

IoT Based Vehicle Speed Sensing & Smoke Detecting System

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Abstract - This article emphasizes an advanced method for controlling the pollution of vehicles through sensor integration process. All sensor nodes will be connected to a control centre and it will be monitored using Online Monitoring System (OMS) with the help of an Improved Smoke Detection Algorithm (ISDA). The purpose of using ISDA is to monitor the vehicles which are located in different areas under different temperatures where, the ISDA divides the regions into circles. The data obtained in OMS will be aggregated and it will be plotted in MATLAB for better understanding. To test the efficiency of the projected method three test cases which include control of energy, minimization of range and cost have been performed. It is observed that in all three cases ISDA proves to be more efficient in terms of energy consumption, cost and distance when compared with existing methods. *System alerts everyone if the pollution has increased above a certain level.* In today's world road and transport has become an integral part of every human being. The present transport system has minimized the distances but it has on the other hand increased the life peril. The focal idea of this paper is very functional to implement as road safety measure. This paper proposes a novel system where it is able to automatically control the speed of the vehicle by detecting the speed signs labels from speed sign boards, which are laid on the road side and take necessary steps to take it to the knowledge of the driver by sending a caution notification. When the driver does not speed down even after the sign of caution, details of the vehicle are notified to the authorities (traffic officials) and the speed of the car is reduced to threshold speed limit as on the speed label. This paper proposes an innovative approach by using two wide scoped fields and relevant knowledge to its fullest. A real time image processing software MATLAB identifies speed sign label, ARDUINO UNO to send that data to cloud and GPRS module to send location of the vehicle. The sent data gets analysed by PHP in the cloud and necessary steps are executed according to the results of the analysis.

Keywords—Air pollution; sensor; IoT ;hardware; traffic control.

I. INTRODUCTION

In recent days, there is a huge necessity of wireless devices to monitor the daily needs of human. Even the applications of wireless devices have been growing and it is easy to implement in vehicular systems also. Most of the urban areas are facing the problem of environmental pollution due to the smoke that is emerging from vehicles. Even a lot of people are unable to breathe due to the presence of smoke in the atmosphere. Most of the people are still using old vehicles which are producing more smoke than estimated and even the change in type of engines also does not provide any satisfactory solutions. The only way to overcome from the threat that is caused by the smoke from vehicles is to stop those vehicles which are producing more smoke than the threshold values at a

particular place without causing any accidents.

Road safety plays an important role in shaping the transportation to a risk free system. Maintaining the threshold speed labelled on speed board sign prevents many fatal accidents caused due to over speeding. Over Speeding is the major cause of vehicle accidents that greatly increases the risk of death or injury.

Disadvantages in existing method:

1. Threshold speed depends on geographical locale which may change in real time.
2. There is no track of vehicle speed.
3. Control of vehicle speed is difficult in real time.

So, this system detects various speed labels as threshold speed of the vehicle. It stores all the data of the vehicle

which includes location, time, instantaneous speed and threshold speed at a particular time.

II. RELATED WORKS

There are many efficient character recognition algorithms using optical character recognition. There are also many systems for vehicle speed control. This paper implements an idea which includes both character recognition which is used to control the speed of the vehicle. Ragini Bhat et al [1] proposed a character recognition technique using simple but efficient morphological operation and sobel edge detection method. This approach is simplified to segregate the numeric characters using bounding box method. Chi-Hung Chuang et al [2] proposed an approach to overcome the problems for poor character recognition with low resolution, long distance image and blurred image with super resolution, by LBP with the concept of fuzzy logics. . Ankush Roy et al [3] proposed a method to overcome the difficult to correctly identify the non- standard characters, by using a pixel based segmentation algorithm of the numeric characters in the speed board. . Arulmozhi K et al [4] applied skew correction technique is applied for accurate character segmentation followed by character recognition Centroid based Hough Transform technique is presented for skew correction of license plate. Roy et al [5] proposed a method where image filled with holes is used for licence plate segmentation, removing all the connecting edges and applied a threshold of 1000 pixels. Sang Kyoon Kim et al [6] proposed a method using a distributed genetic algorithm to overcome the difficulties dealing with degraded number plates. SerkanOzbay et al

