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Vehicle Monitoring System at Signal Level

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ABSTRACT*:* The Vehicle Monitoring System at Signal Level (VMSASL) is the project in which the monitoring of each of the vehicles at the signal level. In this project we need to fix a device for all types of vehicles and signals in which both are act as client and server correspondingly. We can fix devices using electronic devices (kit) that is fair but instead of using electronic device we are using android phone act as device. When we place a device in the vehicle and signal for the initial process the data related to the device details have to be entered and it also be uploaded in the server. In each of the existing signals and vehicles there is a device available and it will have a WIFI facility. The WI-FI range encircles around the signal and the vehicle. When the vehicles are crossing the signal, the WI-FI range which was encircled, creates a communication bond between the signal device and the vehicle device. The signal device detects the vehicle device within the WI-FI range and then it creates the peer to peer communication channel .After it is detected by the signal device ,the vehicle device will transfer its vehicle id to the signal device at this time the p2p communication happens. The signal device will store the vehicle details in a specified buffer. After within a 1minute gap the signal device will upload the entire vehicles id from the device buffer to the server which had crossed the signal last 1 minute before. All the signals and vehicles details are stored in database so we do not need to send full details about it. The privileged user can login to the server and invigilate the details of the vehicles such as he/she can search the details with vehicle id , branch id , and signal branch wise details (if it is possible we can develop the page in responsive website which have the unique facility to flexible with the device resolution).

KEYWORDS: Privileged user; vehicle details; P2P Communication; VMSASL (Vehicle Monitoring System At Signal Level); WI-FI (wireless fidelity); Signal device; Vehicle device ; Server; Database; GPS (Global Positioning System); .

I. INTRODUCTION

Vehicle Monitoring Systems were first implemented for shipping industry because people wanted to know where each vehicle was at any given time. These days, however, with technology growing at a fast pace , automated vehicle monitoring system is being used in a variety of ways to monitor and display vehicle details in real – time . The proposes the vehicle monitoring system at signal level (VMSASL) using wireless fidelity to directly fetching the details of the vehicle at each signal and provide a better service and effective solution for privileged user . In this project the major role is the privileged users .The privileged user in the project constantly watch a moving vehicle and report the status on demand.

we clearly says that all the vehicles and the signals are having the Wi-Fi facility . The Wi-Fi has a specific range of how much distance it will reach the end users . Long-range Wi-Fi is used for low-cost, unregulated point-to-point computer network connections, as an alternative to other fixed wireless, cellular networks or satellite Internet access. Wi-Fi networks have a range that's limited by the transmission power, antenna type, the location they're used in, and the environment. A typical wireless router in an indoor point-to-multipoint arrangement using 802.11n and a stock antenna might have a range of 32 metres (105 feet). Outdoor point-to-point arrangements, through use of directional antennas, can be extended with many kilometres between stations.

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Now when the vehicles are crossing all the signals the signal will detect the each and every vehicle which are crossing the particular signals . In this place the peer to peer communication occurs between the vehicles and the signals . The P2P communication bond has been formed. Once the bond has been formed the vehicle device will communicate its details to the signal device . The signal device will then recorded the details about the vehicle . Here comes the concept of peer to peer communication . Then the signal device will upload the details of vehicle in turn to server and the data will be stored it in the database .

II. LITERATURE SURVEY

A. *Vehicle Tracking System Using GPS And Android*

In today's era everyone is using mobile phones for communication. At the same time Mobile Providers are also providing the variety of services to users. In attempt to expand on this, we propose a GPS based vehicle tracking system for an organization to help to find addresses of their vehicles and locate their positions on mobile devices. The organizations are investing money in monitoring and tracking vehicles aiming at improving services and ensuring the safety in cargos transports. The propose system will give the exact location of vehicle with distance between user and vehicle. The proposal allows organizations to track real -time information about their proposed vehicle during travel. The system contains single android mobile that is equipped with GPS and GSM modems along with processor that is installed in vehicle. During vehicle motion its location update can be continuously reported to a server using GPRS service. This location information will be plotted using Google maps on monitoring device and this project gives the brief information about GNSS (Global Navigation Satellite System

