

Road Monitoring System Use of Radio Spectrum 5G Network

Dr. K. A. Dattatreya¹, P. Karthikeyan², M. Kiran Sharma³, K. Manovijay⁴, K. Moorthi⁵.

Assistant Professor, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India ¹

UG Students, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India ^{2,3,4,5}

ABSTRACT: Now days, nobody in this world is ready to look what's happening around them. Even though, if any accident is detected no one cares about it. This is an intention to implement an innovative solution for this problem by developing an Accident detection System and traffic density monitoring system using android smart phone and online web page .This system has been developed and implemented using the tilt vibration sensor, HC-ST04 sensor based on mobile technology integrated with the android smart phone. The application for accident detection which primarily measures the tilt sensor used for fall down detection, and HC-ST04 sensor is used to detect the road path holes. If there is any variation from the vehicle, then the system detects that may be an accident or not. Then the system will immediately transmit the location of the accident to the preconfigured contacts through Google cloud message (GCM).).If there should arise an occurrence of a mishap is happened then the driver is incited to react the vehicle .In request to dispense with any bogus discovery.So the proposed system ensures that to reduce the human death ratio by accidents. And also traffic congestion is monitored through online.The information's can be put away in information base stockpiling for future reference.This venture likewise proposes a 5G based keen traffic blockage observing framework that progressively sets the sign activity time dependent on the deliberate estimations of traffic thickness clog.

KEYWORD: Path hole Detection, Android Smart Phone, Alert GCM Message, GPRS Location tracking, Sensors, 5G.

I.INTRODUCTION

There is no gauge of what number of harmed in street mishaps kick the bucket a couple of hours or days after the mishap," calls attention to , individual from the LNT Road Safety India. Based on the records, India will become the world number 1 in Road Deaths due to the poor record of average 13 die every hour, which is 1.14 lakh per year. This will make India to be the third place in accident detection. This data about the mishaps is the goal to build up the proposed innovation as logical traffic designing wings to diminish the fatalities because of mishaps.

II. PROPOSED METHOD

This proposed methodology is the automatic system which will provide the solution for identifying the accident location. The physiological parameter such as impact , fall down is monitor and the vital information transmitted to the saved contacts spontaneously when the accidents occurred . The path hole is detected in road automatically E-compliant send to highway authority. In this project has two sections they are

