



# INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 5, Issue 3)

Available online at: [www.ijariit.com](http://www.ijariit.com)

## IoT V2I communication-rescue time

Deepa D. N.

[deepadn98@gmail.com](mailto:deepadn98@gmail.com)

Dr. Ambedkar Institute of

Technology, Bengaluru, Karnataka

Dhanush Gowrav Gowda K. S.

[dhanushgowrav365@gmail.com](mailto:dhanushgowrav365@gmail.com)

Dr. Ambedkar Institute of

Technology, Bengaluru, Karnataka

Harshitha S.

[hslk1998@gmail.com](mailto:hslk1998@gmail.com)

Dr. Ambedkar Institute of

Technology, Bengaluru, Karnataka

Hemanth H. Gowda

[hemanthgowda628@gmail.com](mailto:hemanthgowda628@gmail.com)

Dr. Ambedkar Institute of

Technology, Bengaluru, Karnataka

Anand H. D.

[anandanihd@gmail.com](mailto:anandanihd@gmail.com)

Dr. Ambedkar Institute of

Technology, Bengaluru, Karnataka

### ABSTRACT

*It's no secret that being a doctor is one of the most difficult, important and necessary professions the world and while some doctors work in hospitals and others as a real team of super hero's rushed to help others through the streets of big cities but unfortunately paramedics have to fight not only the diseases of the patient but also with road traffic. Traffic jams are a major problem in India just as in any other popular country, unfortunately, automatics have not figured out how to deal with this yet. ANDROID based systems play a crucial role in solving the problems caused by a vehicle accident. In the first part of the project, concentrates on problems faced by Ambulances, GSM concept is used to send a message regarding the current status of the victim to the Ambulance so that pre-necessary medical arrangements are taken care. In this project, we have registered some volunteer's like junior doctors, students, senior citizens and area ministers located by near the RSU (roadside unit) fixed. If any accident occurs then RSU unit will sense and immediately send the alert message to volunteers, if they respond to message they will press start button on their Android app then it will detect the location using GPS which provides the location of the accident vehicle and also set the timers if they have not taken further action than message is sent to next volunteer. In the third part, concentrated on camera which is used to capture the image and send it to the respective unit through email, based on the volunteer's response they get credits from government or public organizations.*

**Keywords**— Road Side Unit (RSU), Vehicle to Infrastructure (V2I) communication, Android App, Rescue time

### 1. INTRODUCTION

The real felon causing the traffic jam is speed or rather sudden random fluctuations in speed when drivers travel at a constant rate traffic flows freely but when even a single driver hits the flow of the brake is interrupted causing a chain reaction among

the vehicles behind that driver those vehicles must slow down to avoid a collision and then speed back up to restore the previous flow if change in speed isn't too drastic this leads to synchronized flow. A traffic jam occurs when drivers brake abruptly this causes the vehicles behind them to slow down or even come to the stop.

Urbanization, industrialization and population growth are the considerable problems leading to tremendous growth in the traffic which has made traffic management on the road a severe problem. Traffic results in a bundle of problems which include delays faced by emergency vehicles, fuel consumption and pollution, accidents due to traffic rule violation at the heavy traffic signals. Due to increase in population and more and more usage of vehicles leads to accidents that lead to death. This death is because of not knowing the exact location where the accident has taken place, it is not conveyed at the right time which leads to death. A matter of concern in large cities is controlling traffic at intersections. Traffic lights, an initiative to control the traffic. Traffic lights operate according to the current volume of the traffic sensors are used to calculate the current density of the traffic but the limitation in this approach is that this technique based on counting of vehicles treats emergency vehicles like ambulance or a fire truck as the ordinary vehicles which means there is no priority given to emergency vehicles. As a result, the emergency vehicle is unable to respond in an appropriate amount of time coasting a person's life. The problem of traffic lights can be solved by an android based system.

#### 1.1 Objectives

- To reduce the mortality ratio of human by road accidents.
- Using an android app to update the conditions of victims to emergency care centres.
- Involving volunteers to provide first aid to the accident victim before the arrival of the ambulance.
- If an accident takes place volunteers are immediately alerted.

**1.2 Motivation**

To minimize the negative impact on the health of accident victims assisting them as soon as the accident took place is a crucial concern. Death ratios from road accidents can be classified into three different stages

**Stage 1:** This is the first few minutes or seconds after the accident which involves about 10% of all deaths.

**Stage 2:** This is a golden hour, the first hour after the accident. This is the stage that involves about 75% of all deaths (highest mortality). Higher death rates can be avoided by providing first aid (initial health care).

**Stage 3:** Days or weeks after the accident. It involves a death rate of 15% and this stage takes hard work and resources in large amount to reduce this death rate.

