

Tracking Imitator

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ABSTRACT

The Tracking Imitator system, which follows black or white line. The main purpose of developing this system is - reducing human works and also be used security. This system consist two parts hardware and software. Hardware consist fixed system which is based on Arduino board, motor drivers. Line tracer sensor is used in system to give path to the robot, then robot move according to given instruction. This robot is capable to follows complex color lines. Android handset can be connected through Bluetooth with Bluetooth module HC-05, user can operate robot though android software. RF Camera is used for surveillance. Captured video can be seen on television simultaneously. So this robot can be used for security purpose.

Keyword: - Line tracking sensor, Arduino, DC Motor, and Bluetooth module, RF Camera

1. INTRODUCTION

Tracking Imitator robot has ability to follow a single line. Tracking Imitator system is the same as line follower robot. It has onboard hardwired control circuit. Tracking Imitator is can use in daily life to reduce the human works, mostly in industrial area where automation is extremely increased. Tracking Imitator system can used in industrial area for automatic transportation. From the industrial point of view line follower robot has been implemented from semi to fully autonomous plants. This Tracking Imitator is designed for practical applications which include guidance system in industry, household application even at offices files from one room to another room and for security. Line following algorithm is used to automatic moving, and android mobile controlled algorithm is used to avoiding barriers and can also reach long distance without any problem. Bluetooth module HC-05 is used to connect android handset to robot.

2. SYSTEM OVERVIEW

The line imitator system consist two parts hardware and software. The main hardware part of system is Arduino board is microcontroller. This system consist two moving approaches one is robot can move automatically on the black or white lines, and another approach is user can operate robot via android software. In first approach robot can move automatically because programming is provide to the system via arduino microcontroller. Robot is move automatically on the black or white lines. Line tracer sensor is used to trace the black or white line accordingly that robot is move automatically. Motor drivers are used to drives the DC Motors which is mounted on wheels of robot. In second approach user can operate robot via android software, where android software is installed in android handset. Android handset is connecting to the robot via Bluetooth module HC-05. Bluetooth module provides communication media between user through android handset and system by the command given to the handset. Commands are converted string is passed to the arduino board. Converted commands are extracted by the microcontroller which is placed on the arduino board. According to commands motor driver are drives the DC Motors (wheels). RF camera is used also for security purpose. User can see the video simultaneously.

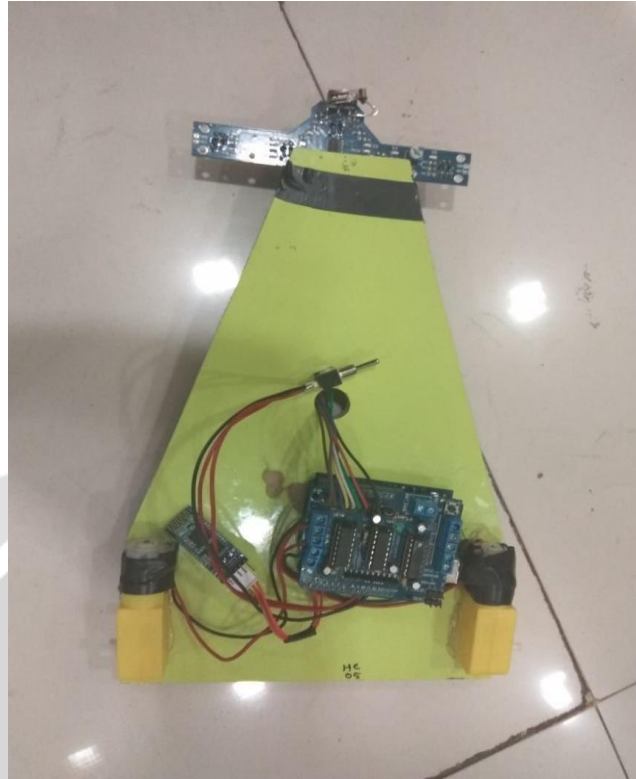


Fig 1. Tracking Imitator

2.1 ARDUINO UNO

Arduino is an open source electronic platform .it is the main part of system. Arduino extract instructions given by user and work accordingly. User can program the Arduino using arduino software. It has 14 digital pins of which can be used to give input and output pins. It has USB connection to connect computer, user can enter program into the arduino board through USB connection. Arduino board contains all things which are needed to support microcontroller. It also has reset button to reset the program.



Fig 2:Arduino uno

2.2 DC MOTORS AND WHEELS

DC motor is used in system for giving movement to the robot. And also used caster wheel at the front of robot for the freely movement DC motor is an electrical motor that runs on direct current of electricity. 12v Battery is used to giving power supply to the whole system and motor drivers are used to drive motor.

