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Smart Highway System for Accident Detection and Prevention Using IoT

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ABSTRACT-

The accidents in India are amongst the highest in the world. The actual number of casualties may be higher than documented. In India nowadays safety on roads has become a serious issue as well as all over in the world. There are some places where accidents occur such as crossings, turns on highways. The accidents on highways can be prevented by understanding the psychological state of driver. A smart system for accident prevention is an ideal concept for smart roads. It is a project that links a different way of looking at things with innovative ideas for safety on roads and highways. The sensors are used to send digital data along with the internet of things (IoT) to take immediate actions under emergency conditions and to communicate through wireless protocol. In this paper we are presenting an electronic system which is based on embedded and Internet of Things (IoT).

I. INTRODUCTION

The presence of devices in an automobile that connect the device to other device within the vehicle or devices networks and services outside the car including other car, home, office or infrastructure.Connected vehicles safety applications are designed to increase situation awareness for accidents though vehicle to vehicle (V2V) and Vehicle to Infrastructure (V2I) communications. The vehicle to vehicle and vehicle to infrastructure communication is done by using two Raspberry-pi.In this project advanced controller is used that is raspberry pi. It also implements wireless vehicle to vehicle communication. Here one vehicle transmits message to another vehicle wirelessly and it reduces noise pollution also because horn is not needed for indication. Ultrasonic sensor measures distance between two vehicles. Here we are also using alcohol detection sensor. When alcohol is detected in vehicles the supply will be off automatically by using relay. In this Project all this communication is done with IOT(Internet of things). we are also using GPS tracker which calculates the langitude and lattitude of vehicles and we will get exact position vehicle.Road traffic safety application have stringent requirements for both bounded delay and high reliability. Examples of road traffic safety applications are warning emergency vehicle approaching , stationary vehicles, drowsiness detection , alchohol detection, anti breaking system.

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II. METHODOLOGY

This project has idea of prevention of acccidents and detection. The detection is done by using sensors. Raspberry-pi is used for wireless V2V communication to exchange safety messages and display messages on server. Ultrasonic sensor is used for distance measurement between vehicles. An another sensor is used for alcohol detection. If there is alcohol in vehicles the supply will be off automatically by using relay. The GPS tracker calculates the langitude and lattitude of vehicles and we get exact position vehicle. Here we have also done with vehicle to Infrastructure communication. An external power supply is provided for operating. If a vehicle arrives near to another vehicle the ultrasonic sensor calculates distance between them if the distance is less than required distance then a safety message is send to LCD display through server on another vehicles LCD this will prevent vehicle from accident. Here one vehicle transmits message to another vehicle wirelessly.