**2. RELATED WORK**

M. Fogue, [1] has proposed a system architecture that detects road accidents through vehicular networks automatically. It estimates the road accidents on the base of severity through data mining and process of knowledge interference. The prototype developed here shows that it takes noticeably less time needed for alert messages through vehicles at the time of accidents due to which the emergency service reach accident spot within less time when compared to previous ways. The system has no proper description regarding security algorithm, for providing security to the alert messages broadcasted by the vehicles at the time of the accident for rescue service.

F. Martinez, [2] proposes an architecture for rescue operation in real time, a new architecture using the vehicular network for vehicular communication and in the new system, the rescue time needed for road accidents is less, as compared to the current scenario. it describes how emergency services and road safety will evolve with the proposed architecture through vehicular communication and road transportation. Problem with this architecture is that it does not notify about the automatic notification for accidents, for safe driving comfort, there is no secure routing of messages in vehicular communication.

Fan Li, [3] here the research challenge regarding routing in VANETs has been discussed and presents a survey using current routing protocols, and shows the mobility models for VANET. the proposed architecture provides ubiquitous connectivity while on the road to mobile users, if not connected to the outside world through alternate networks at home or at the workplace. Here possible different kind of architecture for VANET and for safe vehicular communication and also different kinds of routing protocols which can be used for VANET and research challenges for the same is discussed. The model here is principled for vehicle mobility while travelling on road. It's been concluded here that the performance of a routing protocol in VANETs depends heavily on the mobility model, the driving environment, vehicle density, and many other facts which makes a drawback for the system and they have not discussed anything about secure routing protocol used in VANET.

A. Thangavelu, [4] has proposed a system on VETRAC for tracking of vehicles, here the driver driving the vehicle or any other person can monitor the location of any other moving vehicle. The system uses WIFI IEEE 802.11 b/g in order to get the current and exact location of the vehicle, to provide effective and simple communication. It provides the navigation function anywhere at any time using a Wi-Fi connection. No security algorithm has been implemented in the current system which causes the major drawback for the system.

**3. PRINCIPLE OF OPERATION**

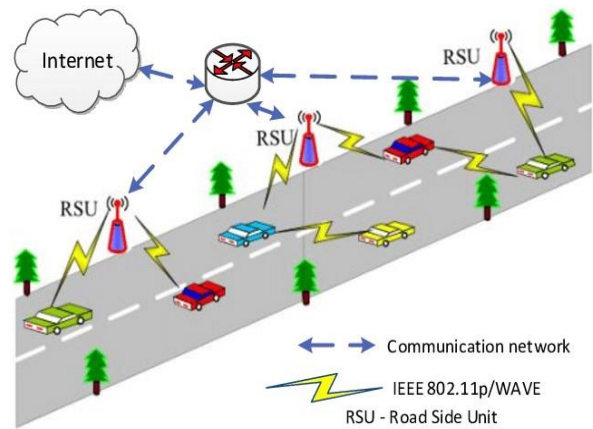
Many embedded systems have substantially different designs according to their functions and utilities. In this project design,

the structured modular design concept is adopted and the system is mainly composed of a single microcontroller, comparator, LED's, Android-based system for communicating purpose we can use the GSM module. The microcontroller located at the centre of the block diagram forms the control unit of the entire project. Embedded within the microcontroller is a program that helps the microcontroller to take action based on the inputs provided by the output of the sensors.

Whenever an accident is detected the microcontroller alerts the GSM module to send messages to the concerned volunteers and also turns on the MP3 device to broadcast the message through voice output. The android app developed will immediately get started in the mobile phones of the volunteers who receive the message and the rescue work begins.

**4. PROCESS FLOW**

If any accident occurs then the designed RSU (Roadside unit) sense the incident via message provided from RF transmitter and receiver. This message is then sent via GSM to the android app which is residing in the volunteer's mobile phone. Here volunteers represent a group of students, junior doctors, political administrators in that particular area or even the people who are willing to help but should have the knowledge of first aid. Once the volunteers receive a message regarding the accident occurrence and the location of the incident the app which is there in the phone will automatically open in that there are two options that are accessible to them. In case a volunteer is free and ready to help the person, he can press the accept button or else if he is busy, he can press the deny button. If volunteer press the deny button the request message is sent to another volunteer.



**Fig. 1: Roadside unit**

Once the volunteer accepts the request they will reach the location he can start providing the initial treatment (first aid) to the patient using the app volunteer can send a current situation of the patient that is they can capture the picture of the victim using their mobile camera, they can send the location and also they can type a message and send to the respective unit through mail. As volunteer send the mail doctors can come to know the situation of the victim and get ready to treat them in the golden hour which is very precious time. Depending on the response of the volunteers that is whether they accept or deny the request they will get credit points from government or private organizations.

There is an air pollution sensor (MQ6) used to monitor the surrounding air for pollutants. Here we have taken 100 as a cut-off if the pollutant value is less than 100 it indicates that the location is not polluted in case if the value is more than 100 via GSM a message stating that Air polluted is sent to the administration section.