- Vehicle side unit with android app
- Road side unit with online web page

III.METHODODOLOGY

A. BLOCK DIAGRAM

1) VEHICLE SIDE UNIT

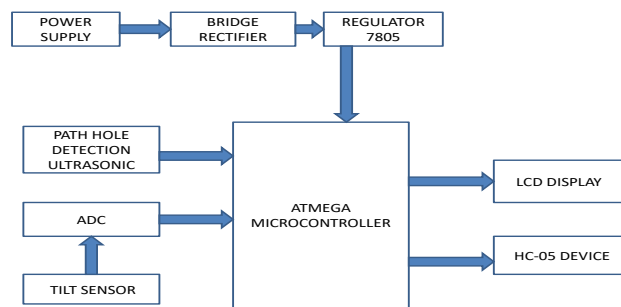


Fig 1. Block diagram for vehicle side unit

2) ROAD SIDE UNIT

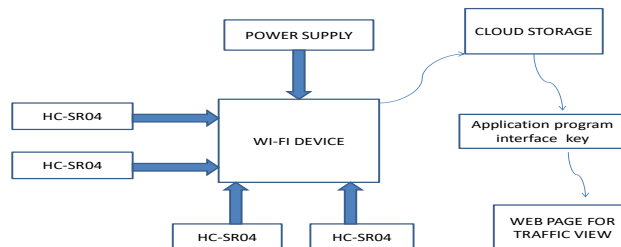


Fig 2. Block diagram for road side unit

3) ANDROID APP STRUCTURE

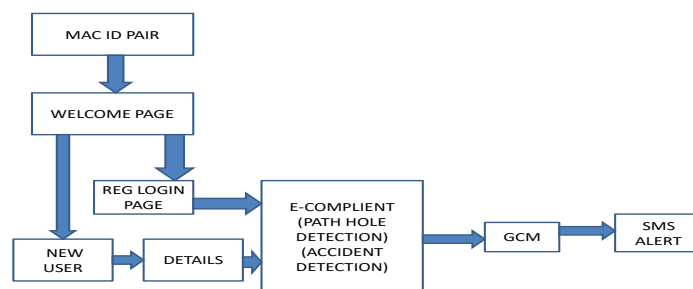


Fig 3. Android app structure

B. OPERATION

This system uses an ultrasonic sensor to measure the length of vehicle queue. It contains a microcontroller for processing the data collected from the sensor node and also a Wi-Fi module for sending data to online either directly if it is within the communication range. This system is using the tilt sensor based mobile technology integrated with the android smart phone. Then the system will immediately transmit the location of the accident to the pre-configured contacts through Google cloud Message .

C. CIRCUIT DIAGRAM

1) ROAD SIDE UNIT

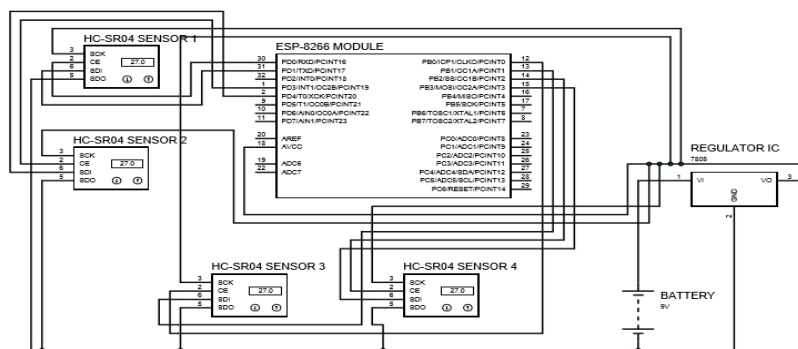


Fig 4. Circuit diagram for road side unit

D. CIRCUIT DESCRIPTION

In road side unit circuit consist of esp-8266 module, 4 HC-SR04 sensor ,battery regulator .the HC-SR04 sensor 1 echo and trig pins is connected to ESP module d0,d1 pin . HC-SR04 sensor 2 echo and trig pins is connected to ESP module d2,d3 pin. HC-SR04 sensor 3 echo and trig pins is connected to ESP module d4,d5 pin. HC-SR04 sensor 4 echo and trig pins is connected to ESP module d6,d7 pin.GND pin is connected to ground .VCC pin is connected to 5v to regulator pin. In this circuit has input supply 9v battery source.

1) VEHICLE SIDE UNIT

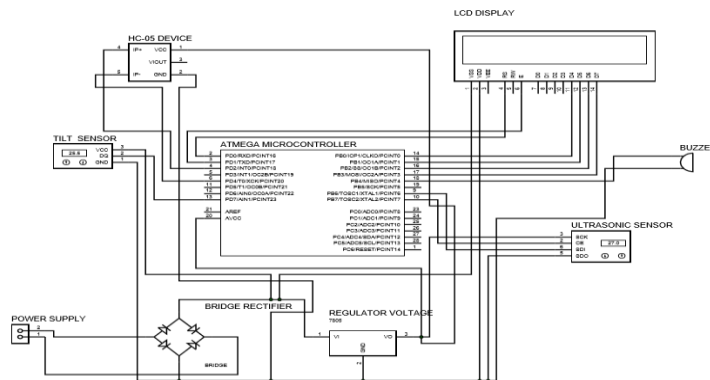


Fig 5. Circuit diagram for vehicle side unit

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E. CIRCUIT DESCRIPTION

In vehicle side unit the circuit consist of ATMEGA 328 microcontroller, LCD display, Hc-05 module, tilt sensor, ultrasonic sensor , buzzer , power supply unit . The 12v input supply is given to regulator 7805 for voltage regulation. The LCD is connected to controller the pins are (b2,b3,b4,b5,b6,b7) GND is connected to common Ground, VCC is connected to VO .Then the tilt sensor output pin is connected to controller analog pin A2. Buzzer output pin is connected controller b9 pin GND is connected ground. Ultrasonic sensor echo and trigger pin is connected to controller analog pin (A0,A1).