GPS and GSM based vehicle location and tracking system will provide effective, real time vehicle location, mapping and reporting this information back to monitoring device and improving the level of service provided. A GPS based vehicle tracking system will inform where your vehicle is and where it has been, how long it has been.GPS has provided positioning, navigation, and timing services to military and civilian users on a continuous worldwide basis since first launch in 1978. An unlimited number of users with a civil or military GPS receiver can determine accurate time and location, in any weather, day or night, anywhere in the world. The system makes use of a medium earth orbit satellite constellation transmitting microwave signals allowing a GPS receiver to determine its position, velocity and time. Different types of positioning can be carried out using GPS receivers depending on the algorithms, type of measurements and corrections used in the navigation solution.

A GPS receiver can measure the pseudo range, i.e. the apparent range between satellite and receiver, using the code phase measurements, which provide an estimate of the instantaneous ranges to the satellites, or the carrier phase measurements, which is the difference between the phase of the carrier signal generated at the receiver and the carrier received from a satellite at the instant of the measurement .The carrier phase measurement is given in a fraction of a cycle, but this does not contain any information about the number of complete cycles (called integer ambiguity).

B. *Real – Time Tracking And Management Of Vehicles*

Real-time tracking and management of vehicles has been a field of interest for many researchers and a lot of research work has been done for tracking system. Recently the various anti-theft modules like steering wheel locked equipment, network tracking system and traditional electronic alarm are developed along with client identification and real time performance monitoring. Describes a real time tracking system that provides accurate localizations of the tracked vehicle with low cost.GM862 cellular quad band module is used for implementation. A monitoring server and a graphical user interface on a Website is also developed using Microsoft SQL Server 2003 and ASP.net to view the proper location of a vehicle on a specific map. The paper also provides information regarding the vehicle status such as speed, mileage. Tien TVu Phuong describes a system based on the Global Positioning System (GPS) and Global System for Mobile Communication (GSM). It describes the practical model for routing and tracking with mobile vehicle in a large area outdoor environment .The system includes the Com pass sensor YAS529 of Yamaha Company and Accelerator sensor KXSC7205 0 of Koi nix Company to acquire moving direction of a vehicle. The system will acquire positions of the vehicle via GPS receiver and then sends the data to supervised centre by the SMS (Short Message Services) or GPRS (General Package Radio Service) service. The supervised centre comprises of a

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development kit that supports GSM techniques -WMP100 of the Wavecom Company. Finally, the position of the mobile vehicle will be displayed on Google Map.

III. EXISTING SYSTEM

In the earlier concepts of monitoring and tracking the vehicle they have introduced the GPS (Global Positioning System) and GSM (Global System for Mobile Communications) and use of microcontroller as a whole to discover the concepts of intelligent vehicle monitoring and tracking system. To meet the requirements of an intelligent vehicle monitoring system, this architecture integrates Global Position System (GPS), Global System for Mobile communications (GSM) and a Microcontroller in the whole. This device is used to prevent texting and calling of mobile phones while driving vehicles.

A. GSM Communication

GSM Modem receives trigger pulse from Mobile Bug Module. It transmits messages to police control room for call detecting. It is controlled by microcontroller by interfacing with RS-232.

B. Speed Sensors

Speed Sensors keeps track of the speed of the vehicle and activates the GSM Modem when the speed of the vehicle goes beyond 40km/hr. The GSM Modem is programmed such that it transmits message only when the speed limit exceeds40km/hr.

C. Call sensing

The sensor used to sense the call and messages and sends as pulse to the microcontroller. The pulse is transmitted as data to the GSM Modem.

D. Call notification

If the person, who drives the car, receives a call or a message while driving, then LED glows and their unique ID will be sent to cops using the GSM Modem and at the cops control centre they will be having a GSM receiver, the output of which is given to another LED.

E. GPS Tracking

The GPS module calculates the geographical position of the vehicle. This helps in detecting the location/position, velocity of our system. The module output data like global positioning system fixed data, geographic position-latitude are passed to GSM Modem.

