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A Review: IOT Smart Vehicle

[1] Thoshif Khan, [2] Aakash Luckshetty [3] Md.Tauseef
[1][2] Electronics and communication Engineering, REVA ITM
Bangalore,India 560064 [3] School of Electronics
And communication REVA University
Banglore,India
[1] thoshifkhan1992@gmail.com, [2] akash.luckshetty@gmail.com [3] md.tauseef@reva.edu.in

***Abstract*— The Internet of Things (IOT) is the system of physical objects—gadgets, vehicles, structures and different things inserted with hardware, programming, sensors, and system availability that empowers these items to gather and trade data. The IOT permits objects to be detected and controlled remotely crosswise over existing system infrastructure making open doors for more straightforward combination of the physical world into PC based frameworks, and bringing about enhanced proficiency, exactness and financial advantage. Smart vehicle is one of the applications of IOT which is generally used for the comfort, safety, security and privacy of the drivers. From the past decades, there has been reported several cases which are related to vehicle theft due to this vehicle security has been burning topic all over the world to overcome the challenges related to the vehicle security, We provide a complete survey in "IOT smart vehicle". This paper also describes vehicle detection tracking and monitoring using IOT application.**

***Keywords*—smart vehicle, application, GPS, GSM, survey.**

I. INTRODUCTION

IOT is a technology which is used for multimedia applications, transport system etc. Smart vehicle is a vehicle which comprises of computers, communication system positioning and automation technology it gives the required data to the clients(drivers) about how to improve safety and comfort of the vehicle[1]. In the present era smart vehicle is an emerging\ issue in the automotive sector now a days the communication between the cars have the potential to predict and avoid collisions. For example traffic status, available of parking space and multimedia communication etc. The paper [2], Presented a framework of the networked vehicle in the content of NGN.

The papers [3][4][5], Presented the vehicle to vehicle communication protocol and its topology. The paper [6] presented the speech recognition device which will reduce the driver distraction. The paper [7] presented vehicle detection techniques for collision avoidance. The paper [8], describes vehicle tracking, monitoring and altering system. The paper [9], describes GPSGSM based tracking system. Some researchers proposed while referring to smart vehicle it is going to obtain the necessary details from network or another system to improve the safety of vehicle and other related application to find out the necessary details the smart vehicle is inbuilt with the system that is called as "on-board module". Which consists of GPS, GSM and ARM 7 microcontroller it can provide

(i) Real-time vehicle location it gives exact location which is very helpful in the vehicle theft, so that we can find exact location of the vehicle.

(ii) Collision avoidance and detection: In this we can get the information about the traffic status and we can prevent the collision if the vehicle meet with an accident then we can send the message to the nearest police station as well as the ambulance for the safety assurance of drives. In this paper, we discuss brief introduction of IOT, smart vehicle, vehicle tracking, monitoring and comparing the existing system with the table. The rest of the paper is organized as follows Section II presents Challenges and applications. Section III presents Vehicle tracking and monitoring. Section IV presents comparative study of existing systems with table. Section V presents Security and privacy in IOT. Section VI Conclusion.

II. CHALLENGES AND APPLICATION

In this area, we discuss about challenges and application of smart vehicle.

A. Challenges

These are classified into following types:

1. Safety 2. depends on infrastructure 3. Expansive (high cost) 4. Technologies are yet to be developed. 1. Safety: In this smart vehicle, whenever it wants to communicate with nearest RSU's(Road side units) it will communicate through the internet, the data which is exchanging between network and vehicle it can be fetched easily by the hacker's/attacker's and can alter the message easily. Therefore, the safety of the drivers profile is one of the challenges in smart vehicle communication that's why privacy and security of vehicle driver are maintained.

2. Depends on infrastructure: As the name itself signifies that the vehicle communication depends on infrastructure. For example: whenever a vehicle sends a message to required destination it must be going through the RSU's so these RSU's must be taken into interconnect while sending the message's.

3.Expansive(High cost): To develop any systems or modes one of the major challenges is cost. Therefore to develop the above-mentioned modes (smart vehicle) is expensive.

4. Technologies are yet to be developed: The biggest challenge in this smart vehicle application is mapping or locating the vehicle when the vehicles are in motion.

B. Applications

These are classified as follows:

1. Communication service 2.road mapping 3.comfort messages to vehicle driver 4.remote monitoring 5.information and entertainment 6.Real-time information 7. Safety application

1. Communication service: As the name it signifies that it provides the required communication between vehicle and infrastructure. For example, it helps in every case mostly in case of emergency and sharing of multimedia files.

2. Road mapping: It helps in the mapping of the vehicle through GPS whenever there is vehicle theft case is reported. It provides the shortest path to reach the required destination in the stipulated amount of time and also provides the real time traffic status to the drivers.

3. Comfort messages to vehicle drivers: In this car condition is provides to the driver to enhance security, privacy and convenience and also emergency messages is passed to the drivers regarding the unused opening of vehicle door, parking places etc.

4.Remote monitoring: Remote Monitoring can be accomplished by remote server, board smart box (OBSB) which is an onboard microcomputer system and GPRS. An embedded receiver of global positioning system is installed in the OBSB that helps in taking up the data and transmitting the same to the remote servers by the GPRS, all theses process are controlled by the software application. In the OBSB approach it enables the traffic controllers to monitor the speed of the vehicle by the supervisor done by the check posts.

5. Entertainment information: In this, the clients can get the information related to multimedia. For example, audio and video etc.