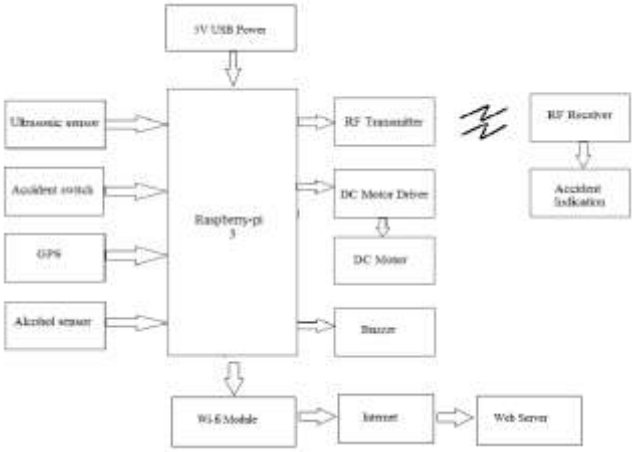


Fig .Block diagram of accident detection & prevention using iot

III. LITRATURE SURVEY

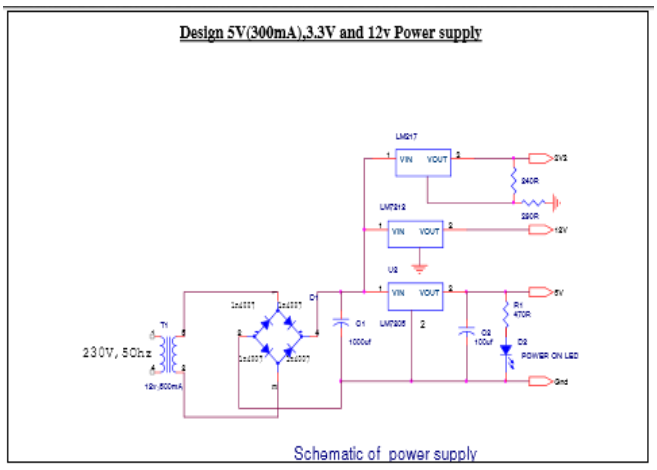
NAME SR.NO	TOPIC	AUTHOR NAME	YEAR OF PUBLICATION	METHODOLOGY USED
1	Smart Highway Systems For Future Cities	Anshu Adwani , Kirti H. Madan , Rohit Hande	2015	"An Intelligent Highway system with (Weather Accidents Landslides and traffic) W.A.L.T." which is an innovative concept to maintain safety on roads

2	Based Accident Prevention & Tracking System For Night Drivers	Aishwarya S.R, Ashish Rai, Prasanth M.A, Savitha	2015	This paper provides Eye Blink Monitoring System (EBM) that alerts the subject during state of drowsiness

IV. COMPONENTS USED TO IMPLEMENT THE IDEA

1. Raspberry-pi
2. DC Motor
3. DC Motor Driver
4. Ultrasonic Sensor
5. Alcohol Sensor
6. MEMS Sensor
7. RF Transmitter
8. RF Receiver
9. Buzzer
10. GPS

V. POWER SUPPLY DESIGN



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To get 5V regulated output we use LM7805.Output voltage of LM7805 regulator is 5V. Dropout Voltage of LM7805 is 2V,So minimum input voltage required at input of regulator to get 5V output is= Output of LM7805

+ Dropout voltage=5+2=7V So minimum input voltage is 7V and maximum input voltage is 35V (Ref. Datasheet) For which LM7805 gives 5V regulated output. Vdc=Regulator output + drop across diode and IC=5+4=9V As we increase Vin for LM7805 Power Dissipation also increases. For LM7805 maximum Power Dissipation is 15W(Ref. Datasheet) In our Design Power Dissipation is = Vdc*Io=9*.3=2.7W 2.7W

Filter Design :

As output of bridge rectifier is pulsating DC ,we need a capacitor to smooth. We have, C=wcRL/(2*pi*f*RL) , where RL=Vdc/I = 9 / 0.3 = 30 ohm Assume wcRL=10;i.e. 10% voltage variation is allowed. C=10/(2*3.14*50*30)=1061uF Select standard capacitor=1000 uF/25V 25V is selected as voltage across C should be greater than Vin.

Rectifier Design :

Diode Selection I(f) average =Io/2=300mA/2=150mA Now Im = 300mA ,PIV rating=Vm=pi*Vc(DC)/2 =3.14*9/2=15V So diode with PIV rating greater then 15V is suitable.IN4007 is more than sufficient as it has PIV=1000V;

Transformer Design:

RMS secondary output voltage of transformer is Vs=(Vm+n*1)/1.42 n=1 for FWR or HWR n=2 for BWR. But Vm =Vdc* pi /2=14.13=15(aprox.) So, Vs=(15+2)/1.42 Vs=12V.

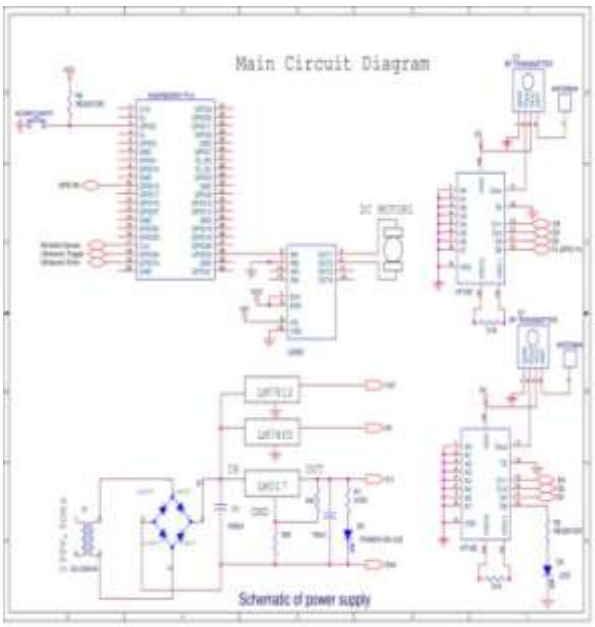
RMS current on secondary side is :