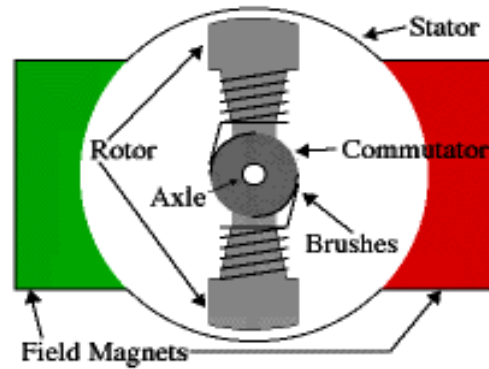


Fig 3. DC motor and wheels

2.3 LINE TRACKING SENSOR

Line tracking sensor is used in system for giving path to the robot. It has high sensitive five sensors. It has a high accuracy to follow black line. At the front site of module has distance sensor to adjustment. If black line is track LED are indicates.

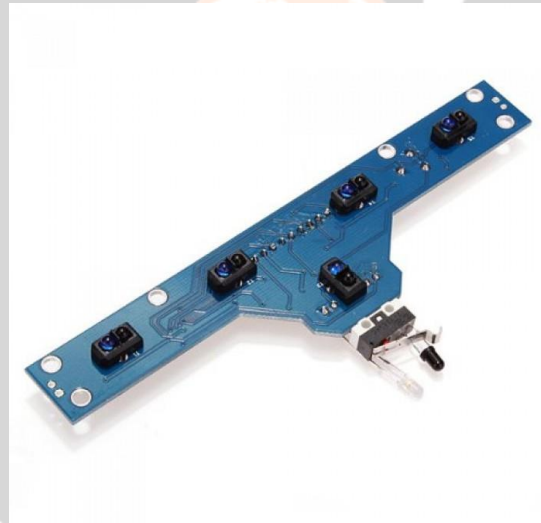


Fig 4. Line tracking sensor

2.4 RF CAMERA

In the system RF camera is used to observe the area. It has maximum range is 500 fit. It required 8 volt DC power supply. It has two parts first is transmitter which is placed on camera, it can observe area and record the audio/video and send to the second part of RF camera that is wireless receiver. Wireless receiver is connected to the TV. The main advantages of RF camera have minimum weight and it consume low power, it has high sensitivity to object the area. The output frequency of RF camera which used in system is 0.9 to 1.2 MHz



Fig 5. RF Camera

2.5. BLUETOOTH MODULE HC-05

Bluetooth module HC-05 is used to connect android handset and robot. By using Bluetooth model user can control robot via android handset. It provide interface between user and robot. The frequency of Bluetooth model is 2.4 GHz, it requires 3.3 volt DC power supply, It has maximum is speed 2.1 mbps, the advantages of Bluetooth model is specified authentication and encryption that is provide more security.

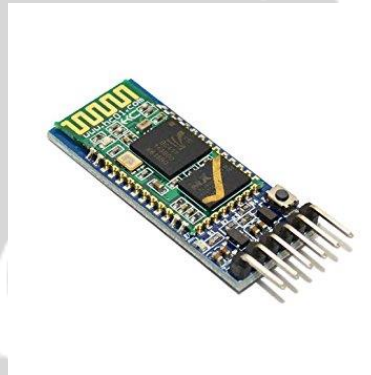


Fig 6. Bluetooth Module

5. ANDROID CONTROL

The User can control robot via android software. Android is a operating system installed in android handset. Android software provides high flexibility of controlling robot via touch screen button. Bluetooth robot remote control application is installed in android handset.



Fig 7. Android control

6. EXPERIMENTAL RESULT

Tracking Imitator movement is show as following table:

Movement of robot	Left motor	Right motor
Straight	Straight	Straight
Left	Stop	Straight
Sharp left	Reverse	Straight
Right	Straight	Stop
Sharp right	Straight	reverse
Reverse	Reverse	reverse

As shown in above table-

- > Left and right motors are rotated straight then robot should move straight.
- > If left motor is stop and right is rotated straight then robot should move at left site.
- > If left motor is rotated backward and right motor is rotated forward then robot should move at sharp left site.
- > If left motor is rotated forward and right motor is stopped then robot should move at right site.
- > If left motor is rotated forward and right motor is rotated backward then robot should move at sharp right site.
- > If both motors are rotated backward then robot should move reverse site.

CONCLUSION:-

Wireless control is one of the most important needs. But unfortunately due to large amount of data system cannot fulfill effective use. One many of the RF module is use to make line follower robot. Burt this project makes use of android handset to controlling robot. Wireless communication technique is used in system via Bluetooth. User can use various commands like forward, backward, left & right. Robot has Bluetooth receiver to receive the command & move according that.

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