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Speed Limiting and Control of Vehicle in Restricted Zone Automatically

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Abstract: ***Automatic vehicle monitoring has turned outto be a very crucial scenario in the current years. It may develop into possibility by executing the following technologies. This project targets to propose a system, which detects speeding vehicles over a specific speed limit and immediately report to concerned authorities. At present, road accidents rates have raised so, there is a necessity for developing a system that detects an over speeding vehicle. The implementation of present Smart Vehicle over speeding Detector using Internet of Things determines all the road traffic information automatically with intelligence. When the vehicle crosses the school/college, RF receiver in the vehicle will send signalto the microcontroller. The microcontroller immediatelycontrols the driver section to control the speed of the motor.Therefore when the vehicle crosses the school/College, the speed of the vehicle will be automatically decreased. This will prevent unnecessary accidents.***
Keywords: Arduino uno, RF Transmitter & Receiver ,Automatic Speed Control Vehicles.

I. INTRODUCTION

The major concern of vehicle accident is the part of continual disaster lists, which might happen anywhere anytime. In accordance with Association for Safe International Road Travel Report, around 1.24 million people die and 50 million people are getting wounded onthe roads each year in the World. Statistically, they are assumed as the second important reasons for death. In order to overcome these problems, many automobile device industries and vehicle manufacturers have tried to propose speed control techniques in order to keep upa vehicle safe distance. In this direction, the effort is going on devising a security driving application for vehicles by new rising IoT-oriented technology, which is employed for devising a more effective solution [1]. The IoT (Internet of Things) is the interrelation of distinctly identifiable embedded computing appliances inside the existing infrastructure. IoT provides sophisticated connectivity of systems, services and devices, which goesbeyond M2M (Machine to Machine Interactions) and covers different domains and applications. This interrelation of embedded appliances like smart objectsis implemented in all automation enabling modern applications such as Smart Grid [2]. The target of this project is to propose and develop a new Smart Vehicle Over speeding Detector using IoT technology for alerting information about over speeding vehicles. The smart vehicle over speeding detector is very essential for the human life as there are so many accidents in road every day. This study gives a general idea about a smart vehicleover speeding detector and also concentrates on the functionality of the over speeding detector by use of IoT technologies. In addition, the current research concentrates on the various methods for controlling the over speeding radars using literature survey. Further this research explains the technical working of the speeding detector and benefits associated with it. Thus, the proposed analysis will act as an eye opener for the future researches and it provides new insights about the particular topic for the researchers and academicians.

II. LITERATURE SURVEY

The authors have presented EBM (Eye Blink Monitoring) technique, which alerts the focus during drowsiness state. An embedded system depends on the psychological state of focus through monitoring head movements and eye movements are helpful in alerting drivers at the sleep cycle stage of drowsiness. An ordinary eye blink moment has no effect on the system results [1].

In [2], researchers have designed Automated Speed Detection System that may detect the vehicle's speed and if over speeding happens, then remove the particular vehicle's license number and send it through mail to Toll Plaza in order to indict fine. Here, Doppler Effect observable fact is employed for measuring the speed. If over speeding is identified, then a camera captures the image of a vehicle automatically; and DIP (Digital Image Processing) methods are used to remove the license number. The findings have revealed that the developed system detects over speeding vehicle successfully, mines the license number, has great performance and may be used on roads to test out for over speeding vehicles.The researchers, in [3], have designed and developed a novel system, which may efficiently identify speed violations on roads and helps driver to respect traffic rules by maintaining speed along with the prescribed speed limit.

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The developed system contains RFID (Radio Frequency Identification), GSM (Global System for Mobile) and PIC (18F45K22). This system has provid reliable, low cost, effective results and real-time notification.

In [4], the authors have proposed a new Vibration Sensor Device that was set on the vehicle. If any accident happens, vibration is activated and then vehicle's location has been detected with the help of GPS locator.

In [5], RF transmitter and receiver needs power source or battery power for operating and it can be usable for a long period over more than decades. It has an inbuilt short range antenna or we can use handheld antenna. The antenna type used in the RF module has a scanning antenna

In [6], RF transmitter module is a small assembly it can ableto transmit the radio waves. This is working along with microcontroller. This is used to give data to module which can be transmitted. Transmitter power output can be decreased by the physical environmental changes such as harmonics, noise and so other parameters.so we can take a necessary steps to overcome this to make transmitter to increase or maintain the quality.

In [7], An RF Receiver module receives the modulated RF signal, and demodulates it. There are two types of RF receiver modules: super heterodyne receivers and super- regenerative receivers. Super-regenerative modules are usually low cost and low power designs using a series of amplifiers to extract modulated data from a carrier wave. Super-regenerative modules are generally imprecise as their frequency of operation.

