centre node where it will be given a Morse code in the form of light which will contain the message about the path it has to take next. The bot has to solve the code and complete the run.

How to approach

The task can be accomplished by the following steps:

1. A line follower mechanism so that the robot can traverse the arena.
2. A Light Intensity detection mechanism through which the robot will be able to read the Morse code.

Mechanisms

The robot will consist of mainly two mechanisms:

1. Line follower.
2. Morse code reader (light intensity detection).

Materials required

1. Light Detecting Sensors and light emitter pairs. Eg. LED & LDR, LED & Photo Diode, IR & Photo Diode. In this combination LED/IR emit light which is reflected by the surface and received by the LDR/Photo Diode. This generates a variable voltage across the LDR/Photo Diode which helps in differentiating colors.
2. Micro Processor/Micro Controller. Eg. ATmega/Arduino.

This is the brain of the BOT. All the inputs we receive from the sensors are sent to the micro Controller. Micro Controller processes the data and gives the required output to the motors. All the commands are given in the form of a code to the micro controller estimating all the possibilities. Detailed description of Micro Controller is explained in Micro Controller tutorial.

3. Morse code reader i.e. an LDR mounted which should face the Morse code transmitter.

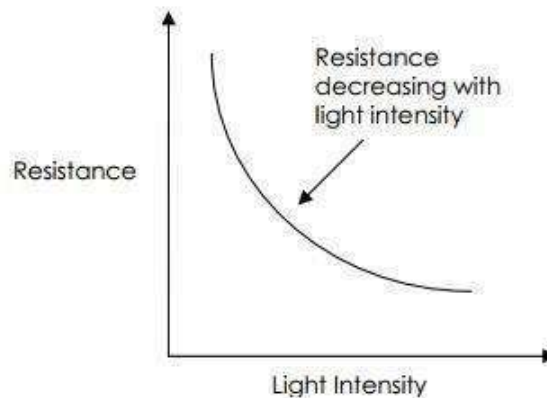
Line Follower

A line follower robot basically follows a line. It uses the principle that Black color reflects less light falling on it as compare to the White color.

We can use IR-LED sensors or LDR sensors to measure and compare the intensity of reflected light.

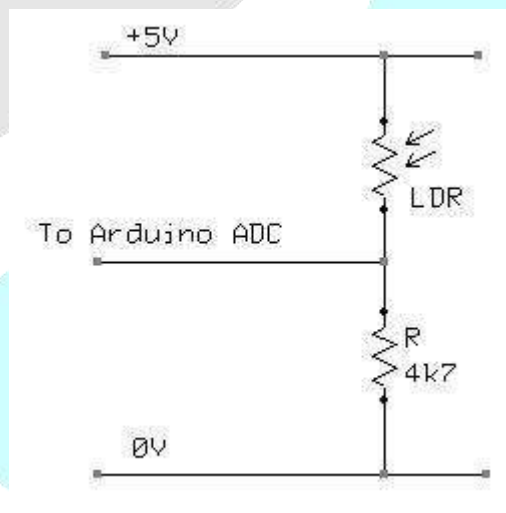
Light Intensity Detection

Light Intensity Difference can be detected in many ways. Here we will talk about LDR sensor. An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.



Typical LDR resistance vs light intensity graph

Light detection circuit



The above circuit is a simple light detection intensity detection circuit, here the resistor and LDR pair serves as a potential divider. As the light intensity increases the resistance of the LDR decreases and hence the potential drop across the resistor increases, so the analog value read by the microcontroller is proportional to the intensity falling on the LDR.

The threshold has to be set accordingly for light ON and light OFF for the Morse code to be read.

Basic Idea

The microcontroller must read the voltage across the resistor and hence calculating the time for which the light is on and read the transmitted morse code and work according to the given code.

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