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Over speed Indication and Accident Prevention over Lane Using IOT

Siddharth Sapkal[1], Mayuri Nawale[2] ,Prerana Regade[3] ,Shuchi Gupta[4]

Student, Computer Engineering, Indira College of Engineering &Management, Pune, India

Abstract- Internet of Things concept is a technology to combine different devices from different areas that will result in exchanging of different data types through different networks. In the developing countries many crimes happens at highways and bridges. So in this project we are introducing a security feature which can resist the occurrence of those crimes. The system which will be based on RFID (Radio frequency identification) technology will replaces the traditional manual tolling system. In the traditional automated tolling system RFID reader only detects the RFID card to deduct the toll amount according to vehicle types. When the vehicle enters the lane it will acquire the speed limit of lane over highway. In the situation when the driver will exceed the speed then the specified limit, the audio alert will be given to the driver. After getting the audio alert if he still exceeds the speed then message will be sent to toll station through server and toll will be deducted when the car reaches at toll station. In addition, to deliver messages between moving vehicles in cities a Social Based Data Forwarding Mechanism (SDFM) for v2v communication has been introduced. The main aim behind this project is to monitor the vehicles in order to provide a safer transportation. It monitors the activities outside the vehicle using various sensors and provides data which are used to automate the transport. In v2v communication, the range is specified for vehicles and if two vehicles come into that range then the alert message will be generated in both the vehicles. The message will contain the distance information between two vehicles and will warn the driver.

Keywords: IOT, Radio Frequency Identifier, Vehicle Toll System.

I. . INTRODUCTION

Nowadays, number of vehicle has been increased and traditional systems of traffic controlling are not able to meet the needs that cause to emergence of Intelligent Traffic Controlling Systems. This project measures the speed of vehicle and if speed is greater than the specified limit then our system sense the speed by using RPM sensor. This information is sent by using RF module [1]. When speed gets increased then the speaker will tell the user that your vehicle speed is increased .If the vehicle still exceeds the speed after getting the audio message then the message is sent to toll station through the server. In our system, user needs to pay the fine, and then only the vehicle is allowed to pass from the toll station. In this way the data is automatically updated by using server (Raspberry-pi). Ultrasonic sensor is used for the obstacles detection to avoid the accident. RF module is being used to send the related information. The RF module is a small electronics device that is used to transmit and/or receive radio signals between two devices. In an Embedded system it is often desirable to communicate with another device wirelessly. This wireless communication can be accomplished through optical communication or through radio frequency (RF) communication. For many applications the choice is RF since it does not require line of sight [1].In the developing countries many crimes are happens at the highways and bridges. In this paper we have introduced a security feature which can resist the occurrence of those crimes. However, this system is based on RFID (Radio Frequency Identification) technology which replaces the traditional manual tolling system. In the existing automated tolling system RFID reader only detects the RFID card to deduct the toll amount according to the vehicle types. In our integrated system if the authority wants to Block a certain type of vehicle or a specific vehicle, it can be done at the toll booth area. For this, a simple code text is sent to the toll station using GSM module and then the vehicle is blocked by not lifting the barrier even after deduction toll amount from the vehicle owner. So by using this technique a criminal can be caught if he is running by performing a crime [1]. The proposed system involves about sensing the vehicles at a distance of 2-3 meters. According to the
Indian roads, we also have made sure that if and only if the car is in motion the sensor is active. Once the distance between the two automobiles is less than the specified distance then automatically a message is received at the dashboard of the car. The message is flashed with optimum colors. Along with this a voice note is also been added in case dashboard goes unnoticed.[3].

II. RELATED WORK

We have analyzed many research works regarding automation of toll collection system to replace manual toll collection system. Manual toll collection system is unreliable, time consuming and it creates traffic congestion. Researchers modeled automated tolling system on the basis of RFID technology using different types of microcontrollers and sensors. Moreover, RFID based security and