In [8], The Zigbee transmitter is placed at that zone for example hospital while the vehicle reached that area the signal is received by the Zigbee receiver in the vehicle. The speed of the vehicle is compared with the determined speed in that area. If speed is higher for that zone the microcontroller takes in action to reduce the speed of the vehicle and if it is silence zone it disables to make a horn varies considerably with temperature and power supply voltage.

Immediately, the incident has been intimated to Patrol and Life support in order to recuperate the accident as well as suspect is to be tracked by means of GPS locator. The researchers have estimated the speed of vehicles by incorporating the accelerometer readings throughout the time and determine the acceleration faults.

III. MODULE DESCRIPTION

A. Transmitter Module

An RF transmitter module is /a small RFID card assembly it can able to transmit the radio waves. This is working along with EM 18 RFID reader. This is used to give data to module which can be transmitted. Transmitter power output can be decreasedby the physical environmental changes such as harmonics, voltage and so other parameters. So we can take necessary steps to overcome this to make motor driver controller to decrease the speed of the DC motor.

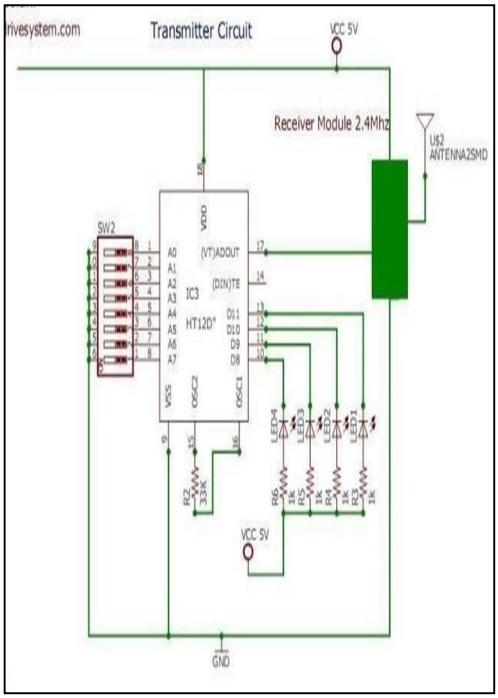
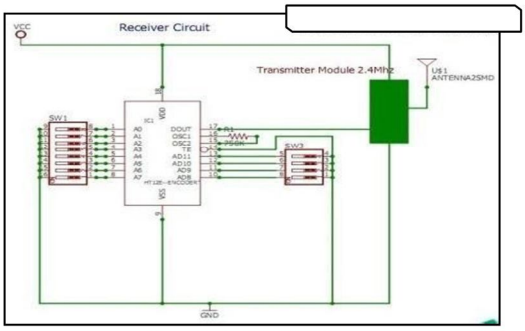


Figure1: RF transmitter

B. Receiver Modules

RFID Reader has transceiver which generates a radio signal and transmits it through antenna. This signal itself is in the form of energy which is used to activate and power the tag.



- Figure 2: RF Reciver
-

When RFID tag comes in range of signal transmitted by the reader, transponder in the tag is hit by this signal. A tag power from the electromagnetic field created by reader. Then, the transponder converts that radio signal into the usable power. After getting power, transponder sends allthe information it has stored in it, such as unique ID to the RFID reader in the form of RF signal. Then, RFID reader puts this unique ID data in the form of byte on serial Tx (transmit) pin. This data can be used or accessed by PC or microcontroller serially using UART communication.

C. Motor driver controller Lm 298

The L298N is a dual H- Bridge motor driver which allows speed and direction control of two DC motors at the same time. The module can drive DC motors that have voltages between 5 and 35V, with a peak current up to 2A. The module has two screw terminal blocks for the motor A and B, and another screw terminal block for the Ground pin, the VCC for motor and a 5V pin which can either be an input or output. When there is an input to the RFID reader, voltage passed to the motor will be reduced so that automatically speed of the motors will be decreased.

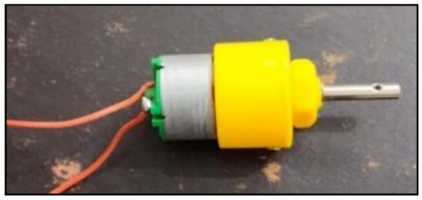
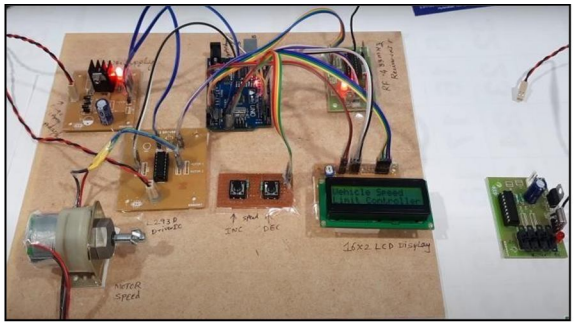


