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Train Collision Avoiding System

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Abstract: ***The main end of the design is to measure the speed of trains and to insinuate it to the station control room TCAS, if the train exceeds it's maximum speed limit.***
Then we will place two IR transmitter receiver dyads with some distance, along the road. And by calculating the time difference between the activation of two IR receivers as per the law sense, the speed of the train can be calculated. So now we will design the design in such a way that the regulator will be connived to the two IR receivers and to the GSM modem through a line motorist IC MAX232 for periodical communication.
Then GSM modem is used to shoot the SMS to the control room to insinuate about the overspeeds.However, the GSM modem sends corresponding data to the station control room TCAS as per the law sense, If any train crosses the speed limit means the time between the activation of two IR detectors is lower than the time limit.
Keywords: Arduino Uno, IR Sensor, GSM Module, IC MAX232, TCAS, LCD Display, LEDs

I. INTRODUCTION

The system is designed to record and report on colorful conditioning within a process called the Tracking System. In the Robotics control system, the control and operation of precise speed control of the unstable system phase where there are dislocations and friction parameters are attained using a wireless communication system.
When driving on rails, train motorists shouldn't exceed the maximum speed limit allowed by their train. Still, accidents continue to do because of the speed limit because train motorists frequently ignore their running detectors. This speed checker will be veritably useful for train control room TCAS drivers because it'll not only give digital display depending on the speed of the train but also sound an alarm if the train exceeds the speed limit.
The system principally has two IR dyads, located on the road tracks outdoors, with a transmitter and two dyads receiver on the other side of the road.
The system shows the time taken by the train to exceed this distance from one brace to another where the speed of the train can be calculated. The total distance between night jitters and time is the interval between crossing the first detector and the alternate detector. The system installed in a train- loco thresholds working automatically as soon as it detects anything going wrong in movement of the train by transferring cautions to all the concerned authorities, including the train's motorist, the coming road station and others over a prescribed radio frequence.

II. LITERATURE REVIEW MATERIALS AND METHODOLOGY

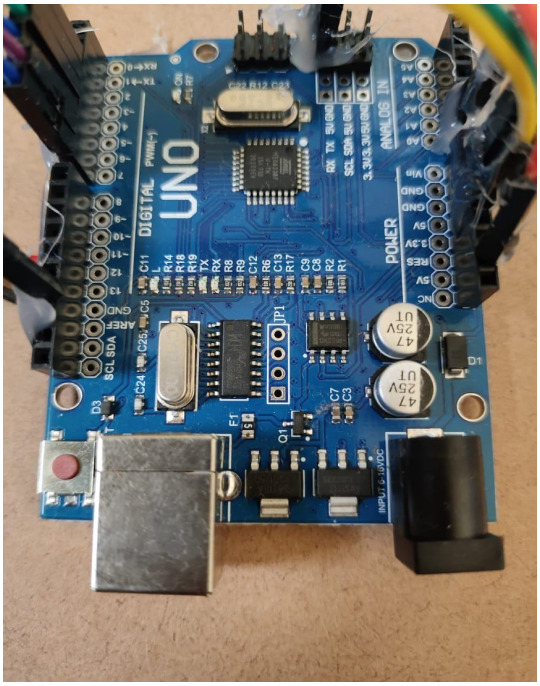
A. Literature Review

This system has been designed assuming that the maximum admissible speed for railroads is moreover 40 kmph or 120 kmph as per the rules. Before operation, using a multimeter we've to check whether the power force affair iscorrect.
However, apply power force to the circuit by flipping switch to ' on' if yes. In the circuit, we use long cables for connecting the two print DIODEs, so that we can take them out of the PCB and install on one side of the road, 100 measures piecemeal. We've installed two IR Diode transmitters (similar as IR Diode firebugs) on the other side of the road exactly contrary to the print DIODEs similar that IR Diode light falls directly on the print DIODEs. Reset the circuit by pressing RESET switch, so the display shows '0000'. Stationary TCAS unit shall also transmit the Movement Authority to the Loco TCAS in its governance in station area. The length of the movement authority is decided grounded on the signal aspect of the approaching Stop Signal. The Loco unit shall make speed profile/ boscage wind for different situations grounded on movement authority, speed restriction and other information as entered from Track side sub-system. The Loco TCAS unit shalldisplay the train speed, the permitted speed, the target distance and the target speed to the loco airman through a motorist Machine Interface (DMI).

