

# Use of Cloud Computing for Accident Detection and Monitoring Traffic Density in VANET

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**Abstract**— An automatic alarm for the vehicles which meets with an accidents and the traffic scenario of the various regions is introduced in this Paper. The system will automatically detect an accident, search for its GPS coordinates, and then it will send the time of the accident at which it occurs. A mobile system having GPS software will be fitted inside the vehicle, it will automatically start communication with the GPS satellite for the longitude and latitude points. The mobile device will send these coordinates to the centralized server. Then server will send the information to the police control system and the hospital ambulance system. Along with the accident information, a mobile device will also give the traffic scenario of various regions. So that it will be helpful for the user to avoid the traffic conditions.

**Key words:** GPS, VANET, Cloud Computing

## I. INTRODUCTION

The rapid growth in the economic concern results into the improvement of the peoples living standard as well as road traffic accidents are increasing causing loss to many lives. Nowadays traffic has been the important issue which is being responsible for an accident. The management in the traffic and the infrastructure available with the system is very poor causing death of people.

The system is developed in such a way that it can detect the accidents, search for accident place and send rescue message automatically to the control system. The device application can significantly gives the time of accident and place of accidental vehicle. The detection of the accidents and information sending is fully automated. It plays a significant role in rescuing the wounded lives and reducing the loss of lives.

## II. RELATED WORK

Most of the location estimation solutions available depends on one specific type of observation, i.e. either on range information only, or on angle information only or on time only. Each solution proposed has its pros and cons.

The efficiency of the transportation reduced by Traffic congestion and also it increases fuel consumption, travel time. So there is a need to make an efficient system to make the driving experience safer and convenient. A vehicle having the On Board Units (OBUs) does the work of various functionality such as Communication, Computing and Storage. The VANET is shifted to a Vehicular Cloud Computing System by merging VANET with the Cloud Computing. VANET cloud is divided into three categories as Vehicular Clouds, Vehicles using Clouds and hybrid Vehicular Clouds. Software as a Service (SaaS) and Infrastructure as a Service (IaaS) are the two services which are most suitable for VANET Clouds. Whereas Platform as a Service (PaaS) is not suitable VANET. VANET provides

the various potential services at Infrastructure as a Service level which might be used as Network as a Service (NaaS). In Network as a Service, a vehicle which is travelling might use the internet service from the nearby wireless facility. For this purpose, vehicle have to pay the resource rent to the local internet service provider. In Software as Service level, a real time data which is available on the internet is shared among the vehicle travelling through the particular area[1]

It has been a main concern of city authorities to provide effective traffic flow control in urban areas with the increase of vehicles in urban areas. Also no one like to stop waiting at intersection, spending too much time at intersection may leads to driving stress. In many cities, these rising demands cannot be counteracted by further extending the existing road infrastructure giving a special importance to the efficient use of the existing network. In this respect, Road traffic density state estimation provides important information for road planning, intelligent traffic routing, intersection traffic signal timings control, etc. VANET based architecture provides the framework to optimize the journey time and the traffic flow according to the traffic density. This architectural framework improves the safety of road users, traffic flow and energy efficiency. The development of the system is not done on wide area traffic control system.

The flow of message interaction between Road Side Units (RSU) and the On Board Units (OBU) are shown using above flowchart diagram. The vehicular mobility management issues and the network operating characteristics are taken into consideration for designing the intelligent road traffic signaling system. The signaling information depending upon the measured statistics of the traffic flow coming to an intersection point is being broadcasted by the Road Side Units. The timings of adaptive signaling system is adjusted by the Unique optimization scheme provided by the RSU[8].

The Road Side Units Broadcast the message in a particular specific region. Whenever a vehicle having on board unit comes under the coverage of Road side Units, the on board units keeps on sending the messages to the road side units time, speed, position of an intersection point. This process is done after every interval of 5 Seconds. Likewise the many Road Side Units keeps on updating with the travelling vehicles. The list of active on board units is keep on updating after every interval of 5 second time period. With the comparison in between the current signal phase duration and the remaining time for reaching the intersection point, an on board unit will decide to move or cross the signaling position. The following flowchart is the sequence flow mechanism for intelligent road traffic signaling system[2]

Density of traffic on highways and roads increasing constantly in the past years due to urbanization, population

growth. Fuel consumption, air pollution and travel time are increased only because of the transportation infrastructure of a city due to the traffic congestion and which gives rise to increased user frustration and fatigue. Intelligent traffic management systems are needed to avoid traffic congestions in the areas which are having more traffic density. A VANET routing protocol is proposed to provide the fast and reliable communication which works on real time road vehicle density. A road Vehicle density is computed by using the road information table and beacon messages[3].