[7] proposed a method to add a simple step before character segmentation which is more efficient to remove noise and unwanted spots. Amninder Kaur et al

[8] performed pre-processing and number plate localization by using Ostu's methods and feature based localization methods. Shan Du et al [9] presented all the methods which are being used till then and have also listed pros and cons of each method in plate segmentation. Keller et al [11] proposed a camera-based system for detection, tracking, and classification of U.S. speed signs is presented. The implemented application uses multiple connected stages and iteratively reduces the number of pixels to process for recognition. Possible sign locations are detected using a fast, shape-based interest operator. Remaining objects other than speed signs are discarded using a classifier similar to the Viola- Jones detector. Classification results from tracked candidates are utilized to improve recognition accuracy. ‘.

III. PROPOSED MODEL

Over Speeding is detected and the speed of the vehicle is reduced automatically to the maximum permissible limit. Detects the smoke and also maintain logs if Smoke emission limit is crossed so that concerned authorities can

take action.

Money is saved on the integrated system as the model does two important work using just one central unit and also the cost of unit is less.

The system is fast and controls the hardware and software automatically. Also, since it is a simple system so can be easily available.

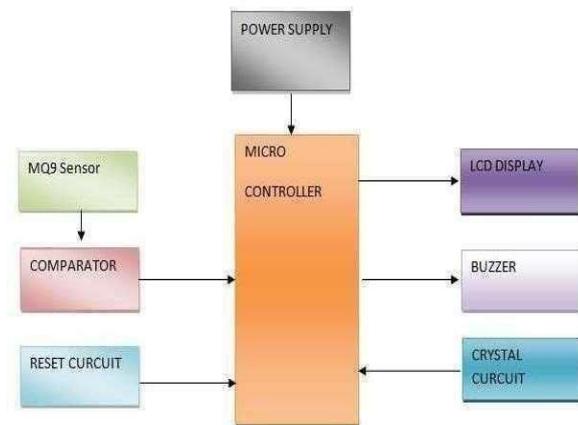
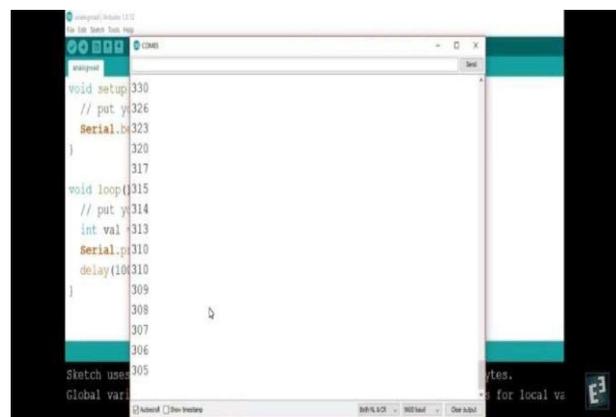


FIG.1 : BLOCK DIAGRAM

Polluting vehicles are significant source of air pollution in urban areas which eventually will lead to the air getting polluted in the whole world. □ This causes global warming at a rate that can cause catastrophe at extreme level like tsunami, unbearable rise in global temperature, large scale extinction, the signals of which were witnessed during Australian bushfires and melting of antarctica glaciers. □ The major populated countries in the world including India suffers from lots of human resource damage due to car accidents many of which are caused by over speeding vehicles. □ Majority of these cases are due to negligence of driver and automobile industries which make less efforts to control these accidents even after having enough resources to bring safe technologies. □ The Air Pollution data and Over Speeding data of vehicles and the systems devised to control it are not very efficient while India being such a large country needs constant access to such data to control faulty vehicles and irresponsible drivers.