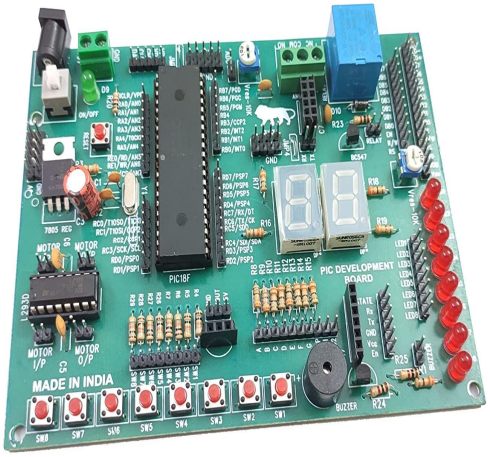
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B. Materials

1) *Arduino UNO:* The Arduino UNO is built around the ATmega328P microcontroller. In comparison to other boards, such as the Arduino Mega, it is simple to use. The board is made up of digital and analogue I/O pins, shields, and other circuits. The Arduino UNO has six analogue input pins, fourteen digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It's written in IDE, which stands for Integrated Development Environment. It is compatible with both online and offline platforms.



2) *PC Microcontroller:* PIC Microcontroller PIC16F877A is one of the most popular microcontrollers in the assiduity. This microcontroller is veritably easy to use, render or edit this regulator is also easy.



3) *Proteus 8 Professional:* Proteus 8 professional is a software which can be used to draw schematics, PCB layout, law and indeed pretend the schematic.
4) *MPLAB X IDE:* Proteus 8 professional software that can be used to draw schematics, PCB format, law and indeed system simulation.

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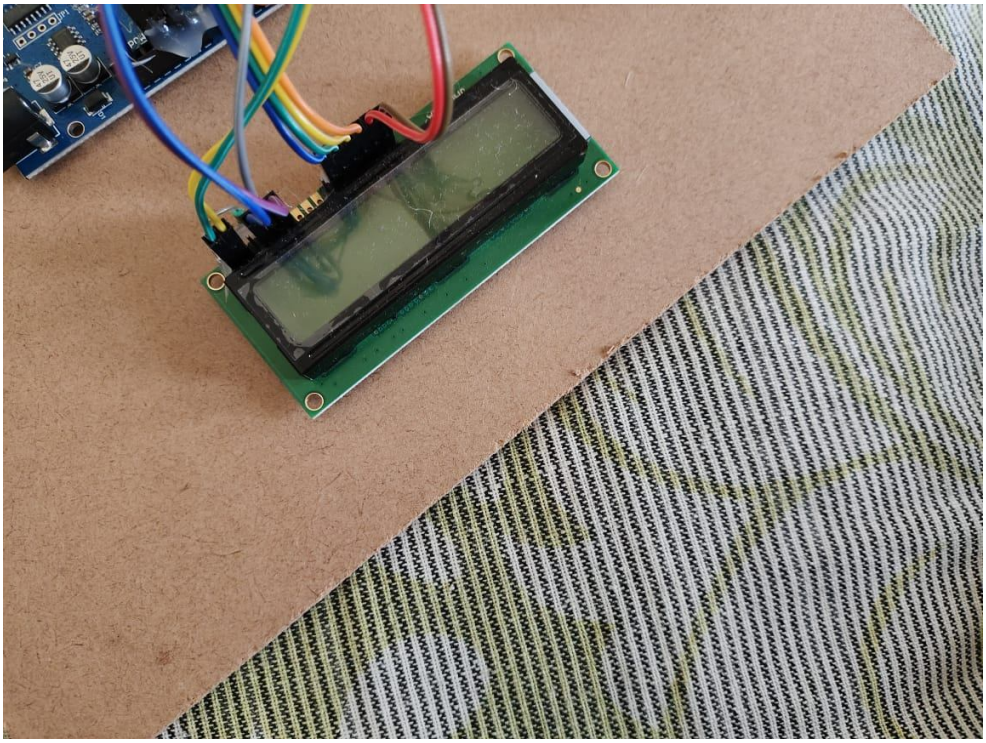
5) *IR Detectors:* IR technology is used in everyday life and in the assiduity for a variety of purposes. For illustration, TVs use an IR detector to descry signals transmitted from a remote. The main advantages of IR detectors are their low power consumption, their simple structure and their simple features. IR symptoms aren't detected by the mortal eye. IR shafts in the electromagnetic field can be set up in the regions of visible microwave oven. generally, the wavelengths of these swells range from0.7 µm 5 to 1000µm.