F. ATMEGA 328 MICROCONTROLLER

ATmega328 is superior, low-power Atmel 8-piece AVR RISC-based microcontroller that consolidates 32KB of programmable flash memory, 2KB SRAM, 1KB EEPROM, a 8-channel 10-piece A/D converter, and a JTAG interface for on-chip troubleshooting. ATmega328 is superior, low-power Atmega 16-piece AVR ("Advanced Virtual RISC") based microcontroller that consolidates 32KB of programmable flash memory.

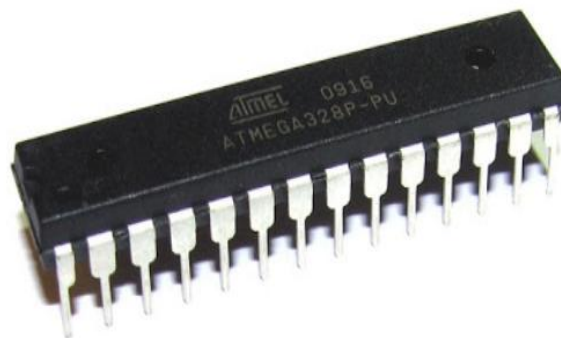


Fig 6. ATMEGA 328 microcontroller IC

G. POWER SUPPLY

The power supply circuits constructed utilizing channels, connect rectifiers AC source to DC source, and afterward voltage controllers 7805 IC. Beginning with an AC voltage, a consistent DC voltage is acquired by converting the AC voltage source , then separating to a Direct Current source level, lastly, controlled to get an ideal fixed DC voltage. The guideline is generally gotten from an IC 7805 voltage controller unit, which takes a DC voltage and gives a to some degree lower DC voltage source , which continues as before the input DC voltage source shifts, or the load gadgets associated with the DC voltage changes.

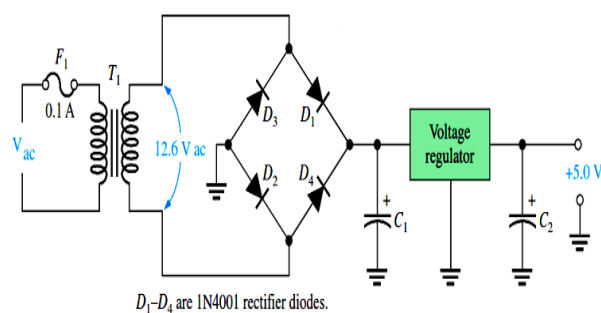


Fig 7. power supply diagram

H. ULTRASONIC SENSOR

Ultrasonic sensor is used for traffic density monitoring and path holes detection .

This can be calculated based on this formula:

$$\text{Distance} = \frac{1}{2} T \times S$$

(T = Time and S = the speed of sound signal)



Fig 8. HC_SR04 sensor

I. TILT SENSOR

A tilt sensor consists of three pins they are positive pin and negative pin ,output pin. This sensor used for vehicle axis and vibration data's detection .then the signal send to the controller will transfer the data to wireless device . the pair android app will sense the signal then GCM message alert the high way authority .

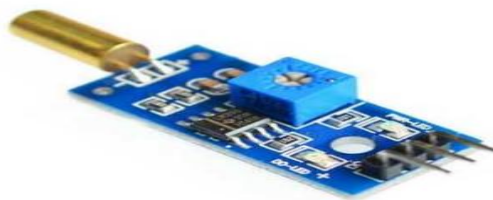


Fig 9. Tilt sensor

J. LCD DISPLAY

A liquid crystal display (LCD) is a flat panel display is used to display the ultrasonic path ole detection information and also the vehicle axis detection .



