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Inter Vehicular Communication for Accident Avoidance in Highways

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Abstract:

In our transport system we have lot of disturbance between the starting and destination locations like obstacle present in the path, irregularity of nearby vehicle activities, unexpected speed change, etc. In order to reduce these issues cooperative vehicular systems are expected to improve the traffic safety and efficiency through the real time exchange of information between vehicles and infrastructures. In our project, this paper presents the experimental evaluation of different V2V safety applications under real world. Inter vehicular communication for accident avoidance is to improve the traffic safety with the help of three sensors namely eye blink sensor, obstacle sensor and accident sensor. These are used to know about the details of the neighbor vehicles. The details which includes vehicles speed, drivers state and obstacle details. Collecting and sending of details to the neighboring vehicles avoid accidents and the driver can alert from the other vehicles.

Keywords: V2V communication, eye blink sensor, obstacle sensor, accident sensor.

INTRODUTION

The new emerging applications for enhancing traffic safety within the vehicular network environments which can be classified as real-time system. Existing vehicle-to-vehicle safety systems together with new co operative systems using wireless data communication between vehicles which can potentially decrease the number of accidents on the high way road in India i.e. transmit the messages within the dead lines. According to World Health Organizations (WHO), road accidents annually cause approximately 1.2 million deaths worldwide; one fourth of all deaths caused by injury. Also about 50 million persons are injured in traffic accidents. If preventive measures are not taken road death is likely to become the third-leading cause of death in 2020 from ninth place in 1990.

EXISTING METHODOLOGY:

The continuous increase in the number of vehicles in the transportation system calls for an improvement of traffic safety and efficiency of the overall transportation infrastructure. To achieve this demand, the vehicular communications have been considered to enable various road traffic applications ranging from traffic safety to pleasant driving applications. Effective implementation of vehicular communication could also improve traffic management system. This effectiveness could be achieved by designing efficient vehicular network protocols. Therefore, vehicular communication networks not only could provide scalable connectivity between vehicles on the

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road but also can establish better coordination between road mobile users.

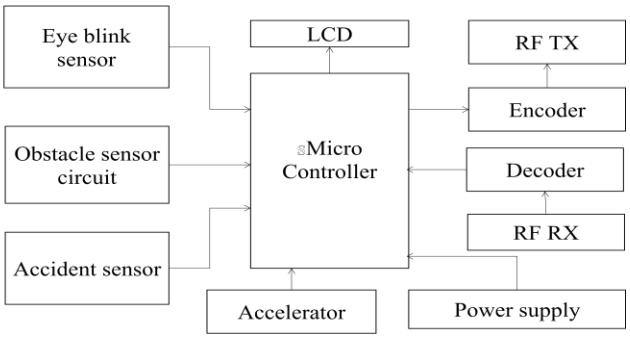
LITERATURE SURVEY:

Various safety critical vehicle applications in particular, such as collision avoidance or mitigation, lane change management or emergency braking assistance systems, rely principally on the accurate and reliable knowledge of vehicles positioning within given vicinity [1, 8]. Distributed algorithms as proposed in [2] and [3] have underlined a recent and important interest for the collaborative localization. Since the number and type of sensors used in vehicular applications increases, it is essential to find ways to better analyze and extract useful data from these sensors and share them between vehicles when it is relevant. Sensors which are used in localization can be divided in two categories: proprioceptive and exteroceptive sensors [4]. In addition to the information exchanging, VANET has brought the capability for communicating vehicles to use their wireless communication devices to measure the distance between each other. There are basically two methods of measuring distance between communicating devices. The first method is the Time-of-Flight (TOF) which is based on the time that it takes for a signal to travel from one node to another node, where the nodes are vehicles in a VANET. The second method is the Radio Signal Strength (RSS) which is based on the attenuation of the signal strength while traveling from the transmitter node to the receiver node. Using the communication devices to measure distance between vehicles has several advantages and disadvantages over the other range measurement devices like radar and lidar. One of the advantages is that the vehicle identification problem and the data association between the received information and range measurements is easier to solve. Another advantage of these method is that its detection performance in the crowded areas is better since it can still be used while an object or another vehicle blocked the line of sight between two vehicles but it does not block the line of sight between antennas.

The disadvantages of these methods over radar and lidar is that in their general form they cannot provide the relative bearing between the vehicles and they can only provide the distance. In addition to this, lidars usually can provide more accurate measurements. Although not all of the RF range measurement methods can provide the acceptable accuracy needed for our method, there are several more accurate RF based methods such as [5] and [9] which can provide the needed accuracy to be used in our method. In addition to the performance analysis of the method, the Sensitivity of the proposed method to the vehicle to vehicle distance measurement accuracy, communication latency and communication failure is also studied.