## 5. CIRCUITRY

The microcontroller is the heart of the system. Here Renesas microcontroller of RL78 family named R5f100LE is used which is of 16 bit with 64 pin IC where 58 pins are general I/O pins and rest are reserved pins (VSS, VDD, VOP, RS, RW and Enable) for LCD.

A 16x2 LCD is used of which first 6 pins of LCD are the reserved pins of microcontroller remaining 8 pins are data bit pins. The LCD is used to display messages. A GSM module is connected to the microcontroller through UART pins for communication. A quad band SIM 800C GSM module is used which supports the frequency range of 850/900/1800/1900MHz. An MP3 player or digital audio player of audio module FN-M16P with an SD card where it stores the voice output is used to provide voice output. An MQ6 air pollution sensor is used to monitor the surrounding air for pollutants. The messages sent by the GSM module is received on the mobile phone of the volunteer. On acceptance of the request to help the rescue operation begins as per the process.

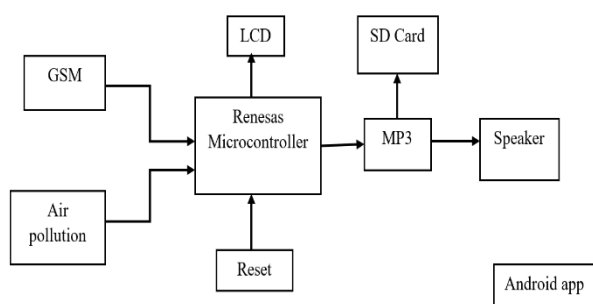


Fig. 2: Block diagram

## 6. ADVANTAGES

- Reduces the mortality rate due to road accidents by reducing the time lapse.
- Starting the rescue process of the accident victim from the accident spot by providing initial medical treatments rather than simply waiting for the arrival of the ambulance.
- Current status of victims is sent to emergency care centres so that they can make required medical arrangements.

## 7. CONCLUSION

The accident might occur it is not necessary that the victim has to die in the major accidents they can be treated on time. The system which is proposed involves reducing the death rate during an accident using the volunteers. Once the volunteer reaches the location where an accident has taken place since they will be having basic knowledge about first aid, the initial treatment for the victim is done by them which will be very necessary at that time. Each and every second will count if there is any delay the victim may die. Since there will be a delay in ambulance to reach the location because of many reasons such as people are not ready to communicate with each other and come forward to help that is lack of communication barriers, traffic, there is no proper

driver's for ambulance, there might not be having proper facility to bring victim to hospital and the main reason is that there is no enough ambulance, even though there is ambulance the information will not reach them fast by the time they reach the location victim condition might get worsen or even victim may die. In order to overcome this problem, we are utilizing the modern technology and smartphones so that our phones can be used for some good cause that is we can help the accident victim instead of just using the smartphones to capture the images or videos of the victim and uploading it to social media. We have designed an application where volunteers will come to know about the accident and the location where the accident has taken place. Using the application volunteers can send a present status of the victim, accident location and captured image to medical services through mail so that by seeing that they can make the necessary arrangements by the time victim reaches the hospital so that once the victim reaches the hospital they can start with the treatment because each and every situation will be having a golden hour period within which the victim has to be treated.

## 8. FUTURE ENHANCEMENT

- Once the accident has taken place and ambulance have reached the location, we can provide a traffic-free path so that the ambulance reaches the medical care centre on time.
- Since there is communication between vehicle and infrastructure using some sensor, we can sense the smoke which might appear in the vehicle suddenly and can inform to the passengers who are travelling in that vehicle through speakers or can install an alarm in the car.
- Using the smoke sensor if there are any fire attacks in the surrounding can be determined and informed to fire extinguishers even for this we can use the volunteers to inform the status to the fire extinguisher officer.

## 9. REFERENCES

- [1] M fogue, P Garrido, F.J. Martines, J.C. Cano, C.T. Calafate, P Manzoni, "A System For Automatic Notification and Severity Estimation of Automotive Accidents", IEEE Transactions on Mobile Computing, Vol 13, NO. 5, May 2014.
- [2] F. Martinez, C. K. Toh, J. C. Cano, C. Calafate, and P. Manzoni, "Emergency services in future intelligent transportation systems based on vehicular communication network", IEEE Intelligent Transport System Magazine, vol. 2, no. 2, pp. 6–20, Oct. 2010.
- [3] Fan Li-Yu Wang, "Routing in vehicular ad hoc networks: A survey", IEEE Vehicular Technology Magazine, vol. 2, Issue (2), pp: 12-22. 2007.
- [4] A. Thangavelu, K. Bhuvanewari, K. Kumar, K. Senthilkumar and S.N. Sivanandam, "Location Identification and Vehicle Tracking using VANET ( VETRAC )", IEEE - ICSCN 2007, Feb. 22-24, 2007. pp. 112-116.