access control system in confidential areas has been introduced previously .We have seen RFID card punch system in hostels, medical centers and offices to restrict the entry of general people. We aimed to combine those ideas and introduce something new which can be implemented at the highways and bridges to ensure security [1]. The accident prevention systems could be classified into two main categories: 1) Proactive whereby the risks areas sassed beforehand and measures are introduced to prevent them happening; 2) Reactive where they are investigated and analyzed to find the causes to prevent a reoccurrence. A proactive method is more attractive since it can pre-notify the driver of vehicle's violation and significantly decrease the amount of accidents or mitigate the Consequences of them to save people's life. The typical proactive systems are Lane departure warning (LDW) system, intelligent speed adaptation (ISA) system and Hard Shoulder Monitoring System (HASMOS) [7].**A**UTOMATED Vehicle (AV) technologies are actively studied by many companies because of their potential to save fuel, reduce crashes, ease traffic congestion, and provide better mobility, especially to those who cannot drive. Currently, almost all major automakers have research and development programs on AVs. By 2030, it is estimated that the sales of AVs may reach $87 billion dollars. National Highway Traffic Safety Administration defines five levels of AV automation. AVs are quickly being developed from level 0 automation, which conducts no driving tasks and up, possibly all the way to level 4 automation, which monitors the driving environment performs all dynamic driving duties. As the level of automation goes up, AVs need to deal with many uncertainties/disturbances in the real world, including imperfect human driver behaviors. AVs are projected to penetrate the market gradually and will co-exist with human-controlled vehicles (HVs) for decades. During this transitional period, AV swill interact primarily with HVs. It is estimated that 70–90%of motor vehicle crashes are due to human errors. However, AVs can have their own crash modes. A practical and defective evaluation of the safety performance of AVs should consider their interactions with HVs.[8]. The proposed system involves about sensing the vehicles at a distance of 2-3 meters. According to the Indian roads, we also have made sure that if and only if the car is in motion the sensor is active. Once the distance between the two automobiles is less than the specified distance then automatically a message is received at the dashboard of the car. The message is flashed with optimum colors. Along with this a voice note is also been added in case dashboard goes unnoticed [3].

I. LANE CHANGE MODELS BASED ON NATURALISTIC DRIVING

The lane change (cut-in) scenario issued as an example to show the benefits of the proposed accelerated evaluation approach successful completion of a lane change requires attention to the vehicles in both the original lane and the adjacent lanes. Few protocols have been published regarding the evaluation of AV's (e.g. AEB systems) under lane change scenarios. Human driver's lane change behaviors have been analyzed and modeled for more than half century. Early studies based on controlled experiments usually have short test horizons and limited control settings. More recently, researchers started to use large scale N-FOT databases to model the lane change behaviors. Leeetal Examined steering turn signal and break pedal usage, eye glance patterns, and safety envelop of 500 lane changes. The 100-cars naturalistic driving study analyzed lane change events leading to rear-end crashes and near-crashes. Changes for heavy trucks .Most of these studies are based on hundreds of lane changes. We use the data collected in the Safety Pilot Model Deployment (SPMD) project, which contains more than 400000lane changes.
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II. PREVENTIVE PROCESS OF ACCIDENT

Consider the automobile is equipped with the microcontroller which continuously records all the variation for particular period. The data will be stored in a First In First Out manner. While driving, if the driver cross the speed limit, the microcontroller warns him/her with the voice message. So that there is a chance of minimizing the speed. By this, we can prevent the 90% of road accidents every year. In case of accident, the variation in the sensors, helps easily to predict the situation.

- PROCESS OF ACCIDENT DIRECTIVE

When accident takes place, assisting injured passengers as soon as possible is crucial to minimize the negative effects on their health. Mortality from traffic accidents can be classified into three phases:

- Phase 1 involves casualties in the first few minutes or seconds after an accident (about 10%of all deaths).
- Phase 2 is the first hour after the accident, the so called golden hour, has the highest mortality (75% of all deaths) and is the phase during which the highest death rate can be avoided by proper initial health care.
- Phase 3 happens days or weeks after the traumatic incident, has 15% of mortality, and takes hard work and a high amount of resources to reduce mortality. As can be observed, the phase where more benefits can be achieved by reducing rescue response time is the second one. A fast and efficient rescue operation during the hour after traffic accident significantly increases the probability of survival of the injured and reduce the injury severity.

For a noticeable reduction in rescue time, we need fast and accurate accident detection and reporting to an appropriate public safety answering point (PSAP). This objectives can be accomplished by using telecommunication technologies incorporated into the automotive world. There have been many advances in the development of communication between vehicles (V2V technologies), also known as vehicular ad hoc networks (VANETs), involving use of GPS (Global Positioning System) and GSM (Global System for Mobile communication).GSM also has the advantage of using SIM (*S*ubscriber *I*dentity *M*odule) cards. The SIM card, which acts as your digital identity, is tied to your cell phone service carrier‘s network rather than to the handset itself. This allows for easy exchange from one phone to another without new cell phone service activation. GSM uses digital technology and is a second-generation (2G) cell phone system. GSM, which predates CDMA, is especially strong in Europe. EDGE is faster than GSM and was built upon GSM.