Fig 10. LCD display

K. HC –05 DEVICE

The HC-05 is a Bluetooth device is used to designed for wireless communication .In this project HC-05 device is used for transfer the road surface pothole detection data's and tilt and crushed details wirelessly send to android app .

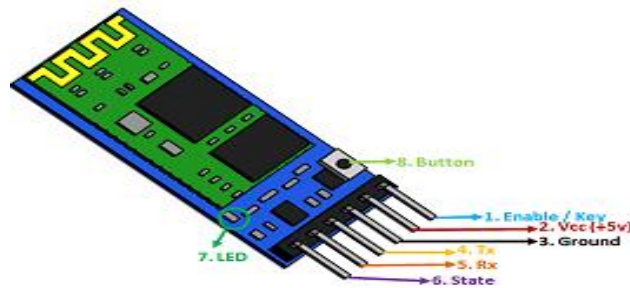


Fig 11. HC-05 device

L. ESP8266 WIFI DEVICE

ESP8266 is Wi-Fi device enabled system on chip (SoC) module developed by Esp8266 system. It is mostly used for development of Internet of Things embedded applications.Wifi device is used for traffic density updating on online with help of API key.

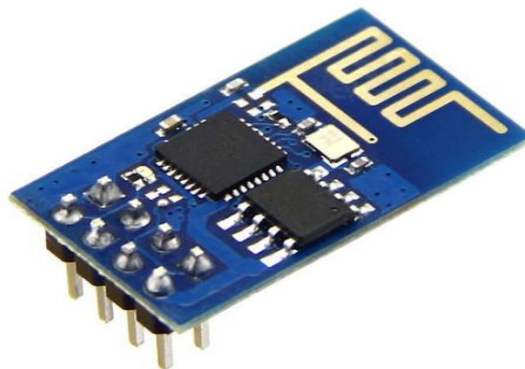


Fig 12. ESP8266 WI FI device

M. SOFTWARE USED

1) ANDROID STUDIO SOFTWARE

Android studio is the IDE based software is developed for creating the android application version 2.2 and operating system used windows8.1.

2) THINGSPEAK WEBPAGE

Thing Speak online web page is used for traffic density monitoring .The data store and recover data from things using the Hyper text transfer protocol over the 5G Internet access. Thing Speak empowers the formation of sensor

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applications logging, information investigation applications, and an everyday things with announcements. For better precision, a Open weather map.com API is with the aim of knowing when the traffic density level is monitored.

3) KEIL SOFTWARE

µVision Keil provides IDE for 8051 programming is very easy to understand. When beginning another venture, just select the microcontroller you use from the Device Data base and the µVision IDE sets all Compiler, Assembler, Linker, and Memory choices. This keil software is used for program the hardware using embedded c language code.

IV. EXPERIMENTAL SETUP AND RESULT

Thus the results shows online traffic junction's monitoring and data storage on think speak web page. In our project has four junctions they are graphical view and gauge meter view are shown in below.