Figure 3: Motor driver controller

IV. WORKING

Passive RFID tags are kept at the beginning and end of speed limit zones. When a vehicle enters the speed limit zone the RFID reader installed in the vehicle detects the tag which is placed on the speed limit indicator at the beginning of the speed limit zone. Now the reader has the 12 digit code which is transferred by the tag. This 12 digit code indicates the speed limit which is to be maintained in that region. Once the reader gets this code, it is then transferred to the control unit, here Lpc2148 microcontroller, for processing.



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When the microcontroller gets this 12 digit code, it compares this with the 12 digit codes which are already saved in the database of the micro controller. If the code matches with any of the codes in the database, then the micro controller knows that it is a valid code. Also it knows the speed limit which is to be maintained in the zone indicated by the tag. Then the speed of the vehicle is reduced.

This paper, the drive of the vehicle is provided by a 12V dc motor. The speed of the motor is controlled using Pulse Width Modulation (PWM) technique. Pulse widthmodulation is the technique in which the width of the output pulse is varied by changing the RFID signal. Thewidth of the output pulses decreases or increases as the

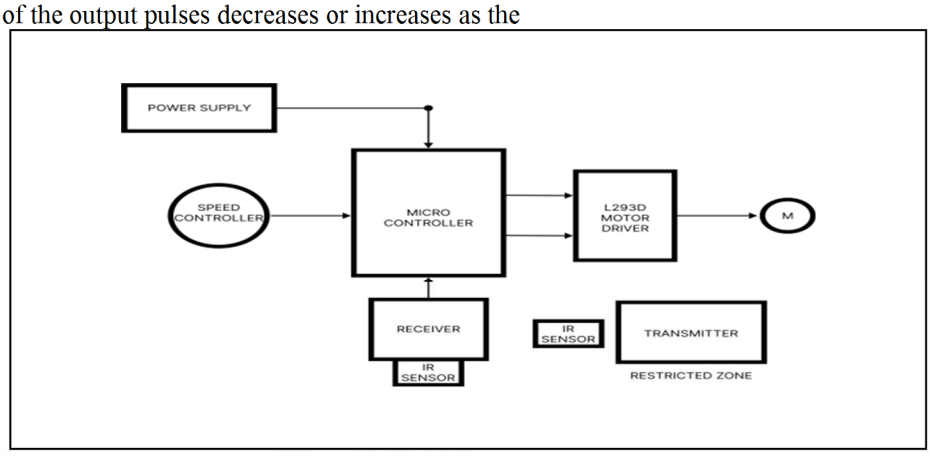


Figure 5 .Block Diagram

RFID tag changes the signal with respect to zone area. This pulse produced by the PWM is given to the motor driver unit for controlling the speed of the motor. When the pulse width is large, the speed of the motor increases and when the pulse width is small, the speed of the motor decreases.

The motor driver unit is a ULN Driver which turns on and off the motor with Pulse Width Modulation the motor used in this paper is a 12 V dc motor. Also the ULNDriver which acts as the motor driver is a high power device. Hence it requires high power to drive the motor unit. But the pulses used for driving the motor are produced by the PWM in the microcontroller. The microcontroller is a low power device which can produce a maximum of 5 V output. If this low voltage output is connected directly as input to the high power circuit, it will not work properly. Also if the low power circuit is connected to the high power circuit directly, it can damage the low power circuit.

The Arduino Uno was used as a the implementation of 'AUTOMATIC SPEED CONTROL OF VEHICLES IN THE RESTRICTED AREA' using Arduino UNO, DC motor, Zigbee module and sensor, where the speed of the vehicle is reduced automatically. This speed control system assures that the number of accidents near the school and another specific zone to reach its minimum speed. this system requires very low cost, durable, low power, and gives maximum safety to the public and simple design to implement in the specific areas. This system also works on bad weather days. This system will protect the public from the rash drivers, alcoholics, and the drivers who lost their minds while driving. By implementing this system we can give a safe and peaceful environment to the public.

V. DESIGN CONSIDERATIONS

1) There is no time lag for the output signal to reachthe motor.
2) The average time taken to process the inputs andoutputs by the Arduino is 30ms (Approx).
3) The motor driver takes around 10ms(Approx)toswitch the circuit.
4) Therefore, the total delay in the execution of theprogramwill be, delay = 10+10+30= 50ms (milliseconds)

VI. FUTURE SCOPE

This system proves to be highly effective in minimizing the over speeding and unwanted accidents in restricted zones. In current systems, there is no autonomous speed restriction in the vehicle to avoid accidents. Hence further research and optimizations of the automatic vehicle speed control system will allow us to implement in vehicles for improved safety for roadside pedestrians, passengers, andother road users.

