Vehicle to Vehicle Communication

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Abstract— As we race toward fully autonomous vehicles, we are started to know that the only expensive car on the road which can communicate with other cars and objects it's nearby like traditional traffic cones. . In this system, if one vehicle driver notices something problem with other vehicle then he/she can use vehicles number to communicate with other vehicle driver. To help resolve this issue, vehicle notification mechanism is required for the vehicles in front of us to get informed regarding any damage or malfunctioning of the vehicle from other users. This device includes of a system that makes use of Third Party Acknowledgment mechanism for notifying the vehicle driver or owner regarding vehicle damage.

Keywords: safety, notification, voice reorganization, communication, helps

I. INTRODUCTION

Vehicle safety is a very important issue due to rising sudden vehicle damages. This Vehicle notification system can be used for the vehicles in front of us to get informed about any damage or malfunctioning of the vehicle from other users. This device made of a system which can make use of Third Party Acknowledgment mechanism for notifying the vehicle driver or owner regarding vehicle damage. This system will make use of android app for notification process, hardware part for GPS and server for determining the nearest garage for informing the user to get the damage repaired. Vehicle to vehicle notification system with voice input facility for user convenience while driving in this system if one vehicle driver notices something wrong with other vehicle then he can use vehicles number to communicate with other vehicle driver. Vehicle to vehicle notification system with voice input facility for user convenience while driving. In this system, if one vehicle driver observes something wrong with other vehicle then he/she can use vehicles number to communicate with other vehicle driver.

Using this system if a vehicle driver observes something about another vehicle then using our system they can notify other vehicle driver. But they can notice or indicate only when the victim vehicle is nearby 100 meters from the observer.

II. LITERATURE REVIEW

In this section, we discuss about the privacy and security issues that are present in both IOV and VANETs. Because the IOV is developed from VANETs, there may be significant overlap in the attack spectrum. As, we discussed these both domains earlier. In VANETs, vehicles can distribute important information about different important events, such as road conditions, traffic jamming, accident notifications, for efficient and distributed traffic management. Vehicles can acquire this sorted information from neighbouring vehicles or from the environment to detect traffic jamming. In such a critical situation, the presence of malicious and misbehaving nodes causing inaccurate and fabricate information distribution in the network can lead to drastic situations, thereby compromise the safety, security, and privacy of potential users. Since VANETs are evolved from MANETs, the vulnerabilities posed by VANETs are largely inherited from the Mantes' ad hoc architecture, which usually attacked from the limited range because vehicles may not essentially be connected to the Internet. We can specifically divide the attacks against to the VANETs as inter-vehicle and in.

A. Paper

Albert Demba and Dietmar P. F. Möller (2018) [1] has suggested that Vehicle-to-vehicle (V2V) communication is an inter vehicle communication paradigm not yet widely standardized. The important feature of V2V is that it does not depend on the third party networks like cellular networks to communicate. Its ad hoc communication spans up to 1000 m with 360̊ view of nearby vehicles. Instead of the wide range of benefit that V2V offers, it still has to faces the number of challenges in deployment. Due to high rating by operators of V2V applications to solve road traffic safety, and increase the interest of people SS in this technology. This research paper of student inquires into technologies, benefits, and challenges of V2V with solutions. The main focus is finding the problems of control systems with more security.

Method: Public Key Infrastructure (PKI)

– PKI depends on verify identities through the use of digital signatures.
– V2V uses the PKI encryption system which is more complex as compared to a standard implementation.
– Basic technologies used for achieving high security levels with the PKI are: Hash algorithms / checksums which provide integrity protection and can provide authentication [1, 2] Encryption provides confidentiality; can provide confirmation and integrity protection.
– Digital signatures provide verification, reliability safety and non-repudiation.

B. Examples

– A Distributed Channel Access Scheme for Vehicles in Multi-agent v2I system.
– New Vehicular Fog Computing Architecture for Cooperative Sensing of Autonomous Driving.
– Repetition Based Cooperative Broadcasting for Vehicular Ad Hoc Networks under the Rayleigh Fading Channel.

III. PROPOSED METHODOLOGY

Following algorithms and the methods are followed by the system.

A. *Decision Tree Algorithm*

– The algorithm of decision tree is kind of supervised learning algorithms.
– The algorithm of decision tree can be used for solving regression as well as classification problems also.
– The aim of using the Decision Tree is to create a training model which can be used to guess the class or value of the target variable by understanding simple decision rules indirect from prior data (training data).
– In Decision Trees, for predicting a class label for a record we start from the root of the tree. We compare the root attribute with the record's attribute. Using the comparison, as basic we follow the branch which is corresponding to that value and can jump to the next node.

B. *Voice Recognition Algorithm:*

– The voice recognition module will recognize the voice input given by the user. User can for open application and also to give instructions to system, user can use voice input. After taking an input from a user voice through the microphone analysis is done.
– The design of the system includes handling of the input audio signal. The number of operations is accomplishing on the input signal in these different stages such as Pre-emphasis, Framing, Windowing, Mel Cestrum analysis and acknowledgment (Matching) of the spoken word.
– The voice algorithms consist of two distinguished phases. The first one is training sessions, whilst, the second one is referred to as operation session or testing phase as describe.
– The product of the best parametric representation of audio signals is an important task for produce a good recognition perform.

