Inter Vehicle Communication

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ABSTRACT

Transportation problems are turning into more critical due to the complication of traffic structure and increase of vehicles on roads. Intelligent vehicle communication provides a free space to the vehicles to communicate among them to avoid collision. The vehicles share information about its speed and position to avoid collision. The main applications of this paper is to provide safe and secure journey to the people on the road by avoiding collision and by providing smart car parking system, which explores the advantages for vehicles to find and choose car park spaces. Another application is to secure vehicle from Vehicle theft that has become a pervasive problem in metropolitan cities. The aim of our work is to reduce the vehicle and fuel theft with an alert given by commonly used smart phones.Multiple communication modes can be used to communicate between vehicle-to-vehicle & vehicle-to-infrastructure in cooperative vehicle infrastructure system, such as wireless fidelity (Wi-Fi), dedicated short range communication, 3G Zigbee and so on.

1. INTRODUCTION

The Vehicular Ad-Hoc Network, or VANET, is a technology that uses moves cars as nodes in a network to create a mobile network. It turns every participating car into a wireless router or node, allowing cars approximately 100 to 300 metres of each other to connect and, in turn, create a network with a wide range. Vehicular communication is the wireless transmission of data between motor vehicles.

The communication and sensor technologies are largely considered research and development to make roads safer and smarter. Since today's vehicles are enabled with sensors to sense the surrounding environment, the further step is to allow the vehicles to communicate with each other. Intelligent vehicle communication is a network that allows vehicles and roadside units to communicate regarding safety warnings and traffic information. These connected vehicles provide a building block to improve safety and comfort of driving. The growing wireless communication techno-logiest promise to reduce the delay in propagating emergency warning signals. The active safety is compiled of sensing and communicating activities. Safety related communication involve two types of messages: periodic and event driven. Periodic messages involve vehicle's status such as position, speed etc. They are used for safety application to detect dangerous situations. Event-driven messages are used when any abnormal condition is detected.

Fig –1: Wireless network establishing among vehicles

The information delivered after the deadline in real time systems is useless and also has severe effect on the traffic safety system. The requirement for ad-hoc network support direct V2V communication. The wireless communication standard for V2V ad-hoc communication in high speed network environment should complete exchanging data within 50ms of time frame.

The Dedicated Short Range Communication (DSRC) technology supported by VANET help the drivers to travel more safely and reduce the facilities due to road accidents. VANET is a self-organizing network that works well for IVC. The vehicles do not send any acknowledgement for the transmitted packets. The transmitter could not detect any failure of the received packets. In collision warning application, all vehicles have to receive the warning message successfully to avoid collision.

Real time information on the current road traffic are collectively collected and shared through V2V based monitoring technique, co-operative vehicular systems could monitor any road segments. V2V systems can detect congestion and provide the traffic information. The vehicles receive messages and transmit this message periodically to other vehicles.

2 COLLISION AVOIDANCE

In this, system allows the vehicles to exchange the data regarding the collision and distance of the obstacle. Based on the received information, a warning is given to the vehicle driver and the vehicle speed is automatically reduced. For collision avoidance we used Intelligent Vehicle Communication system using ARM and Zigbee. In this, the proposed method consists of ultrasonic, vibration and temperature sensors that are connected to the ARM controller unit which monitors and display the values through Liquid Crystal Display (LCD). The sensor values are amplified to strengthen the output signal before feeding to the controller unit. The Radio Frequency (RF) transponder Zigbee is used to transfer information among vehicles. Based on the shared information, the controller takes decision using the fuzzy logic programmed. The decision is taken to control the speed of the vehicle. The sensed values are intimated to the driver through the LCD and in case of abnormal values the speed of the vehicle is automatically reduced. Than solving the traffic congestion and accidents avoiding problems individually, vehicular communication systems act more effective.This system has the main advantage of reducing road crashes and saves lives [1].

3. CAR PARKING

The main objective in this paper is show that even when all vehicles, at least at the start, have knowledge about where available car park spaces are, without cooperation and additional information exchange, the vehicles do worse than if they cooperated and exchanged information about occupied spaces they found. This is because when several vehicles start going for the same spaces, traffic near these spaces could get congested and the cars tend to compete for the spaces, but if they instead cooperated with each other, they could effectively spread themselves out so that on average, vehicles get parked faster. There are a number of proposed schemes to handle car parking, and various parking allocation management systems. Generally speaking, obtaining updated information about available vacant car park spaces and distributing vehicles in the parking area fairly are powerful factors that motivate the construction and design of car park allocation or management systems. One possible situation for ameliorating the car park situation is by adopting sensor technology that can be combined with a notification system to inform drivers.

For Car parking we used the CoPark Approach, which Investigating Vehicle-to-Vehicle Communication for Cooperative Car Parking. In this,CoPark is a decentralized scheme that depends on wireless communication (e.g., limited range DSRC type V2V networking) among smart agents installed in the vehicles. In CoPark, the vacant

parking slots are occupied by vehicles in such a way as to reduce traffic congestion inside the car park, aiming to reduce excessive searching time for parking through realtime negotiation among agents [2].

4. SECURITY

Theft break records gives statistics of a vehicle is stolen in every 13 minutes in our capital city Delhi. The thieves are being efficient to steal vehicles. The vehicles are in unsafe zone as the vehicle thieves are cleverer in stealing. This causes severe safety hazards to vehicles. So it is necessary to protect our vehicles through modern technologies. A communication can be created between the vehicle and Smartphone through Bluetooth. Any security issues will be given as an alert to the owner through Smartphone service. Wireless networks are integrated into the modern automobile.

Here, we used AES Algorithm for Smartphone to Vehicle Communi-cation.To cope with such issues, we designed, implemented and evaluated a security layer that protects from vehicle and fuel theft over the Bluetooth wireless link between the mobile device and the vehicle. AES algorithm is used to interface Smartphone with vehicle to avoid theft. In this, the vehicle is connected to the smart phone via Bluetooth device to avoid vehicle theft. It uses a vehicle Bluetooth receiver and a transmitter which is connected to mobile device. The vehicle is to be fixed with the blue tooth adapter. Any static acceleration and dynamic acceleration resulting from movements in the vehicle hand bar will be the input signal for the adapter. Advanced Encryption Standard (AES) algorithm transfers the input signal to user interface via Bluetooth through cipher text. With the help of user interface the signal is passed to the mobile device. The mobile beeps an alarm thereby instruction is directed to the vehicle driver to lock the vehicle.The work is extended to identify a petrol theft. A petrol theft detector is used to sense the petrol level in the tank. If any decrease in level of petrol during the off condition, it is indicated with an alarm in the vehicle [3].

5. CONCLUSIONS

Vehicular Communication system provides safety and security to lives and reduces road crashes. System allows the vehicles to exchange the data regarding the collision and distance of the obstacle. Based on the received information, a warning is given to the vehicle driver and the vehicle speed is automatically reduced. We introduced CoPark, a vehicle-to-vehicle cooperative car parking approach for improving car park search among competing vehicles and also reduce searching time and consequently, reducing the time and fuel consumption.

6. REFERENCES

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