F. CCTV Cameras

It captures the full video about the incident what had happened. Closed-circuit television (CCTV), also known as video surveillance, is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors. It differs from broadcast television in that the signal is not openly transmitted, though it may employ point to point (P2P), point to multipoint (P2MP), or mesh wired or wireless links. Though almost all video cameras fit this definition, the term is most often applied to those used for surveillance in areas that may need monitoring such as bars, banks, casinos, schools, hotels, airports, hospitals, restaurants, military installations, convenience stores and other areas where security is needed.

Disadvantages of CCTV Cameras (Existing System)

- Some of the disadvantages of CCTV cameras include a false sense of total security, the inability to stop crimes that are in progress and the inability to use recorded footage as evidence in police investigations.
- CCTV cameras can record a robbery or crime in progress, but they can't do anything to actually stop the crime.
- If criminals are wearing masks or have their faces obscured while being recorded on CCTV cameras, there may be very little that the police can do to successfully identify them if there isn't more useful information to use.
- The CCTV cameras handles more information i.e. A video about an incident will play for 5 to 10 minutes which will make the searching process very slow and we have to search by each and every frame to detect the culprit.

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In these previous ideas and concepts many electronics related concepts are used such as microcontrollers and sensors. Instead of using these components we are introduced using android phone fetching the details of the vehicle i.e the vehicle log from the server which had been stored through the signal device. There is no specific device in the for getting the vehicle details at the signal.

IV. PROPOSED SYSTEM

Modern vehicles frequently provide wireless connections with wireless devices carried by vehicle occupants. When a vehicle occupant enters a vehicle with a wireless device, the vehicle can establish a short-range wireless communication link with the device. The short-range wireless communication peer to peer link can allow the vehicle device to communicate with through the signal device. These short-range wireless links are often created by authenticating the vehicle providing the wireless link, the wireless device accessing it, or both. In one example, the vehicle occupant can identify the vehicle broadcasting a short-range wireless link using the wireless device and select the vehicle identity. Also, the wireless device can be authenticated to the vehicle when the wireless device provides a password to gain access to the wireless link or network provided by the vehicle.
After these types of authentication occur, the vehicle occupant may not have to re-authenticate the wireless device with the vehicle again as the vehicle and signal device can recognize each other when they come within a particular range. Detecting the presence of the vehicle device stored with the subscriber identity at a signal; transmitting the wireless identifier broadcast by the existing vehicle to the signal; and broadcasting the wireless identifier to the signal.

In this vehicle monitoring concepts, we are developed using android in which the vehicle number, owner name, engine number, and the vehicle type are all will be inbuilt in the particular vehicle at the time of manufacturing itself. At the time of registration of a particular vehicle the details of the registered vehicle occupants will be enrolled and stored in the centralised server. The privileged user use to get the vehicle log from the server. The privileged user just login with the valid user identity. She/he can search and as well as view the details of the vehicle according to the vehicle identity, branch identity and with the signal branch wise details. For the vehicle and the signal to make a communication occurs among them here comes the peer to peer communication concepts.

Advantages of Proposed System

- In earlier concepts of GPS and GSM without using internet we cannot able to track the exact location where the vehicle is crossing. So we need to use internet connection.
- But in the proposed system, we do not need internet; instead we can able to fetch the details of the vehicle which was stored in the centralized database through the establishment of peer to peer communication.
- In the usage of CCTV cameras, it takes longer time to search and watch a particular video which may takes some longer time, but in the proposed system, the searching process about the vehicle could be made very easy, because it handles only less amount of data.