III. ALGORITHM

- For Radio Frequency Identifier(RFM) sensor

1. Start the process
2. Base station start the communication with Rx (receiver)
3. Base station value send to Rx that is serial Buffer (SBUF) of Rx will receive data from base station
4. Update the RPM from rpm Sensor
5. Compare this updated data to the threshold value

Thx (Threshold) =SBUF-RPM (value)

6. If Thx < value then go to step1
7. If Thx > value, Buzzer and vibration ON.

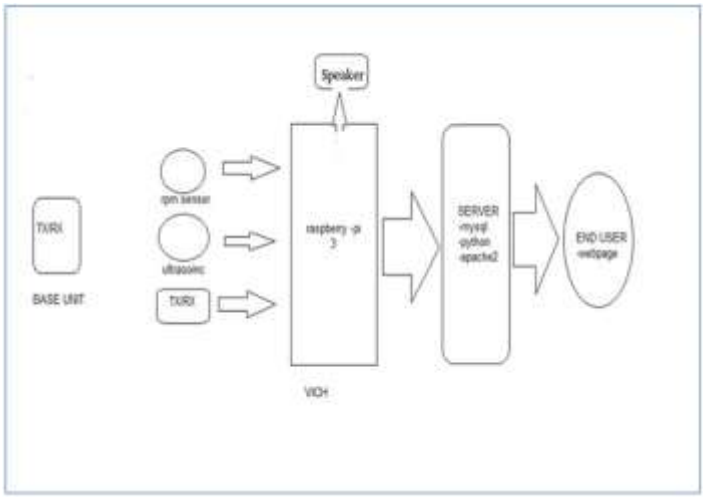
- For Ultrasonic Sensor

1. Start the process
2. Base station start the communication with Rx (Receiver)
3. Base station send the value to Rx that is serial Buffer of Rx will receive data from base station
4. Update the value from Ultrasonic Sensor
5. Compare this updated data to the threshold value

Thx (Threshold) =SBUF-US (value)

6. If Thx < value go to step1
7. If Thx > value, Buzzer and vibration ON giving warning to user.

IV. PROPOSED MODEL



We are implementing a system that recognizes the speed of the vehicle and gives the audio alert when exceeded the speed. If still the vehicle exceeds the speed limit then the message will be send to the toll station through server which tells which vehicle exceeds the speed limit. The proposed system involves about sensing the vehicles at a distance of 2-3 meters. According to the Indian roads, we also have made sure that if and only if the car is in motion the sensor is active. Once the distance between the two automobiles is less than the specified distance then automatically a message is received at the dashboard of the car. The message is

flashed with optimum colors. Along with this a voice note is also been added in case dashboard goes unnoticed.

- Raspberry-pi: It is a low cost, basic computer that was originally intended to help spur interest in computing among school-aged children. The raspberry-pi is contained on a single circuit board an features ports for: HDMI.
- Ultrasonic Sensor: It is used to measure the distance between two cars. If the distance between two vehicles reduces, then ultrasonic sensor sends message to both the vehicle drivers.
- RPM Sensor: It is used to measure the speed of the vehicle. If driver exceed the speed limit then rpm sensor send message to driver.
- Transceiver (TX) &Receivers (RX): It is used to receive the information from sensor and transfer this information to toll station.

V. CONCLUSION

In this paper we tried to design an embedded system to ensure a faster toll collection system along with security feature that will contribute a lot to stop crimes at the highways and bridges. It will also ease the work of the police authority to catch a criminal. The system performs the whole task by processing the data received through GSM shield from the police authority. However, the same concept can be implemented at the car parking system or any other security concern places. The real life model construction cost of the system is very less and sustainable too [1].We can improve the response time of the whole system by using more powerful RFID system. As a whole, the integrated toll collection with security system is very beneficial and effective system. It is due to the driver‘s madness, traffic accidents keep with a yearly increasing of a high rate. This paper shows the new fatigue prevention and detection techniques using alcohol impact, accelerator, brake, clutch etc. In this technique the situation will be detected immediately and the detection module regularly records the driver‘s and third parties events. This could find solutions for the long day problem in witness case [4].The detection will be highly accurate and doesn‘t provide false statements. The proposed project provides a simple way to ensure that a warning or a caution is provided at times when accident about to happen. It just implies on avoiding accident rather than saving after accident had occurred. Through research presented in this paper, we propose an intelligent automobile system so the world became a much better and safe place to live [5].

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