6) *Buzzer:* Sensor-Buzzer is a buzzer that is passive. It is like a magnetic speaker, requires voltage with different frequencies in order to produce sound. When the frequency increases, the pitch becomes louder.

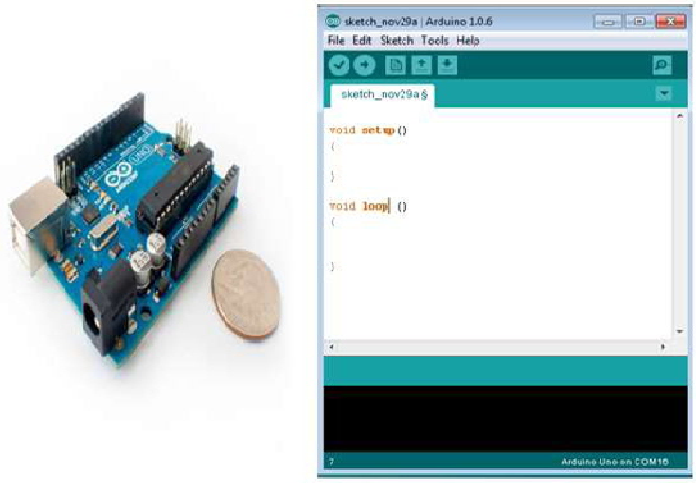


7) *Tv Display:* The TV screen(Liquid Crystal Display) is an electronic display mode with a wide range of operations. The 16x2 TV display is a introductory and extensively used in colorful bias and circuits. These modules are preferred over seven orders and numerous other LEDs. Reasons available LCDs are provident; fluently organized; there's no limit to displaying special and customized characters (as opposed to seven orders), vitality and further. 16x2 TV means it can display up to 16 characters per line and there are 2 similar lines. In this TV each letter is displayed on a 5x7 pixel matrix. This TV has two registers, videlicet, Command and Data. The command register keeps the instructions given by the TV.



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8) *Arduino IDE Compiler:* Arduino is an open-source electronics platform built primarily on user-friendly hardware and software. To upload our programme into the microcontroller, the Arduino IDE employs an AVR-GCC compiler and AVR-dude. The Arduino IDE is open-source software for writing and uploading code to Arduino boards. The IDE application is compatible with a variety of operating systems, including Windows, Mac OS X, and Linux. It is compatible with the programming languages C and C++. IDE is an abbreviation for Integrated Development Environment.



C. Methodology

Protection Functions

Prevention of Signal Passing at Danger (SPAD)

1) Stationary TCAS unit shall calculate the movement authority grounded on the signal aspect or/ and track circuit status or/ and route locking status, point position and the status of the berthing track circuit.