V.SYSTEM DESIGN ARCHITECTURE AND IMPLEMENTATION

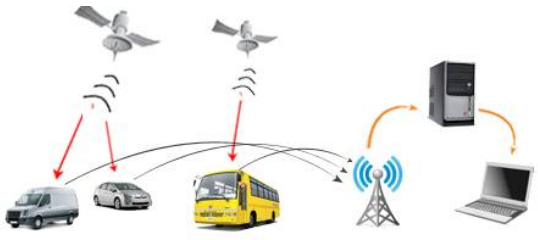

Fig 1 Overall Architecture

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The System Architecture depicts the various kinds of the modules namely,

A. *Vehicle Signal Communication*

In this module, when the vehicles are crossing the signal, the vehicle will need to communicate with the signal at that time. Now the peer to peer communication technology has been used. All the vehicles and signals are called as peers in peer to peer communication. All the vehicles are discovering peers to the signal. Then the signal will detect the vehicles and make connection between them. Through the socket the vehicle will transmit the information to the signal. The received information will be stored in the local buffer of the signal. The local buffer is called SQLite.

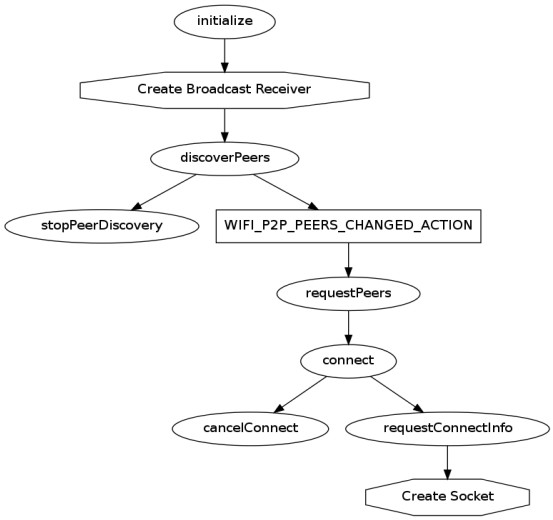

Fig 2 Vehicle Signal Communication

B. Server Signal Communication

In the previous module, the vehicle data has been stored in the local buffer. Within the 1 minute gap the vehicle details will be uploaded in the server. In this module we have used JSON technology. This diagram clearly depicts how the data is transferred to the server.

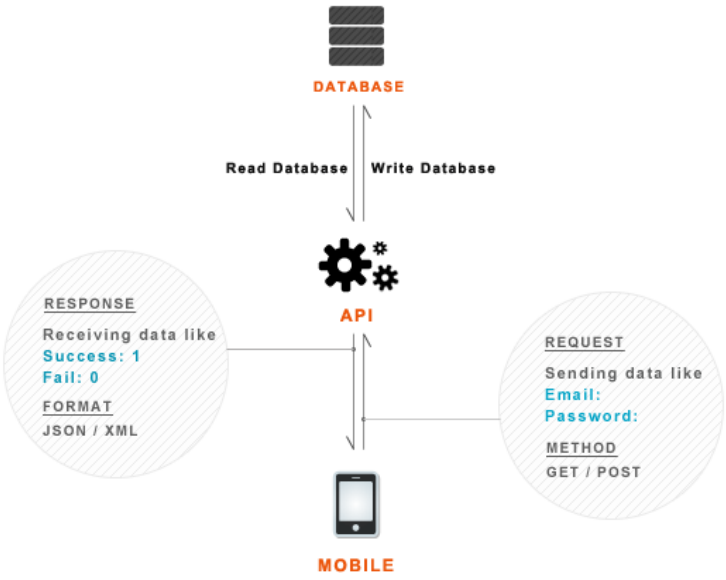

Fig 3 Server Signal Communications

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C .Privileged User Pages

- Login page

In this module the privileged user will enter into the website and login the page with the valid username and password. If the privileged user had entered the username and password correctly means it will enter into the next page showing the menus as all log, vehicle wise log, branch wise log and logout.

- Displaying all the log details

In this module, it will display the details of the vehicle with the specified branch identity, vehicle identity, respective time and signal name.

- Displaying the vehicle wise log details

In this module, the privileged user will enter the vehicle identity in the textbox, then he presses the GO button, then it will display the details such as branch identity, signal name and time.

- Displaying the signal branch wise log details

In this module, the privileged user will select the branch identity which was in the drop down list box and clicks a specified branch identity then the particular vehicle identity with the time will be displayed.