6. Real-time information: In this clients can get the information related to the real-time that is weather forecasting, traffic status, parking, news etc. 7. Safety related applications: In this clients can avoid collisions or if the vehicle meets with an accident then the collision message is sent to the nearest police station as well as the ambulance.

III. VEHICLE TRACKING AND MONITORING

In this section, we discuss about the vehicle tracking, monitoring and altering

A. Vehicle Tracking

For the vehicle tracking, GPS is most widely used. In case of vehicle theft, the exact location of the vehicle is given by GPS to track it. Global Positioning System is generally utilized for the following framework. In this study, we have contemplated different following framework. Benjamin Coifman, David Beymer, et al. proposed a constant PC vision framework for vehicle following and movement reconnaissance on the premise of video picture preparing framework. The vehicle direction is utilized as info to modern, mechanized observation applications. The following framework can give the precise position of vehicle and vehicle developments in weaving segments [10].

Akande Noah Oluwatobi speaks to programmed vehicle area is propelled strategy to track and screen any vehicle furnished with programming unit that gets also, exchanges signal through GPS satellite. Programmed vehicle area framework utilized online, versatile correspondence and SMS based stage for correspondence. This framework empowers to gather and break down the data about the area of vehicle continuously [11].

Transport landing time forecast calculation consolidates worldwide situating framework with the constant evaluations of bury station speed. This framework is prepared to do following countless all the while and recognizes the courses and bearings consequently. Simulated neural the system model is utilized for anticipating transport landing times and show its unrivalled execution as contrasted and another strategy [12].

B. Vehicle Monitoring

In this, we can monitor the vehicle where actually it is in the Google map. For example, this is generally used in the cab's to catch out the status where actually the vehicle is moving in through this we can make out or we can predict the exact timing of the vehicle in which it is going to reach a particular destination. Some researchers have proposed the system which is useful for operator's to monitor's the behaviours of drivers in this system we can use the Short message service(SMS) alert whenever the vehicle exceeds the speed limit, collision and theft etc. Gangadhar, M. Madhu, M. S. et al. proposed framework gives data of vehicle like position, velocity through GPS recipient and temperature to an observing framework. It too gives security to vehicle by locking motor from remote area utilizing GSM. It additionally gives security to individual vehicles like auto by locking the vehicle motor from remote area utilizing GSM as a part of instance of burglary. The vehicle can be recognized and ceased at anyplace [13].

Abid Khan and Ravi Mishra proposed the framework comprises of single board inserted framework having GPS and GSM modems with ARM processor is introduced in the vehicle to track vehicle. This framework has numerous favourable circumstances, for example, huge capacity, low operation cost, solid expansibility [14].

The following framework can illuminate the area and course gone by vehicle and that data can be watched from whatever other remote area. The framework additionally incorporates the web application that gives definite area of target. This framework empowers to track focus in any climate condition [15].

Prafull Patinge and N.R. Kolhare proposed keen on board open data framework, having fix GPS, GSM/GPRS and microcontroller module on transport. This framework ready traveler about the present and next station on examination with GPS directions and as of now put away GPS directions of separate area on LCD show in transport and additionally declaration utilizing speaker [16].

Intelligent system can act as per its circumstance without being told by people. It comprises of information processor like simulated neural system, which is generally utilized as information mentor. The transport checking and administration framework give the definite area of the transport and anticipate the landing time on the premise of course and activity [17].

Y. Kakuda proposed innovation for kids the following framework to avoid violations against youngsters and useful to folks. The innovation depends on mobile ad hoc network. The framework is useful to parent to know the wellbeing level and to and from the data of understudies on school course. J. Saranya and J. Selvakumar proposed the framework which is concentrate on executing kids following framework on android terminal for each kids going to in the school. The framework incorporates following the kids development to furthermore, from school and data is send to parents and control room. The framework comprises of voice perceiving sensor which detects the cry of kids in the school transport and send data to their guardians around by utilizing database put away in the framework [18].

IV. COMPARATIVE STUDY OF EXISTING SYSTEM

Exiting system	Platform /Technology	Methodology
Vehicle tracking and monitoring [13]	System is based on ARM7 micro controller	Tracking temperature sensing and alerting
GPS-GSM based tracking system with Google map Based monitoring [14],[15]	GPS, GSM and micro-controller based system	GPS tracking,Monitoring using Google map and alerting
On board Public information system using GPS GSM for public transport [16]	GPS,GSM GPR PC Based system	GPS tracking, Control using map And sending alert SMS
Intelligent bus monitoring management system [17]	RFID, GPS, GSM, PC based system	GPS tracking, Database collection, alerting
Children tracking system [18]	GPS, Mobile ad hoc network, PC based system	Children tracking and data analysis

V. SECURITY AND PRIVACY IN IOT

In this section we discuss about security and privacy in IOT.

A. Security

A. security it plays a very crucial role in IOT because

(i) In this most of the communications is wireless.

(ii) In wireless communications as prone to attacks and attackers can take over the message easily.

So that's why security of the vehicle drivers comes into picture. Proposed so many system to overcome it majority of the systems uses authenticity and data gravity to overcome this issue.

B. Privacy

In the present ERA, it is the most important topic to be discussed because everyone starting from the children to adults need privacy. Now days, this is one of the major problem which is ending in IOT. According to researchers, privacy can be protected the smart vehicle can start sending the messages or communication after it is authenticated so that the data can be protected.

VI. CONCLUSION

In this paper we have gone through the complete survey of challenges, application, vehicle tracking and monitoring with the comparative table of existing systems we starts the paper with the brief introduction of IOT, smart vehicle, key application etc. and at last we discussed about the problems faced in the security and privacy in IOT.

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