Irms=2*Im/pi=0.191A, Irms=0.191A

Rating of transformer = Vs*Irms; = 12*0.191=3.25VA V1/V2=I2/I1 230/12=.191/I1 I1=0.01A;

LM317 regulator: Assume R1=240 ohm Calculate R2 Uses formula Vo=1.25*(1+R2/R1)+Iadj.R2 Neglect Iadj. 3.3=1.25*(1+R2/240) R2=390R 12V Design : Use LM7812 and follow the same procedure.

VI.CIRCUIT DIAGRAM



VII. POSSIBLE OUTCOMES

- The main objectives of this project are we have to analyze different methods to avoid accidents on road, Design & simulate.
- Analyze the new technologies on wireless connectivity for safety on highways. Also we have to do communication with internal and
- External environments supporting the interactions between vehicle and sensor, vehicle and vehicle, vehicle and Infrastructure.

VIII. ADVANTAGES DISADVANTAGES AND APPLICATIONS

- **ADVANTAGES**

1]Reduces loss of life & property.
2] Get road condition prior .
3]Easy to communicate.
4] Efficient and saves time, money.

- **DISADVANTAGES**

1In this system sensors are only capable to detect those vehicles that comes under that particular sensors range.

2When there is bad weather condition, the detection becomes impossible or the accuracy drops significantly.
3]Technology Takes Control of Life.
4]There is possibilty of compatabilty and complexity of IoT.

- **APPLICATIONS**
- This system can be used on highways
- V2V communication
- V2I communication
- Exchange messages wirelessly
- Distance measurement
- Automatic speed control

IX .CONCLUSION

In this project smart system has been implemented for the highway system which uses concept of IOT. This project includes use of various sensors like ultrasonic sensor that detects various type of accidents, to avoid it, a novel idea is proposed for monitoring the accident over the highways. Using wireless communication message will be sent to another vehicle, Infrastructure (Home, hospital, police station or quick response team) and also displayed on server display. Thus here by we conclude that the proposed system

Remove all the drawbacks of existing system and enhanced with the IoT system for V2V and V2I system. So it makes the highway system very smart thus we named it as "Smart highway system for accident detection & prevention using IoT"

REFERENCES

[1] AnshuAdwani ,Kirti H. Madan , RohitHande**"** Smart Highway Systems For FutureCities **" "**DOI: 10.15680/ijircce.2015. 0307115ISSN 2320-9801 vol.3 , Issue
, 7 July 2015

[2] Aishwarya S.R, AshishRai, Prasanth M.A, Savitha S.C "An IoT Based AccidentPrevention&Tracking System For Night Drivers"ISSN 2320-9801 vol.3 , Issue
,4 April 2015

[3] AbhirupKhanna , Rishi Anand "IOT based parking system''DOI : 10.1109/IOTA .2016 IEEE coference publications.

[4] KAZI MASUDUL ALAM "Toward Social Internet of Vehicles: Concept,Architecture, and Applications" – IEEE Access, March 25, 2015

[5] CHUNSHENG ZHU, "Green Internet of Things for Smart World" – IEEE Access, October 17, 2015

[6] Ning Lu, "Connected Vehicles: Solutions and Challenges"- IEEE INTERNET OF THINGS JOURNAL, VOL. 1, NO. 4, AUGUST 2014

[7] Giorgio Rusconi "I-WAY, intelligent co-operative system for road safety" - Proceedings of the 2007 IEEE Intelligent Vehicles Symposium Istanbul,