The advances in internet and the Cloud Computing provides an opportunity for resolving the challenges caused by abundantly increasing transportation. Nowadays a vehicle is equipped with various systems such as sensors, actuators, GPS. With the equipped on board unit system, a vehicle is able to communicate with the other vehicles and can exchange the information amongst them using internet protocols. The advancement in the Cloud Computing and Internet of things gives the chance to address increasing transportation issues such as vehicle density, traffic congestion etc. Cloud Services are developed for modular and multilayered vehicular data cloud platform. The Internet of things and the Cloud Computing Technologies enables vehicular data cloud information into the IoT environment[4].

In the recent years, there has been a lot development in the Vehicular networking and its potential applications. It is found that the vehicular cloud computing has an advantage to raise the privacy and security issues. Vehicle node in a cell can communicate with a virtual machine that is responsible for the cell. The communication between the cloud and a vehicle is through a unique entry. A single system image to each single machine is provided by the cloud services. A vehicle node consists of an image, application and security systems into it. A request is done to the cloud by the vehicular application and is then getting forwarded to the hardware and operating system. The request will be sent which is received by the cloud single system image. The cloud allocator will locate which virtual machine should be responsible for the request and forward the request to the virtual machine[5]. For analyzing the Potential privacy threats and security challenges a set of security and privacy protecting protocols of vehicular cloud computing is used. The security challenges include the various factors such as Scalability, authentication of high mobility vehicles, locations[6].

### III. SYSTEM MECHANISM

The system is designed in such a way that gives an information about is a traffic accident automatic detection and long distance alarm message. The system is consists of large range dual-axis accelerometer and small-scale three-axis accelerometer sensor, GPS positioning, people machine interaction device. When a vehicle gets collided with each other or with the any stationary thing, large number dual axis accelerometer detects the level of the Collision automatically, the Z-axis of small range acceleration sensor automatically detects the Vehicle roll angle. The signal of accident is sent when the angle is greater than the threshold set value. It is done using the mobile device. The device updates all its information such as accident geographical Co-ordinates, time, date onto the server. The GPS device

gives real-time search for satellite signals, through the program to extract the geographic coordinates, date and other information. Subsequently the alarm message is sent to the control system[9].

The standard programming interface for application developers and database systems providers is Microsoft Open Database Connectivity (ODBC). Before ODBC became a standard for Windows programs to interface with database systems, programmers had to use proprietary languages for each database if they want to connect with the database system.

Now connectivity with the database system becomes very much easy because of ODBC which is irrelevant with the coding point of view. Due to ODBC, application developers have no need to worry about the various things related to connectivity.

