

Path Finding Robot

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March 4 2019

Introduction

An autonomous robot can be configured to follow a path.

There are many ways to do obstacle avoidance or path following for autonomous vehicles.

This project can be implemented by the use of photodiodes to follow a black line on the ground.

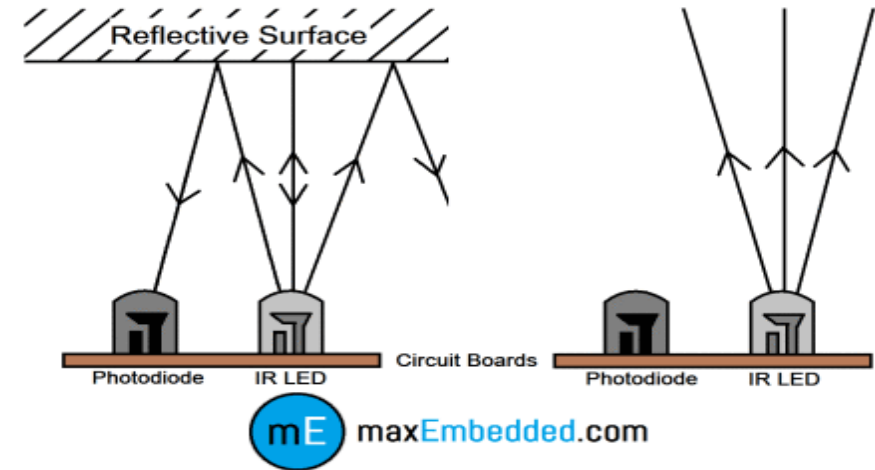
Stepper motors can be used to move the robot

The applications can be extended to automated delivery systems in closed systems or exploration of places people can't go.



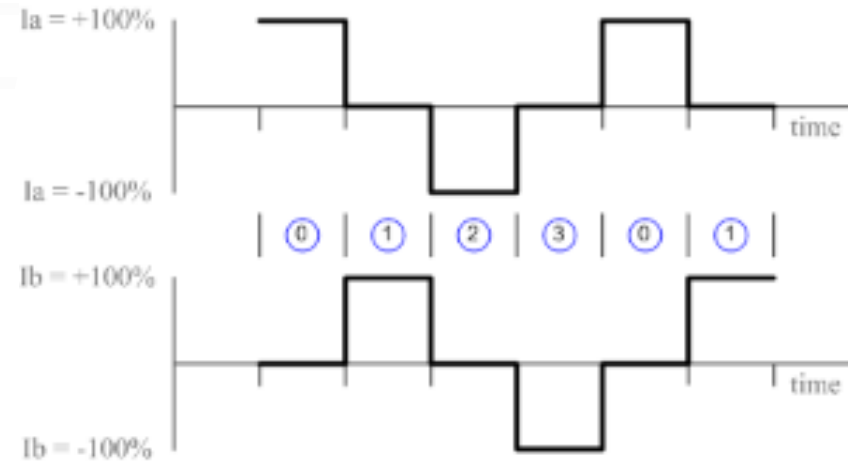
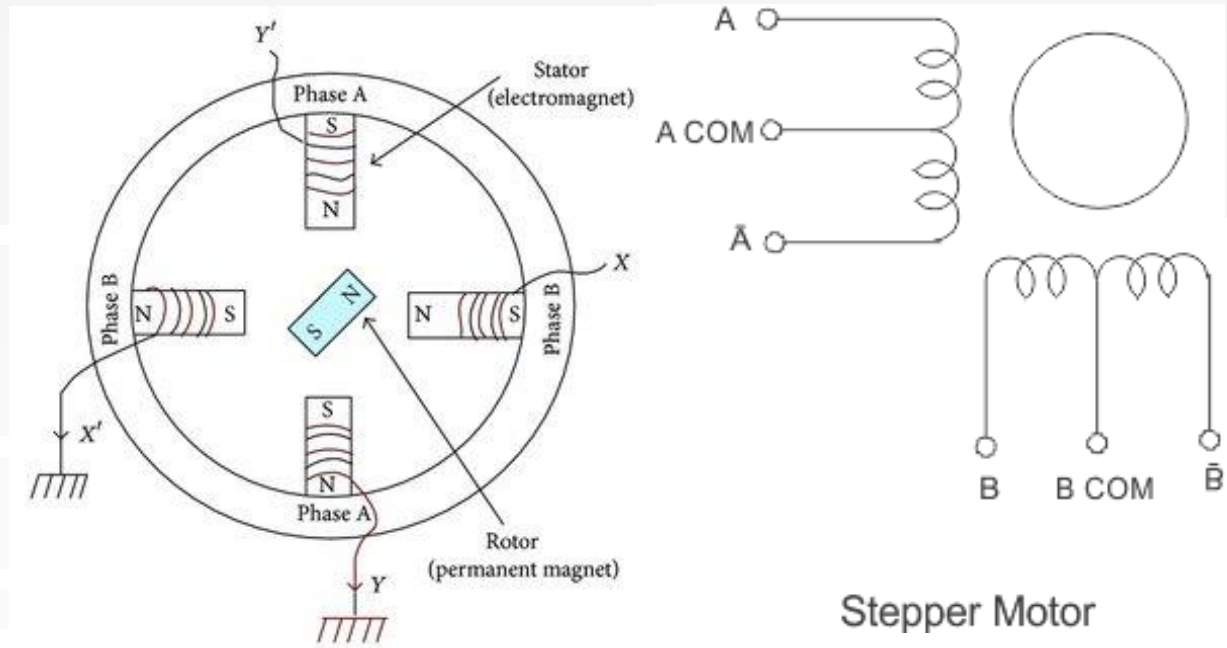
Components

- Emitter/ Sensor – an LED in the IR range can be used to emit light and two light sensing diodes (photodiodes) will detect the difference in light levels to determine direction.
- Driving- Two stepper motors controlled by the PIC and powered by the battery
- PIC – used for processing sensor data and collecting/sending path data
- Power – a battery to drive the motors and power the PIC



Motor operation

- A stepping motor is moved by the power of magnetic fields
- The rotor is a permanent magnet and the stator is electrical coils.
- By alternating the activation of the coils, the poles on the rotor are pulled towards the coils.
- Different driving methods –full, half, wave
- Wave stepping will be used



Implementation

The PIC will be mounted on top of a battery operated robot

The robot will be driven by two stepping motors (which will be attached to wheels)

Each motor is controlled individually to enable tight turning.

The IR LED will be mounted in the middle and photodiodes will bracket it at roughly the width of the line.

The PIC will process sensor input and determine how to move the motors.

Challenges and Extensions

- Path needs to be wide and matte
- Environmental restrictions (brightly lit room)
- Getting useful digital data from analogue sensor
- Automated system should come with self correction systems.
- Storing or broadcasting path data
- Adding Bluetooth to send path data to a computer
- Additional sensors for better path finding and maybe obstacle detection



Thank you!
Questions?