Intelligent Car System for Accident Prevention

[1] Gitanjali Mehta,

[1] Department of Electronics and Communication Engineering, Galgotias University, Yamuna Expressway Greater Noida, Uttar Pradesh

[1] gitanjali.mehta@galgotiasuniversity.edu.in

**Abstract: - The aim of the project is to make vehicles smarter and more responsive that can alert or prevent users in unsafe circumstances; they can provide critical information in real-time emergencies to save themselves or the police or owner. Driver fatigue caused by sleep deprivation or sleep disorders is an important factor in the growing number of road accidents. In this article, we define a system of online security that regulates the speed of the car under driver fatigue. Such a model is intended to advance a system to detect symptoms of fatigue in drivers and control vehicle speed to avoid accidents.** **The system's main components are number of real-time sensors such as ultrasonic, RFID, and location-based software app with GPS and GSM.** **Such a model is intended to advance a system to detect symptoms of fatigue in drivers and control vehicle speed to avoid accidents.**

**Keywords: AVR, GPS / GSM, LDR, RFID, Sensor, Vehicle Speed**

**INTRODUCTION**

Every year, at the thought of seeing what bleeding-edge prototypes car manufacturers can unleash on the car show circuit, car enthusiasts are salivating. Often those same fans are frustrated when several years later the innovative designs have still not made it to the showroom floor of the auto dealer. But before any new car model will ever go on sale to the public, it must first endure a battery of testing to ensure that it is safe, robust and fairly in accordance with the motoring public demands. The main goal for this project is that when the sensor senses the obstacles, the car can automatically brake due to obstacles. The function of the braking circuit is to automatically brake the car after the sensor receives a signal. We use Automated Emergency Brake Systems and Ultrasonic Sensors to avoid such vehicle accidents. The main goal for this project is to quickly stop car cans when the sensor detects the obstacles due to obstacles. The role of the braking circuit is to automatically brake the car after the sensor detects a signal. Accident avoidance and mitigation in terms of their impact are the integrated techniques that we follow. Under the unique term "Perceptive Drive,"

with numerous new assistance systems, greatly enhanced purposes and upheaval defensive systems, we systematically pursue this method. The perceptive push turns the car into a "perceptive companion." It defines a specific range of dangers and offers support by auditory, visual and tactile alerts, which can also improve the response of the driver. In an emergency situation, certain devices are able to take the necessary actions, such as automatic braking to steer clear of a collision and reduce the severity of damage. Eventually, the driver is satisfied and the comfort level is improved. This perceptive mix of creative sensors and technologies is a model for autonomous driving on the road and a protective driving crash. Emergency braking systems (EBS), traction control and stability control are the existing approaches used to measure safety and prevent accidents. GPRS is based on the Gaussian Minimum Shift Keying (GMSK) modulation technique. This is where the rectangular pulses referring to the bit stream are extracted using an impulse response filter in Gaussian form, generating lower side lobes than would otherwise be the case. This modulation technique does not allow the eight-phase-shift keying (8 PSK) modulation that is being introduced in EDGE systems to be as high a bit rate across the air interfaces. In addition to the above-mentioned features, Bluetooth can mimic a universal bridge to connect existing data networks as well as an ad-hoc networking method. Designed to operate in noisy frequency conditions, a fast detection and frequency hopping system is used by the Bluetooth radio to make the connection reliable. Enabling GPRS on a GSM or TDMA network includes the installation of two main components, the Gateway GPRS Service Node (GGSN) and the Supporting GPRS.GPRS connectivity, which are designed to supplement but not replace current circuit-switched networks and are used primarily as an auxiliary form of data communication. In practice, connection speeds will be significantly lower than the theoretical maximum, depending on the amount of network traffic and the number of handsets-supported simultaneous channels. GPRS is an evolutionary step in the direction of enhanced data for global eve in practice.

**PROPOSED SYSTEM**

With all aspects of systems, intelligent systems are used; CARs are the critical systems that are involved in real time and life. Not only does this program cope with part management, it does more than just tracking customer operation, behavior review, device behavior, warning & co-ordinate. Ultrasonic Sensor, RFID are the vital and of great importance from the perspective of passenger safety and traffic safety. One of the lifesaving and essential knowledge provider program is also the identification and warning of effects.

1. *GSM & GPRS Modem:-*

General Packet Radio Service[1], [2] (GPRS) is a packet-based wireless data communication service designed to replace the current circuit-switched services available on the Global Mobile Communications System (GSM) and Time Division (TDMA) IS-136 networks in the second generation. For voice communication, GSM and TDMA networks were designed to divide the available bandwidth into multiple channels, each of which is constantly allocated to a single call (circuit-switched). Both networks can be used for data transmission purposes, but they only provide about 9.6Kbps (kilobits per second) of overall transmission bandwidth. GPRS distributes data packets from multiple system terminals through multiple channels, rendering the capacity currently available for burst applications such as internet access much more effective. In principle, a GPRS link will reach a data transfer rate of up to 114Kbps using all eight channels in a GSM network at once. Such higher data levels would allow users to use a mobile phone or laptop computer to communicate with digital websites and related apps. Theoretically, GPRS networks should be cheaper than circuit-switched communications, using the network only when transmitting data.

1. *RFID:-*

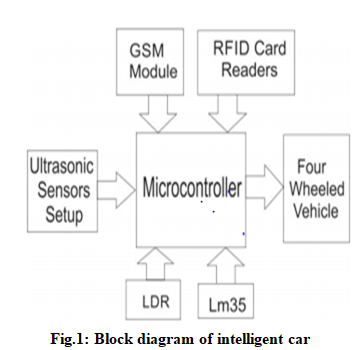
There are many RFID[3], [4] applications that are used in automobiles. RFID technology is now being used for security purposes. Using an RFID sticker and an RFID scanner, this is achieved. The RFID readers are mounted on the vehicles and from these tags there is a server that collects information. The reader's reads the details inside the tags put on cars as the consumer marks the reader. It allows the system to recognize the vehicle and the payments will be paid.