Transmitter

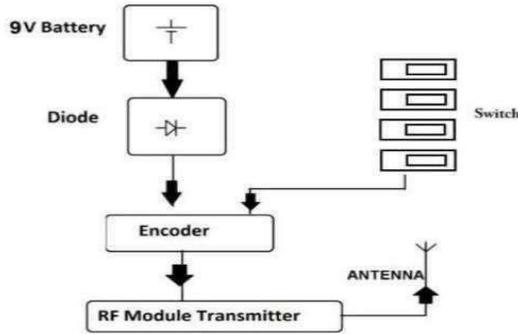
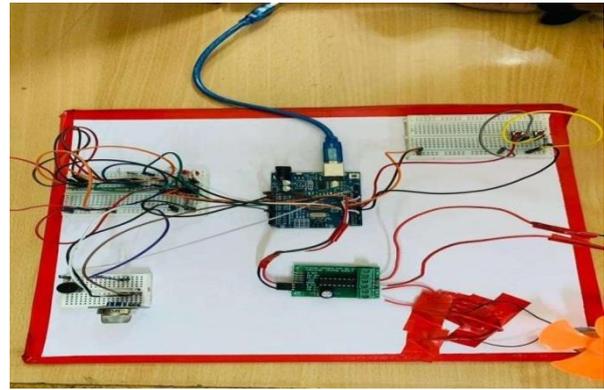


FIG: TRANSMITTER



FigResultant Working Circuit

Receiver

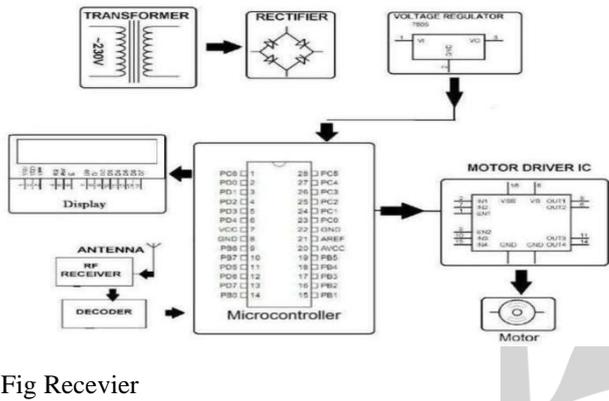


Fig Recevier

The power up the circuit 12v power supply is used. Using manual switches traffic light signals are controlled and after that driver and relay circuit is used to switch the signals from green to red and vice versa, to process input and output the 28- pin microcontroller Arduino UNO is used.

MQ-9 gas sensor using gas-sensitive materials with lower conductivity in clean air tin oxide (SnO₂). High and low temperature cryogenic loop detection mode (1.5V heating) to detect carbon monoxide sensor conductivity increases with the increase in the concentration of carbon monoxide gas in the air, high temperature (5.0V heating) detection of combustible gases methane, propane and cryogenic cleaning adsorption of stray gas.

IV. RESULTS AND DISCUSSION

Our proposed model was successfully completed with the following results: The gas sensor was able to produce the smoke values emitted by the vehicle simulator on the serial monitor. The speed was detected and controlled automatically using wireless transmitter-receiver. The faulty values were logged and registered.

Fig Smoke Sensor output on serial monitor

V. CONCLUSION

Thus by implementing this technology, we can detect the over polluting vehicles easily at the school zone, hospital and pollution levels due to vehicles can be reduced. It has the immense potential to detect the over polluting vehicles at a rate comparably faster than any other. As it is an automated technology, it doesn't require any manpower to work and the accuracy rates are high. Our present scenario is a situation where global warming is occurring very rapidly due to industrialization and over usage of vehicles and as a result the ozone layer, which is a protective shield from the harmful ultra-violet rays has been depleted. Hence it is mandatory to reduce the emission which causes global warming. The main motive of this project is to detect the over polluting vehicles at a rate faster than any other.

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