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Intelligent System for Train Engines to AvoidAccidents and to Control the Railway Gate Using Wireless Technology

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Abstract: ***Since from the past many years the railway Is being the part for accidents un-intendedly in various ways like, accidents during the crossing the lane, accidents that caused due to an obstacle onthe lane an also the Lack of communication between the gate Man and the Loco pilot. In the year 2019 nearly 27,987 accidents were happened due to various reasons. This project will be helpful to avoid these type of accidents Caused by the trains. Here obstacle sensor is used to monitor the track and sense any obstacle if sensed in short distance signal is transmitted to the receiver section which will give horn i.e. buzzer which alerts the loco pilot to stop the train. And similarly for avoiding the accidents at railway gate ,A sensor has be placed that sends signal to Loco pilot in order to avoid the collision .RF TX and RX are used to transfer the signals to avoid the accidents .The fire sensor Can also be used by connecting with the buzzer to alert the passengers and also to spread water using dualaxial Motor, this can also improvised using the transmitter and receiver at the Train and the stationsto send the signals while any fire accident took place.***

Keywords: Microcontroller AT89S52, Fire sensor, RF Transmitter and receiver, Buzzer, DC Motor.

I. INTRODUCTION

This project adds the automation to the railway system and also helps to avoid the accidents caused by the trains .Here the RF sensor is used for transmitting the signal between the railway gate and the train RF system in order to control or sense the signal to take the regarding action to avoid theaccidents. The IR sensor is used as the obstacle sensor which senses the obstacle on the railway line and sends the signal to the train. Dc motor is used at the gate for opening or closing the railway gate. And if the Fire is detected by the sensor the the water is spread automatically with the help of DCmotor. We can also use the Dual axis connection of DC motor to use for both x and y co-ordinates .If the train misses the track by any chance the a message is sent to the control room to take the necessaryaction to avoid the casualties.

