Intelligent Railway Track cleaning system

Mrs.Rikita Gohil, Mrs. Niti Gupta

Dept. of Electronics and communication Engineering

Abstract

This paper aims to present a prototype model for a cost efficient track cleaning system which would prove to be a wonderful alternative to the current system in place if implemented. The aim is to make an automated vehicle that can effectively clean the tracks of the railway station. It will be a vehicle that will consist of an overhead tank will supply water to the nozzle. There will be brushes attached to the bottom of the vehicle that will rotate in circular manner to clean the surface. In case there is an obstacle in front of the vehicle, the vehicle will sense with the help of object sensor. Object sensor will stop the movement of the system and activate an alarm to indicate an obstacle. At the end of the platforms of the station, there will be sensors which will indicate that the whole track of that platform has completely been clean. This vehicle can work on platforms as well.

Keywords: Automation,Railways,Microcontroller,sensor

INTRODUCTION

India is the second most populous country in the world with billions of people. The fastest and most economical mode of transportation is 'INDIAN RAILWAY'. Though the government and railway authority are doing their best to maintain the cleanliness of the railway tracks but owing to the large population the railway tracks are usually found dirty! So we have thought of preparing a model which is sensor based automated vehicle. This vehicle can move over the existing railway tracks and help in cleaning the tracks. With the help of this development, we can serve our nation to maintain cleanliness and well-being of citizens.

The aim of our project is to make a model that can effectively clean the tracks of the railway station. It will be a vehicle that will consist of a overhead tank will supply water to the nozzle. There will be brushes attached to the bottom of the vehicle that will rotate in circular manner to clean the surface. In case there is an obstacle in front of the vehicle, the vehicle will sense with the help of object sensor. Object sensor will stop the movement of the system and activate an alarm to indicate an obstacle. At the end of the platforms of the station, there will be sensors which will indicate that the whole track of that platform has completely been clean.
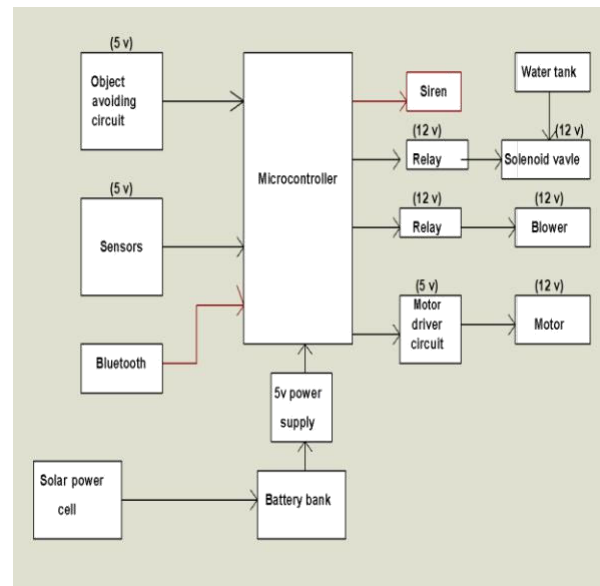
Block diagram

Fig.1 Block diagram

- **OBJECT AVOIDING CIRCUIT**:
  In this project, the transmitter section includes an IR sensor, which transmits continuous IR rays to be received by an IR receiver module.

- An IR output terminal of the receiver varies depending upon its receiving of IR rays. Since this variation cannot be analyzed as such, therefore this output can be fed to a comparator circuit.

- Here an operational amplifier (op-amp) of LM 358 is used as comparator circuit.

