Smart Traffic Signs

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Abstract— As the vehicles in our country are increasing,the road mishaps are also increasing day by day.Most of them are caused due to most common negligence of overspeeding.This motivates us to think about making a system which ensures the safety of the driver,making it necessary to follow the speed limit,as per the government guidelines.The proposed system is a smart traffic sign.A module affixed in the traffic sign post,such that,the module will sync with module affixed on the vehicle,which will display the speed limit in a display, will be able to detect if the vehicle is overspeeding and will send a notification to the traffic police control station as well as the ignition will seize if the speed is not reduced within a specified time interval.

Index Terms—ESP 8266,GPS Module,GSM Module,Hall effect,RF transceiver,transducer,Microcontroller.

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1 INTRODUCTION

THERE is an alarming increase in the morbidity and mortality due to road traffic accidents.This has been a matter of great concern globally.In India,it is estimated that one accident takes place every 2 minutes.Data from the National Crime Records Bureau indicates that death and injuries related to road traffic accidents has increased four fold during the period 2003-2013.Reportedly 2,56,713[1] people were killed in 2013 on Indian roads.

Despite the safety rules made by the government,many drivers fail to abide by them.The riders in India oftem bypass the prime rule of maintaining a speed limit according to location.This leads to fatal injuries to the rider in case of accidents.Apart from manual checking,there needs to be a system that could enforce this rule upon the riders and hence prevent them from bypassing it.Almost 65% of the accidents in our country can be prevented if the riders start maintaining a speed limit.

Incidence of Accidental Deaths By Natural and Un-natural Causes (2009 - 2013)

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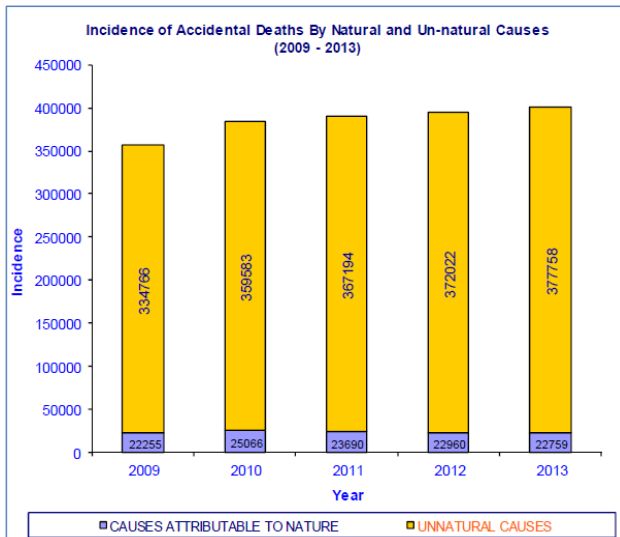
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2 PROPOSED SYSTEM

The proposed system is a smart traffic sign.The system ensures the safety of the driver,by making it necessary to drive within the speed limit,as per the government guidelines.
A module is affixed in the traffic sign board,such that the module will sync with the module affixed on the vehicle.The system will bear the following personalities:

- It will ensure that the driver does not exceed the speed limit as per the locality.
- If the driver does not slow down the vehicle within a stipulated time after receiving the speed limit to be maintained, a notification will be sent to the Traffic police department along with the vehicle details and location [2] through gsm module [3].
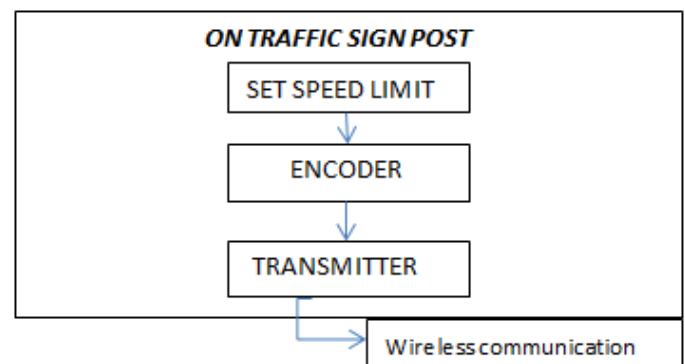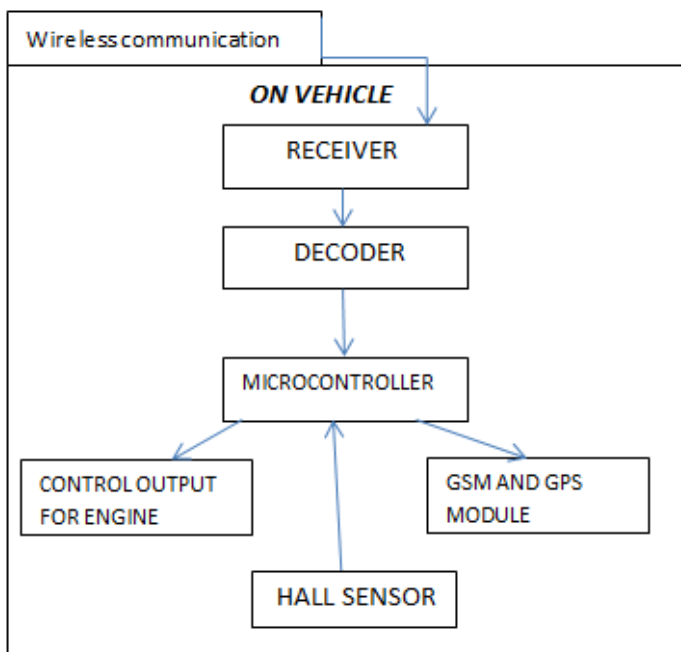
It consists of two parts:
- Module on the traffic sign post and
- Module on the vehicle.

Data from the traffic sign board will be transmitted wirelessly to the vehicle.According to the sensor input(Hall sensor) the microcontroller(ESP 8266) will decide the action of other blocks.

3 SYSTEM DESIGN

The system consists of two blocks:Traffic sign post and the vehicle.

Hall Sensor: A Hall Effect sensor is a transducer that varies its output voltage in response to a magnetic field. Hall Effect sensors are used for proximity switching, positioning, speed detection and current sensing applications. We will be using this to find the speed of the vehicle.
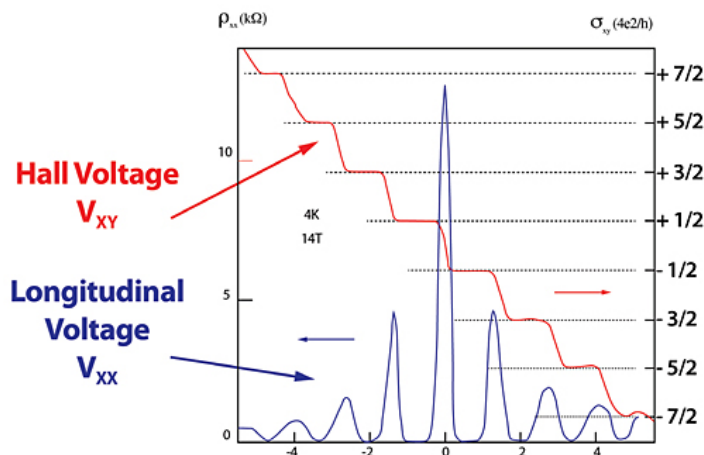
3.1 TRAFFIC SIGN PART

It basically consists of a Microcontroller and Transmitter.

Microcontroller: The speed limit is sent to the microcontroller as input. Through this the threshold speed is sent to the module on the vehicle wirelessly.

Transmitter: A RF transmitter operating at 434 MHz Radio Frequency is used to transmit the serial data to the receiver over wireless media.

3.2 VEHICLE PART

It basically consists of a Receiver, Microcontroller, Hall Sensor, LCD Display, GSM Module and GPS Module.

Receiver: A RF receiver operating at 434 MHz Radio Frequency is used to receive the serial data to the receiver over wireless media.

Microcontroller: This is actual decision making unit of the entire circuit and the programs will be fed into it. According to the data it will receive from the RF module on the vehicle it will control the output of remaining components. Based on the output of Hall sensor and speed limit, it will send message to traffic police department using GSM module and will send a relay output to the engine[4].