A. Block Diagram

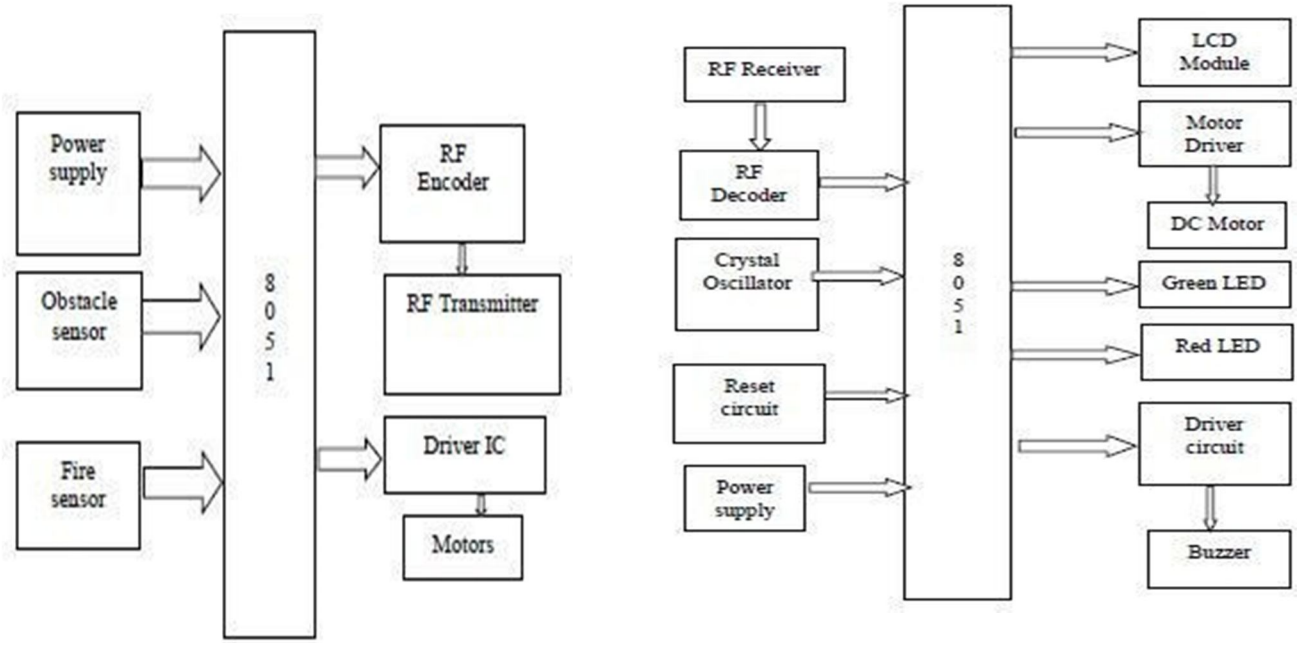


Fig: Transmission section Fig: receiver section

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B. 8051 Micro Controller

Micro controller is the electronic device is a processing unit device like a cpu which is actually a single chip integrated semiconductor device which is used to perform various actions through i/o peripherals and we can able to program the micro controller to perform the desired actions. The micro controller also consists of the different I/O ports which are used to perform the input and output actions,it also consists of memory and bus for transferring of data etc.. all these are the blocks of the micro controller The name of the Micro controllers are changed (or) can be classified based on variousparameters like their bus capability their storage etc.. Here in AT89s52 micro controller ,it is same as the 8051 micro controller but the only difference between them is the flash memory of the 8051 microcontroller is about 4k where as the AT89s52 have 8k . the different sensors and the other I/O peripherals are connected as shown in the figure to take the input and process it as per program and to control (or) to perform the action.

C. DC Motor

For closing and opening the railway gate, we are using DC motor. It is operated by 12V DC power supply. In any electric motor, operation is based on simple electromagnetism. A current carryingconductor generates a magnetic field; and to the strength of the external magnetic field we are placing DC motor for controlling the railway gate activity depending on the instructions passed from micro- controller

D. LCD (Liquid Crystal Display)

To display any character on LCD, micro controller has to send its ASCII value to the data bus ofLCD. LCD display used here is 16*2 which means 2 lines each with 16 characters

E. LED (Light Emitting Diode)

A Light emitting diode is a semi conductor light source that emits light when current flowsthrough it.

F. L293D Driver IC

It is a 16 pin Motor driver IC .By using this Driver IC we can able to drive the two motors at atime and also we can able to control the direction of the motors individually .This IC works on the principle of Half H-bridge , Basically the Half H-bridge setup is used to run the motor in both clockwise and anti clockwise direction. It also has the o/p current of 600ma and peak o/p current of 1.2A. The o/p supply (VCC2) of about 4.52 – 36V.

G. Buzzer

It is a audio signaling device like a beeper or a buzzer is a electro-mechanical ,piezoelectric or mechanical type. It is powered through a dc voltage its function is to convert the signal into the buzzersound.

H. HT12E Encoder And HT12D Decoder

The HT12E encoder is the 12 bit encoder IC which is used to encode the data .The encoded databit has the 4 data bits and 8 address bits (4+8=12). It is mostly used the areas of RF and IR wireless transmission. We can also use the alternatives like PT2262, 74C922. The HT12D decoder is 12 bit decoder similar to the encoding circuit it decodes the 4 bit dataand the 8 bit address (4+8=12). which operates at the same voltage like the encoder of about 5V. Thealternatives for this decoder are PT2272.

I. RF transmitter and RF receiver

STT-433 (433Mhz RF transmitter)is ideal for the remote control applications where low costand long range is required it operates at the 1.2-12 V supply.

STR-433 (433mHZ RF receiver)is similar to that of the transmitter used as it is ideal for theremote applications with low cost and long range and operates at 5V.

J. Obstacle Sensor

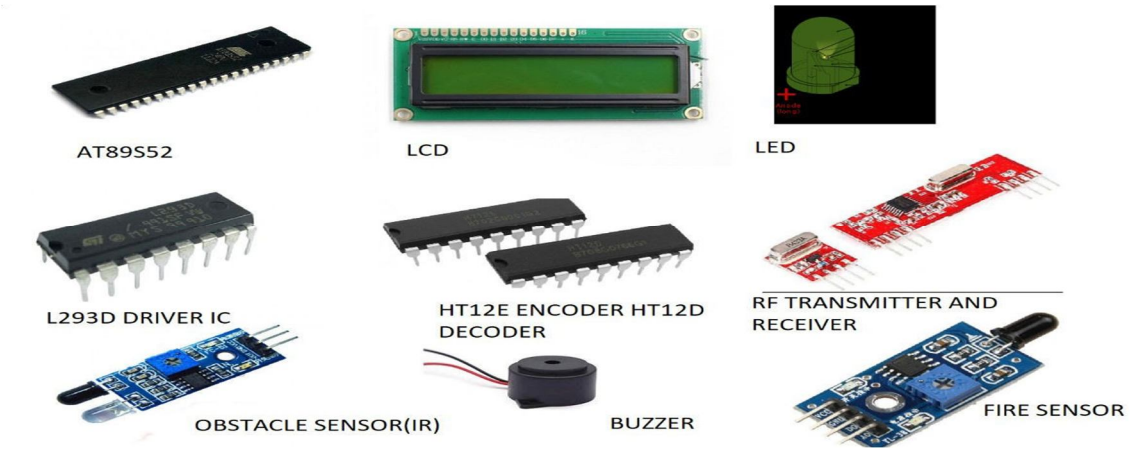
IR Infrared Obstacle Avoidance Sensor Module has a pair of infrared transmitting and receivingtubes. When the transmitted light waves are reflected back, the reflected IR waves will be received by the receiver tube.