- When the IR receiver does not receive a signal, the potential at the

inverting input goes higher than that non-inverting input of the comparator IC (LM339). Thus the output of the comparator goes low, but the LED does not glow. When the IR receiver module receives signal to the potential at the inverting input goes low. Thus the output of the comparator (LM 339) goes high and the LED starts glowing. Resistor R1 (100), R2 (10k) and R3 (330) are used to ensure that minimum 10 mA current passes through the IR LED Devices like Photodiode and normal LEDs respectively. Resistor VR2 (preset=5k) is used to adjust the output terminals. Resistor VR1 (preset=10k) is used to set the sensitivity of the circuit Diagram.
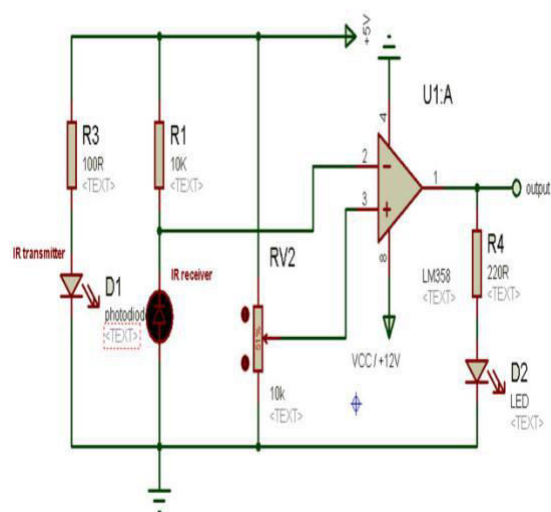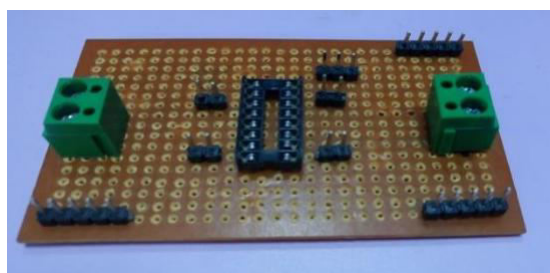

Fig.2 Circuit diagram

A sensor is a type of transducer; sensors may provide various types of output, but typically use electrical or optical signals. For example, a thermocouple generates a known voltage (the output) in response to its temperature (the environment). We would be using IR sensors.

DESIGN METHODOLOGY AND IMPLEMENTATION

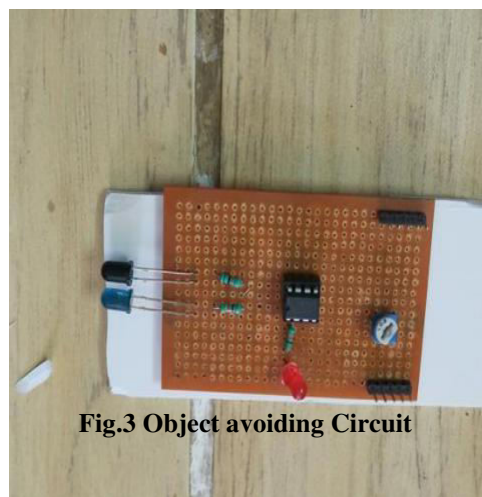**Motor Driver Circuit**

Object Avoiding Circuit:

Fig.3 Object avoiding Circuit
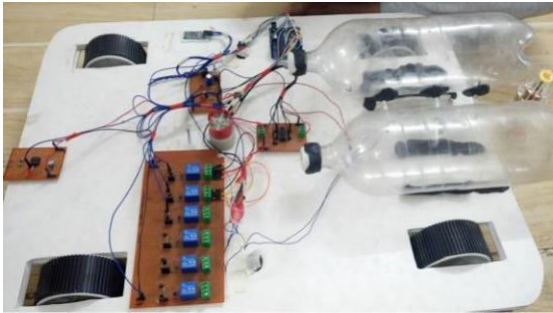
Complete Circuit Design

Fig.4 Design

CONCLUSION

The Intelligent Track Cleaning system provides an efficient cleaning process and promises dirt free railway tracks in the stations with minimal human interaction. The proposed application of system can also be utilized for cleaning in emergency interventions. This proposed mechanism forms a complete system for an autonomous track cleaning.

REFERANCES:

[1] K.S. Nagla, MoinUddin, R. Jha, Akshay Mathur, "Service Robot for Indian Railway Tracks at Platforms: Feasibility, Kinematics, Dynamics and Trajectory planning" International Conference on Mechatronics and Automation, June 25 - 28, 2006, Luoyang, China.

[2] Xavier Gibert, Vishal M. Patel, and Rama Chellappa "Robust Fastener Detection for Autonomous Visual Railway Track Inspection" Winter Conference on Applications of Computer Vision, IEEE, 2015, PP. 694-701.

[3] Dr. Manoj Hedaoo, Dr. Suchita Hirde , Ms. Arshi Khan ,"Sanitation in indian railway premises: a great cause of concern" , International Journal of Advanced Engineering Technology, 2015

[4] Dr Aparajita Baruah, The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013: A Review, Baruah. Space and Culture, India 2014.

[5] Rajesh Pant, Mayank Uniyal, Prashant Ratodi, Bhawesh Mehta Tarun kumar, Zaki-ur-Rehman,GurpreetSingh, "Manual Scavenging and Technological Solution to Eradicate It. (Turning Scavengers to Engineers)", IOSR Journal of Mechanical and Civil Engineering, Vol.11, Issue 3, pp.08-15,2014