C. *GPS:*

– A GPS is a map-reading device, GPS receiver, or simply GPS is a device which is able to accept the most important data from GPS satellites and then to calculate the device's geographical position.
– Using correct software, the device may show the position on a map, and it may give directions.

D. *Android:*

Android application the application will be installed on user's android device which will accept the voice command and notify the other driver.

1) *Abbreviation and acronyms*

Acronym	Definition
V2V	Virtual to Virtual *(operating system migration)*
V2V	Vehicle to Vehicle
V2V	Vehicle-To-Vehicle *(communication)*
V2V	Vendor to Vendor
V2V	Video-To-Video
V2V	Vienna to Venice

2) *Equations*

$$E(S) = \sum_{i=1}^{c} - p_i \log_2 p_i$$

Where,
"Pi"= simply the frequents probability of an element,
class "I" = our data.
For simplicity's sake let's say we only have two classes, a positive class and a negative class. Therefore "I" here could be either positive (+) or negative (-). So if we had a total of 100 data points in our dataset with 30 belonging to the positive class and 70 belonging to the negative class then "P+"would be 3/10 and "P-" would be 7/10.

E. *Proposed System:*

Here we are using two types of input devices.

– Firestone is the touch device and the second one is a voice recognition sensor. Both the input devices are mounted on the dashboard of the vehicle. The touch device has an application enabled the user to give the input towards the microcontroller. The device enabled the communication between the user as well as the microcontroller. When the user is encountering or approaching any type of inconveniences in the road, the driver can touch the appropriate button present in the touch device so that the exact contents present in the buttons displayed in the output device which is mounted on the back side of the vehicle. The list of hazards or inconveniences a driver can face while driving is already inbuilt in the microcontroller. It is mentioned in Table 1with its detailed description.
– The second category of the input device is a voice recognition sensor which senses the voice of the driver and automatically detects the type of inconvenience the user is faced or spelled from the list of word or voices present already. At present, the input devices are supposed to be designed.

Types of messages and its detailed descriptions.

Type of Warning	Description
HAZARD!	Any possible source of danger on the road or near the road which leads to a crash.
WRONG ENTRY	Any possible entry of vehicles which is in wrong side
ROAD UNDER CONSTRUCTION	Appearance of a construction in the road
FOG / MIST	Appearance or sudden arrival of FOG/ Mist.
SANDSTROM	Appearance or sudden arrival of Sand Strom
ACCIDENT	Appearance or sight of an accident
DAMAGED ROAD	Appearance of a damaged road
CROWDED	Appearance of a busy road
CROSSING AHEAD	Appearance of a crossing in the middle of the road
KEEP DISTANCE	Encountered a forth coming vehicle as too closer

F. *Technologies Used*

– FRONT END: Android ,JDK 8
– BACK END:- MYSQL Database

G. Hardware Requirements:

- The minimum configuration which is required on server side platform
  - 1.5 GB HDD for installation.
  - 512 MB for Main Memory
  - 60 GB or more Space on Hard disk.
  - USB Drive Connectivity
  - Wi-Fi Connectivity/Internet Access

H. Software Requirement:

- Android Studio
- Java
- OS Requirement : Windows 7 & above

IV. FUTURE SCOPE

Car manufacturers and the US government are serious about the discovering for and finding two technologies that results into future cars for communicate with each other and with objects around them. Imagine approaching an intersection as another car runs as red light. Sometimes you are not able to see them, but your car gets a signal from the other car that it's in your path and warns you of the potential collision, or even hits the breaks automatically to avoid an accident. A developing technology known vehicle-to-vehicle communication, or v2v, is being tested by automotive manufacturers like ford as away to help reduce the amount of accidents on the road.

V. CONCLUSION

This work presented a method of communication between vehicles running in the roadway. This method can communicate more effectively with the vehicles present on the road. Using the third party acknowledgement, it is more compact and cost-effective since there is no need for any infrastructure or networks for establishing a connection between the vehicles compared to existing schemes. Using the proposed system, whenever the driver encounters any abnormal or irregular driving circumstances, of another vehicle the user can display the situation for the forthcoming vehicle by clicking the input touch device. The proposed system is designed in a way such that it can ensure the safety of forthcoming vehicles and reduces chances of upcoming driving inconvenience faced by the driver. The main contribution of this paper is to give future directions to the vehicle to vehicle communication development as well as to the research. From the perspective of security this proposed system gives us the benefit.

REFERENCES

[1] Harding, J., Powell, G., R., Yoon, R.,Fikentscher, J., Doyle, C., Sade, D., Lukas, M., Simons, J.,& Wang, J.: Vehicle-to-vehicle communications: Readiness of V2V technology for application. Report. No. DOT HS 812 014,Washington, DC, National Highway Traffic Safety, 2014.

[2] National Highway Traffic Safety Administration(NHTSA), Department of Transportation (DOT)Notice of Proposed Rulemaking, 'Federal MotorVehicle Safety Standard (FMVSS), No. 150, tomandate vehicle-to-vehicle (V2V) communicationsfor new light vehicles and to standardizethe message and format of V2V transmissions', Federal Register Vol. 82, No 87, 2017.

[3] Cabal-Aragon, J.; Pomarico-Franquiz, J.; Shmaliy, Y.S.; VeraAlmanza, O "Embedded microcontroller using GPS asecurresource for disabled people" Instrumentation and Measurement Technology Conference (I2MTC) Proceedings, 2014 IEEE International,pp: 226-229.