2) In case of any conflict between signal aspect, point position, berthing track section, signal aspect sequence and drum, the Stationary TCAS unit shall transmit most restrictive aspect of that signal and shall reduce the movement authority consequently.

3) Stationary TCAS unit shall check route information configured on the base of the TCAS Control Table of the stationary TCAS Unit(banning overlaps.

III. MODELING AND ANALYSIS

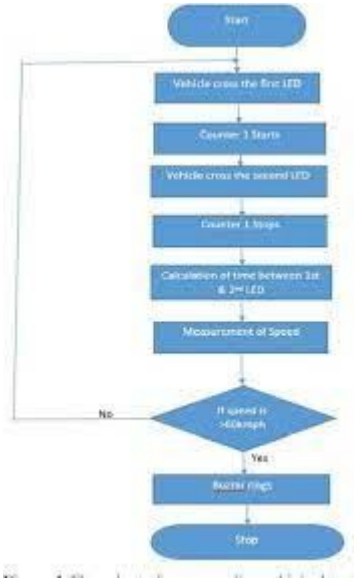


Figure 1: Model Block Diagram.

IV. RESULTS, DISCUSSION, AND CONCLUSION

While driving on India's railroads, motorists shouldn't exceed the speed limit. still, accidents do as a result of speeding as numerous motorists exceed the speed limit. An easy- to- manage rail speed checker is used and to describe possible train collisions on railroads without mortal intervention. TCAS drivers take immediate action when the speed limit exceeds as the system provides digital display and alarm to descry any speed of the train if the train exceeds the speed limit. To overcome this problem, we've used a circuit called speed checker and overhead discovery. This program is cheap and easy to install and there's no need for homemade monitoring. If the speed limit falls the alarm is raised to alert TCAS officers to immediate action.