PROPOSED METHODOLOGY:

BLOCK DIAGRAM



In this attempt we have three data capturing units, two display units, and one transmitting and one receiving unit. In order to detect the driver's drowsy state, the emission of IR wave from the human skin is sensed by the eye blink sensor. When the eye open there is no IR emission. Likewise any obstacle present in front of the vehicle UV wave is transmitted by the obstacle sensor. The UV wave is reflected by the obstacle which is sensed and it has been displayed by LCD display. Accident sensor is used to sense the unbalanced condition of the surrounding vehicle by using accelerometer, vibrational sensor, tilt sensor whose output has been indicated by the LCD display. The element buzzer is used by the eye blink sensor. Before the transmission of information which has been absorbed by the

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above sensors is encoded that means change the format of data for comfortable data transmission by using the encoder. The data format is reconstructed in the receiver side by using the decoder. RF transceiver is need to transmit the absorbed data and receiving the surrounding vehicles data which is transmitted by its transceiver

OBSTACLE SENSOR:

This is an infrared based sensor that can be used for obstacle sensing, and also for wireless infrared communication.

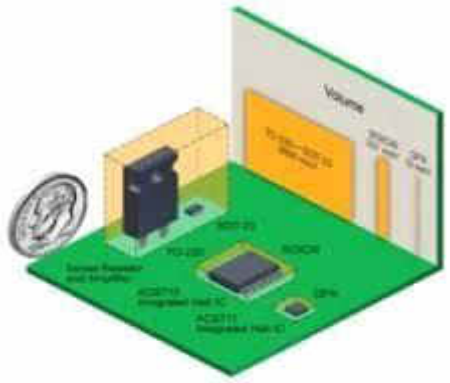

Figure.1. Obstacle Sensor

The sensor provides high immunity from ambient light and can be used in all light conditions quite effectively. The sensor can be used to detect signal from IR remotes that work on 38kz frequency range. To sense these signals, put the mode selector jumper in the Tx position and sensor will detect any IR signals. The sensor can also be used to do wireless IR communication. To achieve this you will need two sensor modules, one for transmitting the signals and other for receiving it. To do wireless communication, put the mode selection jumper to the Tx position on both the modules. Any signal (0-5V) applied to the Tx pin on the transmitter will appear at the output pin on the receiver.

EYE BLINK SENSOR:

The eye-blink sensor works by illuminating the eye and/or eyelid area with infrared light, then monitoring the changes in the reflected light using a phototransistor and differentiator circuit. The exact functionality depends greatly on the positioning and aiming of the emitter and detector with respect to the eye. This **Eye Blink sensor** is IR based. The Variation Across the **eye** will vary as per **eye blink**. If the **eye** is closed means the output is high otherwise output is low. This to know the **eye** is closing or opening position. This output is give to logic circuit to indicate the alarm. Connect regulated DC power supply of 5 Volts. These wires are also marked on PCB. To test sensor you only need power the sensor by connect two wires +5V and GND. When Eye closed LED is off the output is at 0V. Put Eye blink sensor glass on the face within 15mm distance, and you can view the LED blinking on each Eye blink. The output is active high for Eye close and can be given directly to microcontroller for interfacing applications.

ACCIDENT SENSOR:

Vibration and tilt sensor are essential components in vehicle alarm systems today. Recent technological advancements in the manufacturing of these sensors have improved accuracy, reduced cost and increased life time. Consequently alarm systems have become cheaper and readily available on the market. This paper focuses on the commercial applications for vibration and tilt sensors in construction vehicle monitoring systems. Tilt sensors can be implemented using mercury and roller ball technology. In a resting position with no slant, the liquid mercury makes contact with both leads. When the sensor is tilted, the mercury shifts such that the contact is broken between the

two wires. Vibration sensors are used for measuring linear velocity, displacement and proximity, and acceleration. They are true accelerometer, they are sensitive to gravitational acceleration. It can detect the change in inclination to as small as a tenth of a degree while roller ball tilt sensors only detect angles of 10,15,30,45 degrees.

RF TRANSCEIVER:

A **transceiver** is a device that contains a transmitter and a receiver which are both combined and share common circuitry. T**ransceivers** combine a significant amount of the transmitter and receiver handling circuitry. An **RF Transceiver** utilizes **RF** modules for high speed data transmission. Transceivers combine a significant amount of the transmitter and receiver handling circuitry. An RF Transceiver utilizes RF modules for high speed data transmission. Software-programmable digital processors used in circuits allow conversion between digital base band signals and analog RF signals. Transceivers are most frequently used to describe the component in LANs that actually applies signals to the network wire and at the same time detects signals passing through the wire. Several LANs have the transceiver built into the network interface card. In radio communications, a transceiver is a two-way radio that combines a radio transmitter and a radio receiver exchanging information in half-duplex mode. Integrated circuits (ICs) allow high performance circuits to be built at lesser costs and with significant amounts of space savings. multi-bit digital words that indicate actual position directly.

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