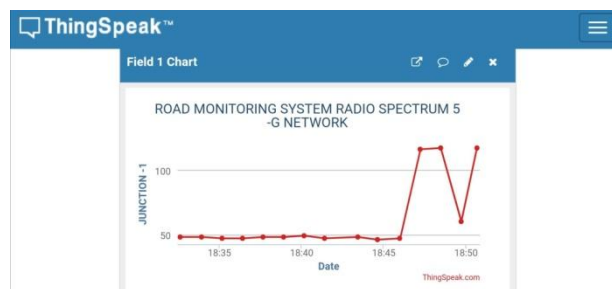


Fig 13. Junction 1 traffic density graphical view

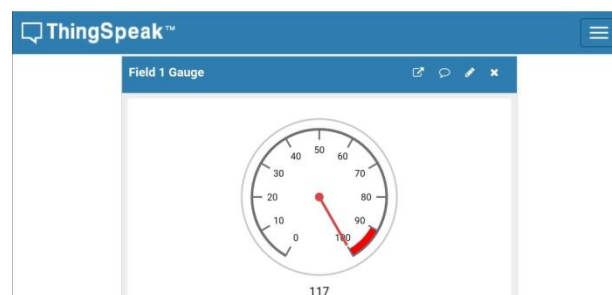


Fig 14. Junction 1 traffic density gauge meter

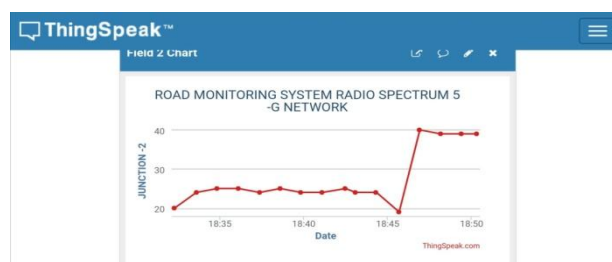


Fig 15. Junction 2 traffic density graphical view

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Fig 16. Junction 2 traffic density gauge meter

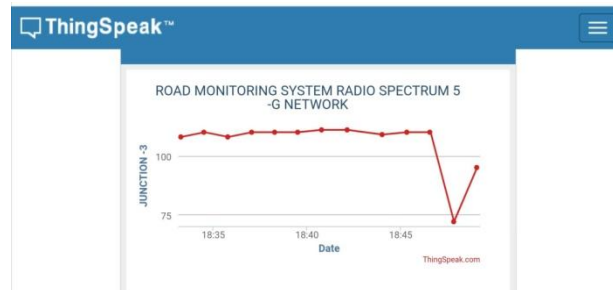


Fig 17. Junction 3 traffic density graphical view

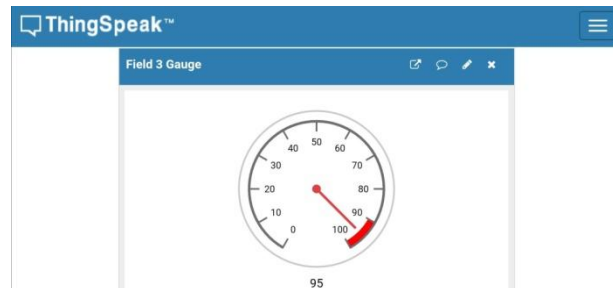


Fig 18. Junction 3 traffic density gauge meter

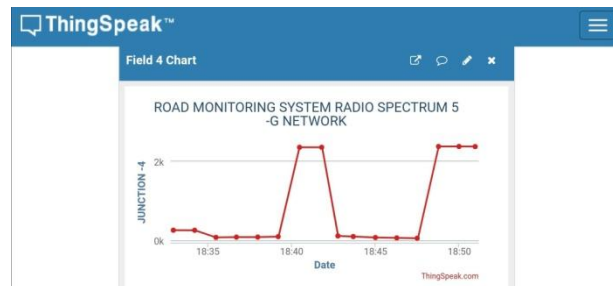


Fig 19. Junction 4 traffic density graphical view

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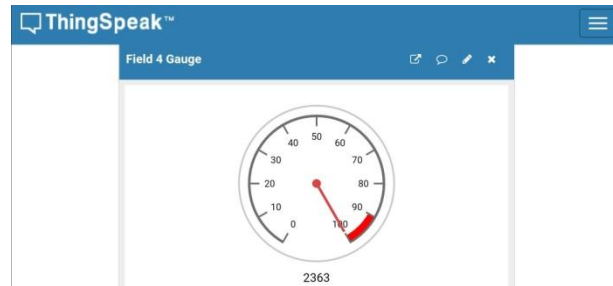


Fig 20. Junction 4 traffic density gauge meter

V. CONCLUSION

Traffic clog is one of the significant issues with the open transportation arrangement of every single creating nation in late time, as it not just builds the fuel utilization .This paper presents an 5G-based intelligent traffic congestion control system in order to reduce the congestion delay via dynamic management of traffic signals at the road crossings. the accident happen information can be send to authorized person using GCM.

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