GPS Module: It is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position. We will be using this to find the location where the driver has overspeeded[5].
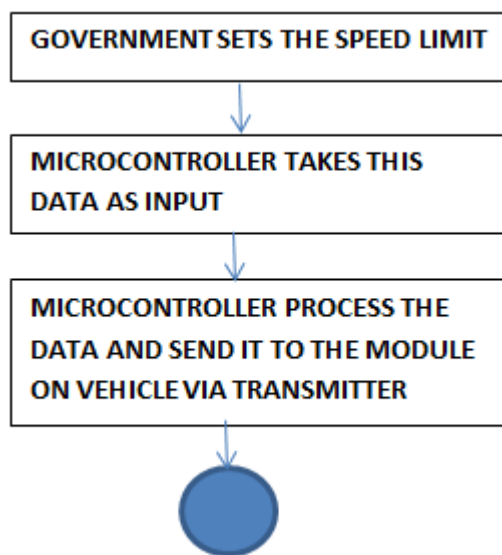
GSM Module: This GSM Module can accept any GSM network operator sim card and act just like a mobile phone with its own unique phone number. Applications like SMS control, data transfer, remote control and logging can be developed easily. The modem can be connected directly to any microcontroller. It can be used to send/receive messages and voice calls. We will be using its SMS application to send SMS to the traffic police department[6].
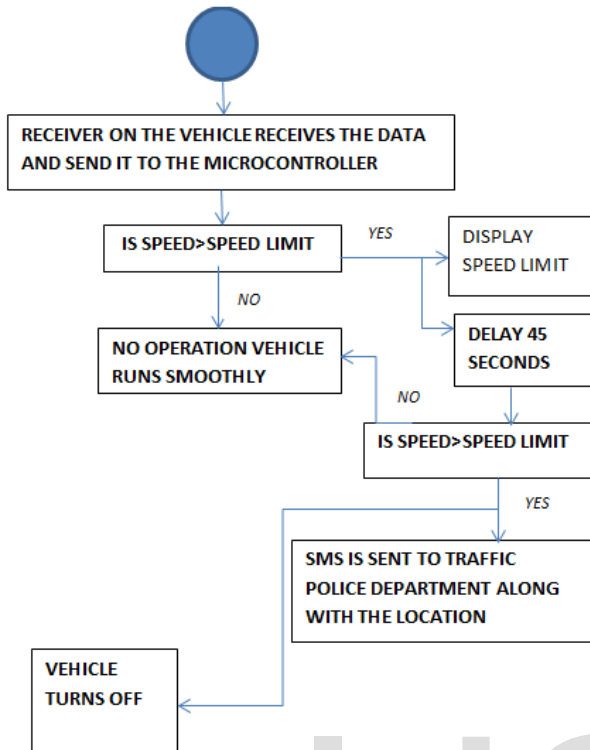
Display: It will display the speed limit and a message to slow down in case of over speeding[7].

4 IMPLEMENTATION

The hardware and software requirements and the work flow of the system are described below.

4.1 SYSTEM WORK FLOW

7 REFERENCES

[1] http://ncrb.gov.in/StatPublications/ADSI/ADSI2013/accidental%20deaths%202013.pdf

[2] http://gauss.gge.unb.ca/papers.pdf/GPS.GGE40th.June2002.lowres.pdf

[3] http://research.ijcaonline.org/volume109/number8/pxc3900994.pdf

[4] https://www.academia.edu/33433822/Smart_Helmet

[5] https://en.wikipedia.org/wiki/Hall_effect_sensor

[6] https://www.codeproject.com/articles/20420/how-to-send-and-receive-sms-using-gsm-modem

[7] https://www.arduino.cc/en/Tutorial/LiquidCrystalSerialDisplay

4.2 SYSTEM REQUIREMENTS

Arduino software is used to hardcore the program into Arduino(ESP 8266) board[8].Other hardware requirements are listed in the table below

SR NO	COMPONENTS	COMPONENT NAME
1.	Arduino	ESP 8266
2.	GSM Module	SIM 900A
3.	GPS Module	NEO-6M
4.	Hall Sensor	KG134 30A ACs712
5.	Display	TFT Color Display
6.	Transceiver	ASK 434MHz RF

5 CONCLUSION

Smart traffic signs ensure the safety of the driver as well as the passengers,by making it necessary to be within the speed limit.If this prime safety rule is violated,the system will seize the ignition and will send message to the traffic police department if the speed is not reduced within a stipulated time.

6 FUTURE WORK

Another type of wireless communication can be used because RF module has some limitations which only provide one way data transmission.All the traffic sign post can be replaced by a module which will greatly save the government expenses thus can be used for some other purpose.