VI. STIMULATION AND RESULTS

INPUT	EXPECTED OUTPUT	ACTUAL OUTPUT	STATUS
IF WI-FI IS ON	THE GREEN SCREEN WILL BE DISPLAYED IN WI-FI STATUS TAB	THE GREEN SCREEN WILL BE DISPLAYED IN WI-FI STATUS TAB	PASS
IF WI-FI IS OFF	THE RED SCREEN WILL BE DISPLAYED AND AUTOMATICALLY WI-FI WILL BE TURN ON	THE RED SCREEN WILL BE DISPLAYED AND AUTOMATICALLY WI-FI WILL BE TURN ON	PASS
ENTERING THE SIGNAL NUMBER AND SIGNAL NAME GIVE SUBMIT	IT WILL BE UPLOADED IN BOTH LOCAL BUFFER SQLITE AND IN SERVER DATABASE	IT WILL BEUPLOADED IN BOTH LOCAL BUFFER SQLITE AND IN SERVER DATABASE	PASS
GO TO NOT UPLOADED VEHICLE DETAILS	THE DEVICE OF THE VEHICLE WHICH ARE NOT UPLOADED WILL BE DISPLAYED HERE	THE DEVICE OF THE VEHICLE WHICH ARE NOT UPLOADED WILL BE DISPLAYED HERE	PASS
GO TO OVERALL CROSSED VEHICLE TAB	BOTH UPLOADED AND THE NOT UPLOADED VEHICLE DETAILS WILL BE DISPLAYED	BOTH UPLOADED AND THE NOT UPLOADED VEHICLE DETAILS WILL BE DISPLAYED	PASS
GO TO CURRENTLY DETECTING VEHICLES TAB	DETECTING THE VEHICLES WHETHER IT IS IN THE WIFI RANGE	DETECTING THE VEHICLES WHETHER IT IS IN THE WIFI RANGE	PASS

Table 1. Server Side

INPUT	EXPECTED OUTPUT	ACTUAL OUTPUT	STATUS
IF WI-FI IS ON	THE GREEN SCREEN WILL BE DISPLAYED IN WI-FI STATUS TAB	THE GREEN SCREEN WILL BE DISPLAYED IN WI-FI STATUS TAB	PASS
IF WI-FI IS OFF	THE RED SCREEN WILL BE DISPLAYED AND AUTOMATICALLY WI-FI WILL BE TURN ON	THE RED SCREEN WILL BE DISPLAYED AND AUTOMATICALLY WI-FI WILL BE TURN ON	PASS
ENTERING THE VEHICLE NUMBER AND VEHICLE NAME GIVE SUBMIT	IT WILL BE UPLOADED IN BOTH LOCAL BUFFER SQLITE AND IN SERVER DATABASE	IT WILL BE UPLOADED IN BOTH LOCAL BUFFER SQLITE AND IN SERVER DATABASE	PASS

Table 2. Client Side

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INPUT	EXPECTED OUTPUT	ACTUAL OUTPUT	STATUS
ENTERING THE USERNAME AND PASSWORD	IF IT IS CORRECT IT WILL SHOW SUCCESSFULLY LOGIN. IF IT IS NOT CORRECT IT WILL SHOW LOGIN FAILED.	IF IT IS CORRECT IT WILL SHOW SUCCESSFULLY LOGIN. IF IT IS NOT CORRECT IT WILL SHOW LOGIN FAILED.	PASS
ENTERING THE VEHICLE ID	IT WILL DISPLAY THE CORRESPONDING DETAILS OF THE VEHICLE	IT WILL DISPLAY THE CORRESPONDING DETAILS OF THE VEHICLE	PASS
ENTER THE SIGNAL BRANCH ID	IT WILL DISPLAY BRANCH WISE DETAILS	IT WILL DISPLAY BRANCH WISE DETAILS	PASS