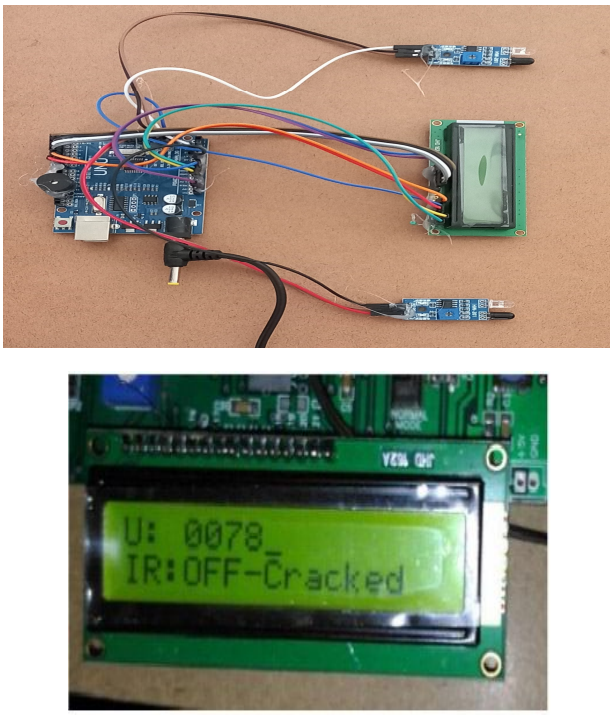


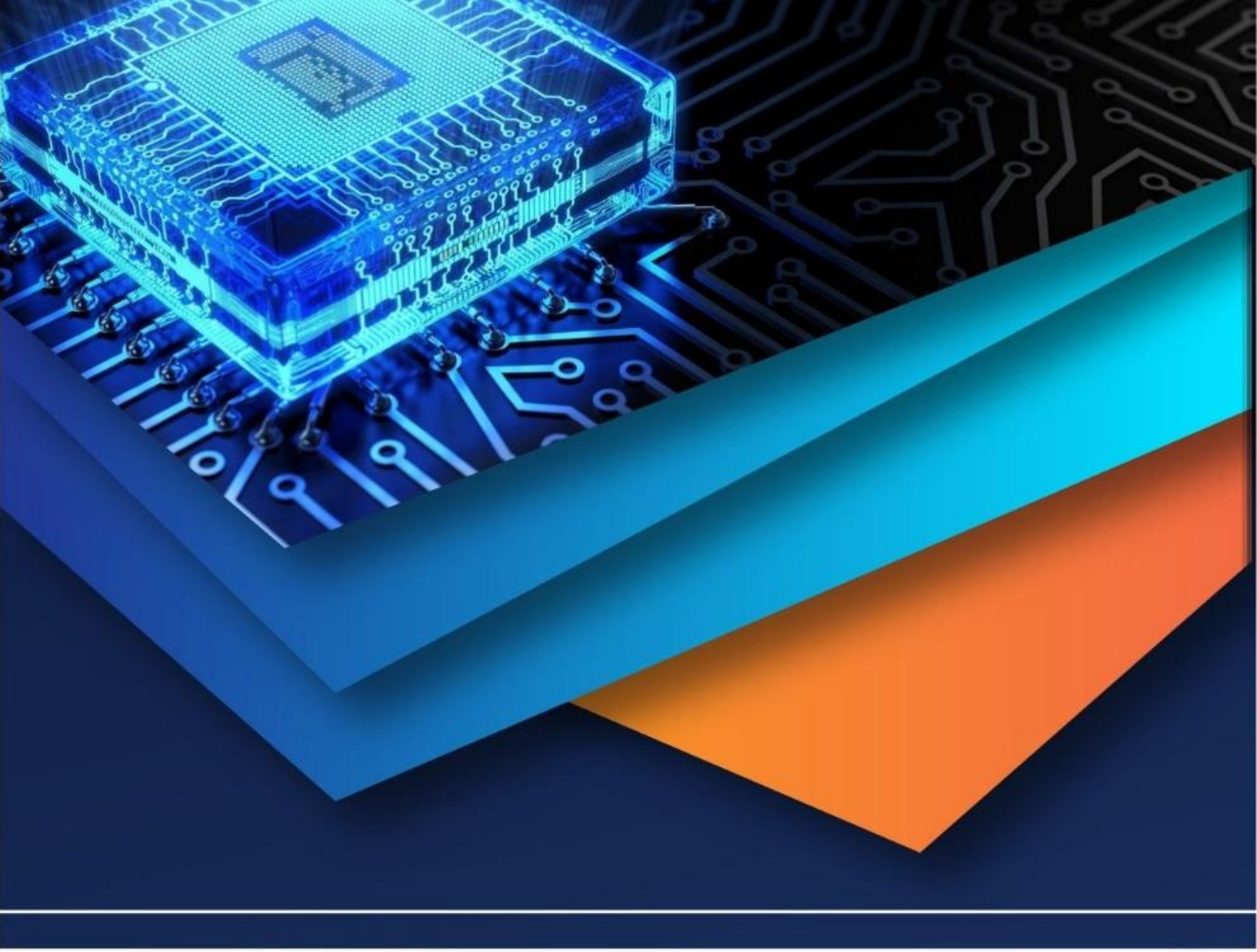
Figure12: Distance from Opposite Vehicle and Crack on Track

V. CONCLUSIONS

The design "TRAIN COLLISION AVOIDANCE SYSTEM " has been successfully designed and tested. It has been developed by integrating features of all the tackle factors used. Presence of every module has been reasoned out and placed precisely therefore contributing to the stylish working of the unit. Secondly, using largely advanced ICs and with the help of growing technology the design has been successfully enforced. Indian Railroads have successfully piloted ACDs in the northeast frontier road, covering,736 kilometres (079 mi) of its broad hand route. They're now installing the ACDs on 760 kilometres (470 mi) of the Konkan Railway.

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