### IV. PROPOSED SYSTEM PLAN

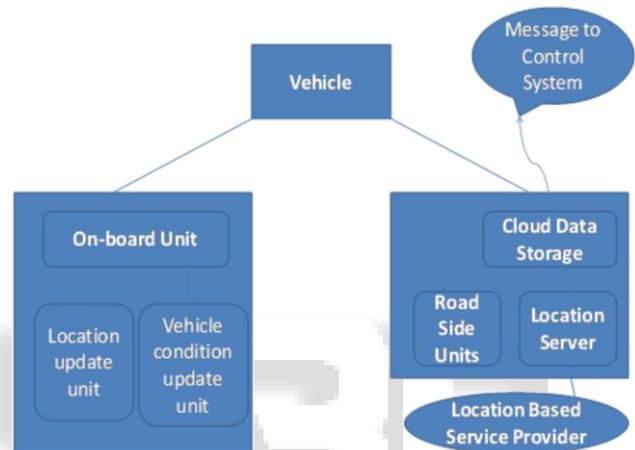


Fig. 4: Plan of Project

In this proposed system, a vehicle will be having a small on-board unit which will have a location update system. The location update application will trace the location of the vehicle and store it into the server with the help of location based service provider. With location update unit, on-board system will have another component to detect the Condition of the vehicle. This component is for detecting a vehicle's situation whether the Vehicle has fallen or not. Once, the vehicle falls on either of the side, a location update unit will update the condition of the vehicle into the server and subsequently the message will be sent out from the server to the control system where proper action can be taken. To reduce fuel consumption a method will be propose for calculation of optimal deceleration patterns, minimizing the use of braking. To adapt the dynamic vehicular city conditions a routing protocol that works based on the real-time road vehicle density is implemented. It will provide fast and reliable communications. In the routing scheme, Vehicle density is computed by each vehicle of the road to which it belongs by using signal messages and the data information table. On the basis of the real-time road vehicle density information, each vehicle will establish a reliable route[10].

V. RESULTS

A. Registration of User:



Fig. 5.1: Registration Page

To avoid the misuse, a user has to register with the system. In the registration process user has to provide the various entities such as first name, last name, password for the system, and the valid email id of the user as shown in the fig.

B. Authentication of User:

After the successful registration of a user into the system, user has to login through login page as shown in fig.



Fig. 5.2: Authentication For The User

C. SYSTEM WITH TRAFFIC CONDITION

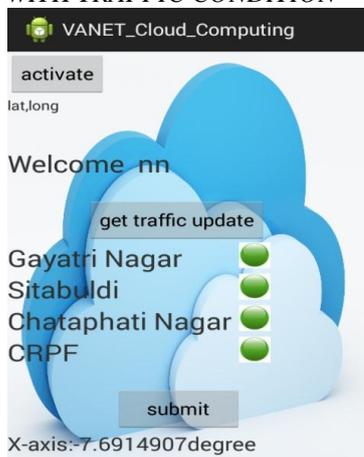


Fig. 5.3: System Showing Traffic Scenario

When user logged in into the system, onboard system dashboard will be appeared. Dashboard will be consists of the list of various areas of the localities. After the activation of the system, device will show the latitude and longitude coordinates of the current position of the device. It will also show the angle at which vehicle is positioned on the ground surface as shown in the fig.

Vehicle will also be getting an updates related to traffic conditions. System will be having the records of the various regions and it will keep track record of each registered vehicle into the database. According to the density of vehicle into the particular areas, system will give the traffic condition of particular region as shown in fig.

Whereas if the the number of vehicles get increased into the region, system will blink a red signal for that particular area as shown in fig.

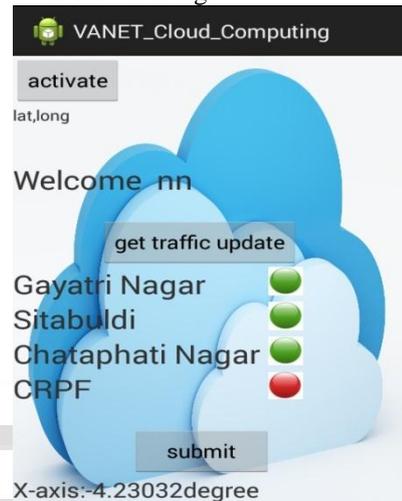


Fig. 5.4: Area Having Traffic Congestion

D. Accidental Vehicle's Information Data:

Similarly in case of accidents, system will have the records of the vehicles into the server. The GPS coordinates of the vehicle, time and the date at which vehicle meets with an accidents are the attributes which will be stored in the server. Accordingly the control system generates a signal message of accidental vehicle as shown in fig.

Accident Records				
Name	Latitude	Longitude	Time	Delete Record
yyy	21.11	79.00	12:36	X
yyy	21.12	79.05	12:33	X
yyy	0.00	0.00	11:51	X
yyy	21.12	79.04	11:51	X
aaa	21.12	79.05	11:41	X
bbbbb	0.00	0.00	15:41	X

Fig. 5.5: Accidental Vehicles Records

VI. CONCLUSION

An automatic alarm signal system for the accidental vehicle is being proposed and accordingly the results are obtained. The proposed system will gives the position and the time of the vehicle which meets with an accident. Consequently it will save the time of a user in traffic scenario by giving the status of traffic density of various areas.

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