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VII. FINDINGS

The automatic vehicle speed control system is a much more practical and safety feature for the pedestrian and it is economical in implementation. The Zigbee wireless communication is chosen rather than the RF wireless communication due to its secured encryption and multipleconnections for communication

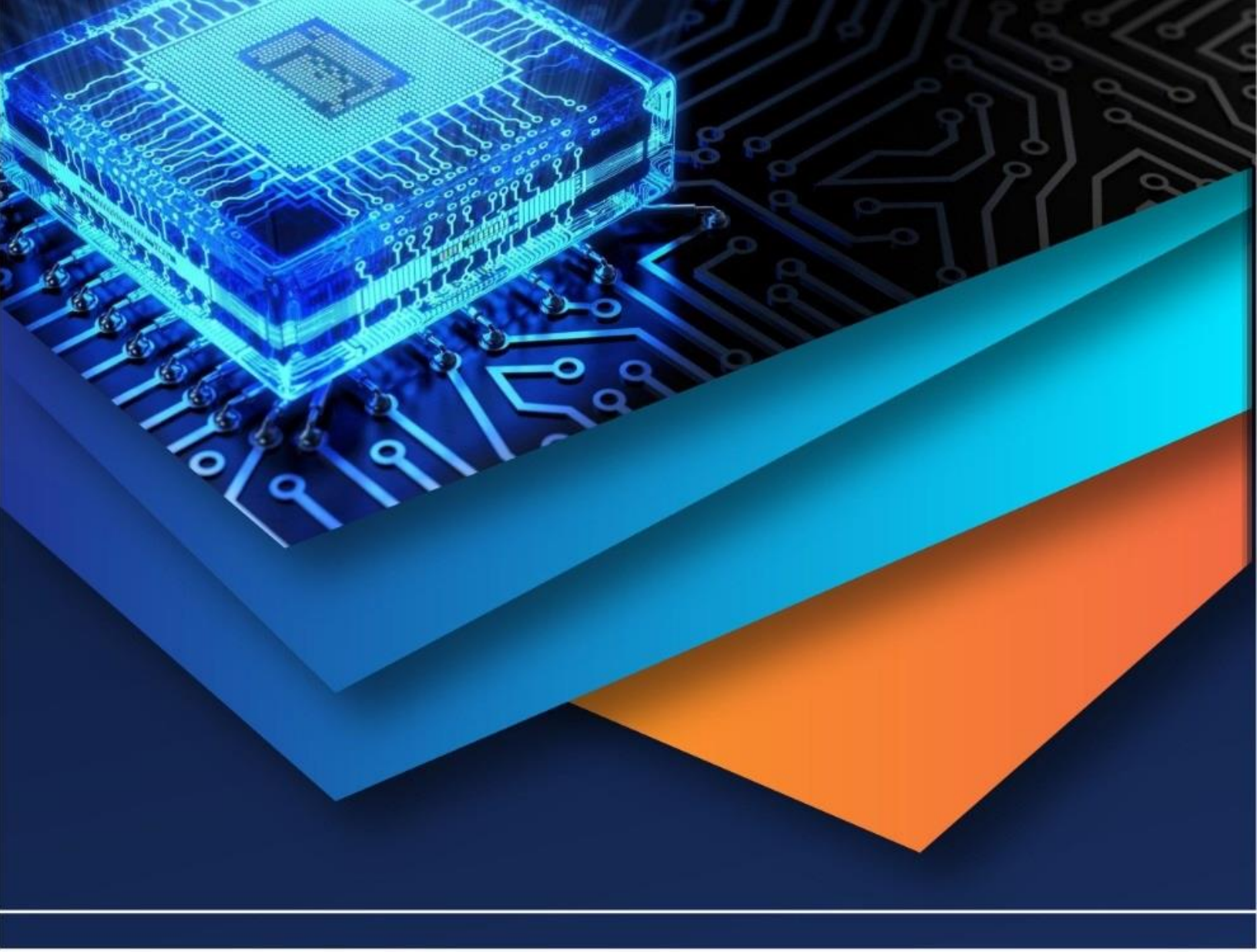
VIII. CONCLUSION

The paper has an RFID tag which indicates the vechicle when it enters a speed limit zone. Hence by using slotted couplers the speed of the vehicle is monitored and using pwm technique the micro controller unit controls the speed, the speed of the vehicle be maintained in the limited speed without the intervention of the driver. If this can be implemented effectively rash driving and over speed can be reduced to a large extend, thus decreasing the total number of road accidents in our country.

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