K. Fire Sensor

Fire alarms are those which senses the heat and get respond to it basically there may be achance of getting false alarms due to over heat in temperatures , this should be avoided by taking the precautionary measures.

L. Power Supply

The AC input i.e230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output of the rectifier is a pulsating DC voltage which is passed through a filter to remove AC components. Now, this voltage is given to a voltage regulator toobtain a pure constant DC voltage .

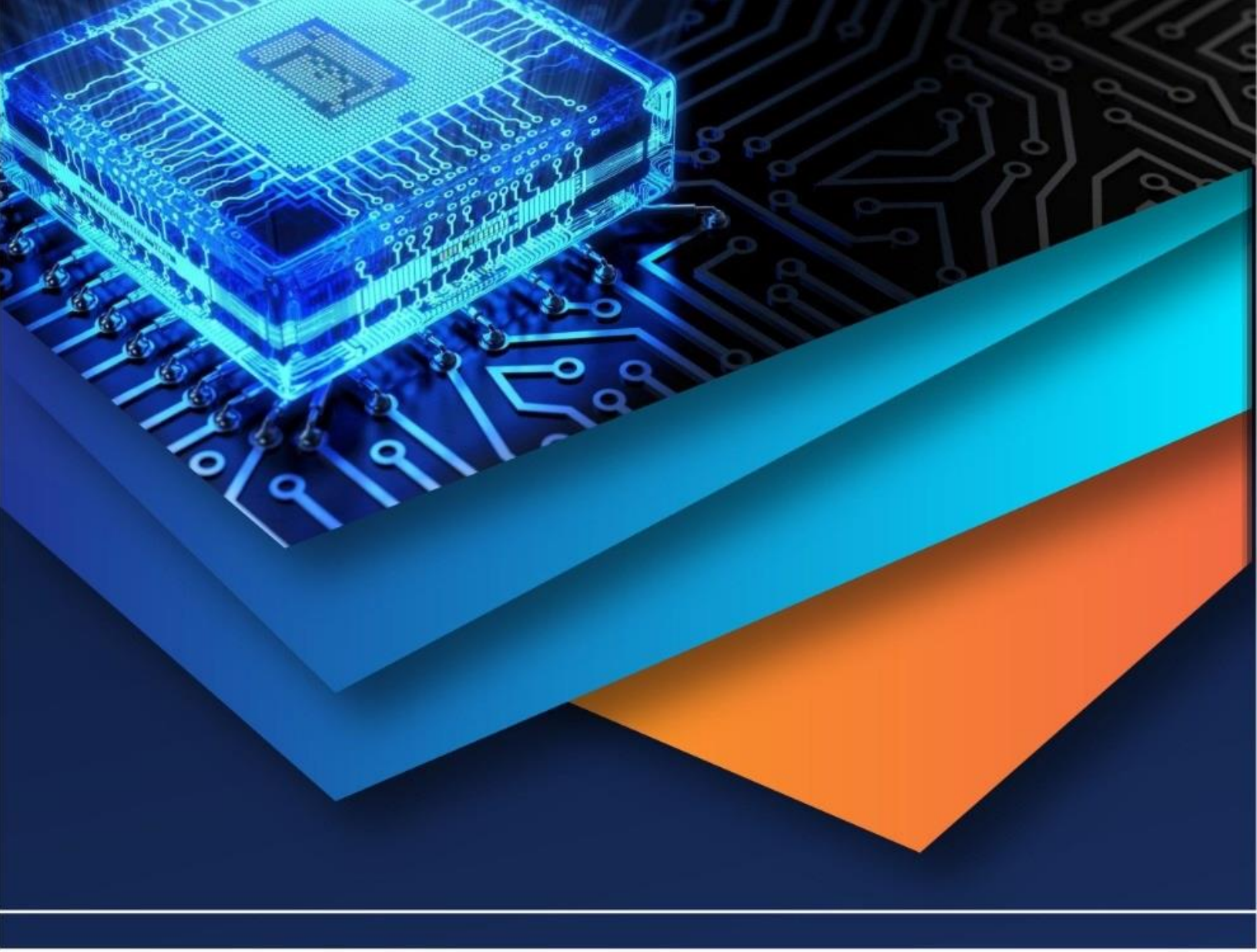


II. CONCLUSION

By using the about idea we can able to avoid the accidents that are caused by the trains. By using the obstacle sensor it regularly monitors the obstacles on the train track and sends the signals according to that. The usage of the fire sensor also gives the advancement to the projectby making the alarm and sprinkler ON to reduce the casualties . This system not only helps in avoiding the accidents but also in worst case scenario if any accident happens it will surely send the signals to the nearest station for help. If this works well in the real time scenario we can also make advancement in the system by using the other technologies to improve the system performance to avoid the accidents.

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