Table 3 . Privileged User

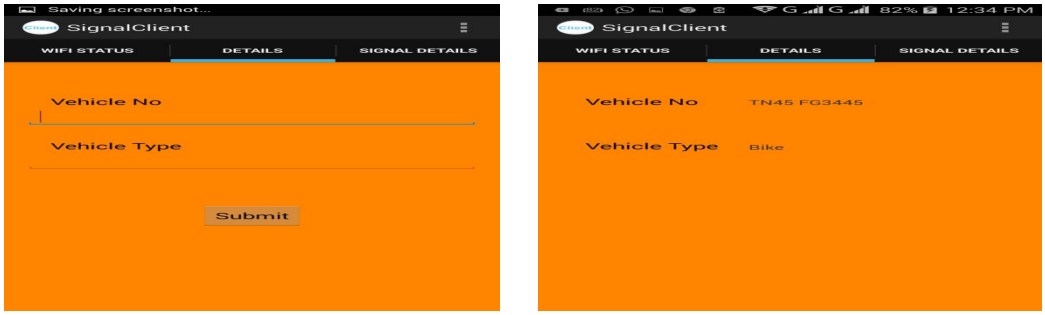

Fig 4 Entering the vehicle details and Search details of the vehicle

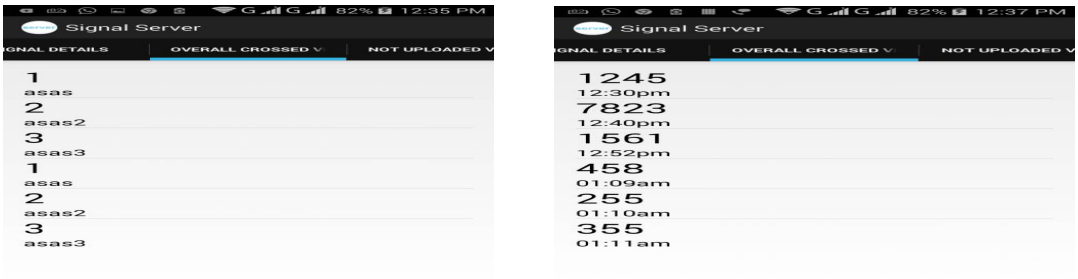

Fig 5 Overall crossed vehicle and Overall vehicle details time

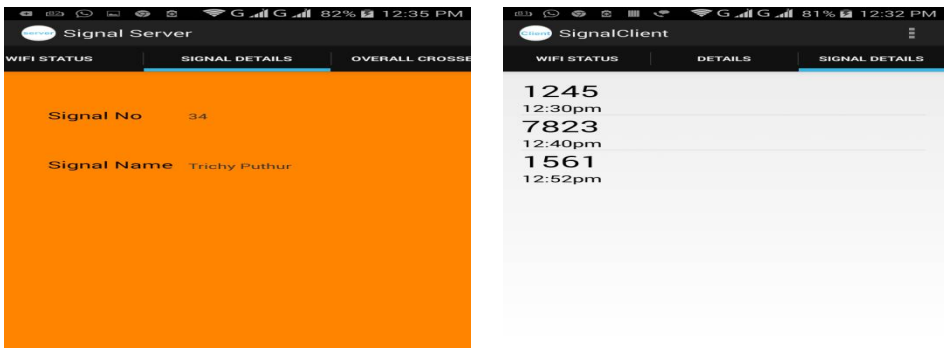

Fig 6 Searching signal details and Displaying signal details with time

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VI. CONCLUSION

In this project, we are fetching the details of the vehicles when they are crossing the signal. To our knowledge this is the first study based on vehicle monitoring and fetching the details such as vehicle identity, branch identity, respective time and the vehicle wise log and the branch wise log while the vehicle is on motion. Through the gathering information the privileged user can able to invigilate in which area the illegal activities are taken place .And the use of the responsive website the appearance of the project will be in good look of the web page to be flexible the device resolution.

VII. FUTURE ENHANCEMENT

In future this project will become a big network for finding the vehicle details in the signal level. The vehicles are being tracked by the signal and it will be updated in the server .In the future a separate device can be used to monitor the status and vehicles complete details to find the illegal activities. A separate electronic device can be used instead of android mobile phone.

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