1. *Ultrasonic sensor:-*

Ultrasonic transmitter [5], [6]transmits the ultrasonic waves to a road surface after ultrasonic waves have been produced to find out the obstacle. The frequency measured by the barrier depends on the type of ultrasonic sensors used. The ultrasonic wave detects any physical obstacle, thus producing a wave that is reflected. There is a reflector that reflects the ultrasonic waves once the obstacle is detected. For this reason, an ultrasonic detector is used to absorb the ultrasonic waves that are transmitted from the road surface to produce a signal of reception. There is an ultrasonic transducer that transforms the sound wave back into electrical energy.

**SYSTEM ARCHITECTURE**

With all types of structures, adaptive devices are used, CARs are the essential systems that are active in real time and life. Not only does this program cope with part management, it does more than just tracking customer operation, behavior review, device behavior, warning & co-ordinate. From the standpoint of passenger safety and traffic safety, eye twitch sensor & drug monitoring is important and of great importance. Impact monitoring and warning is also one of the mechanism that saves lives and delivers critical information. Fig.1 shown the block diagram of smart car.



**Fig.1: Block Diagram of Intelligent Car**

Fig.1 describe about block diagram of intelligent car in which all the function of the intelligent car controlled by the microcontroller.

1. *Microcontroller:-*

To the degree that they interact with other tools including sensors, engines, buttons, keypads, screens, memory and even other microcontrollers, micro-controllers, [8] are useful. Over the years, multiple device approaches have been established to address the complex issue of circuit design requirements such as functionality, expense, height, weight, power consumption, durability, quality, and manufacturing. Different communication approaches are usually combined by many microcontroller projects. A microcontroller system can be viewed in a very simplistic way as a system that reads from inputs (monitors), performs processing and writes to outputs (controls). An embedded system will only execute one operation using a microprocessor or microcontroller. There is only one program device usually burned into ROM in an embedded system.

1. *Ultrasonic Sensor:-*

Ultrasonic sounds are identical to visible sound waves, with the exception of far higher frequencies. Ultrasonic sensor (US) can provide the initial distance information to get the parameters for additional mission output methods. These are vibrations that are almost like visible sound waves, with the exception of higher frequencies. The ultrasonic transmitter has a piezoelectric crystal resonating at a frequency that is required. We have ultrasonic transducers that reverberate to a desired frequency with piezoelectric crystals. This converts electrical energy and vice versa into acoustic energy. The sound waves are reflected back from a target to the transducer, which are distributed in the form of a cone. Here an output signal is produced to execute some kind of role of labeling or power. In order for the echoes to be elucidated, a minimum distance from the sensor is required to issue a time delay. There are few variables that can affect ultrasonic sensing operations. Some of them are surface roughness reflective, surface angle target, or temperature or humidity changes. Such objectives might have some reflective shape like round objects. Ultrasonic transducer produces an ultrasonic pulse. Through a sensing medium these signals are produced. There is usually one ultrasonic transducer in an ultrasonic sensor that converts an electrical energy into sound and vice versa into an electrical energy. A building with an ultrasonic transducer sealed. Optionally an electronic signal processing device and an electrical interface included in the housing as well. The ultrasonic sensor tests the difference between the ground and the vehicle from the chosen level. The ultrasonic sensor measurement is based on an ultrasonic pulse's fighting time to its reflected wave from the ground.

1. *LCD Display:-*

LCD [9], [10](Liquid Crystal Display) screen is an electronic display module and find a wide range of applications.A16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. A 16x2 LCD means 16 characters can be displayed per line and 2 such lines exist. Each character is displayed in a matrix of 5x7 pixels in this LCD. This LCD consists of two registers, Command and Data. The register command stores the instructions given to the LCD for the command. A command is a command issued to LCD to conduct a predefined function such as initializing it, clearing its panel, setting the location of the cursor, controlling display, etc. The data registry will contain the details that will be shown on the LCD. The data is the character's ASCII meaning to view on the LCD. Tap for more detail on an LCD's internal structure.

1. *Bluetooth:-*

In many apps from smartphones and home entertainment items to watches and medical devices, Bluetooth functionality can be used. One common usage, for example, is to use your phone to link to the car to listen to music. Bluetooth[11], [12] technology is a low-cost, low-energy short-range connectivity system. When two devices are connected, they can "pair" with each other as long as they are within the proximity of each other. A connection is retained afterwards, even if there is no flow of data. The ability to handle data and voice transmissions simultaneously is a feature of Bluetooth wireless technology. It also works with a distributed frequency hopping maximum duplex signal in the unlicensed commercial, scientific and medical (ISM) band at 2.4 to 2.485 GHz. Frequency hopping spread spectrum is a transmission technique where at random time intervals the frequency used is changed or switched. It helps in a more efficient transmission; as it is impossible to decrypt and has minimal interference with other transmissions. Bluetooth 4.0 is the current Bluetooth wireless technology version and is already being introduced in some devices like the Samsung Galaxy S3 and IPhone 5. It will also be introduced in the coming year on many more devices. Bluetooth 4.0's most significant feature is energy efficiency, providing devices with a much better battery life. Therefore, the Bluetooth Core Specification, which is the Bluetooth low energy (BLE), has been added to a new protocol. BLE has been developed for devices that regularly capture tiny pieces of information, so it is not suited for file transfer or streaming despite having a data rate of 1Mbps. BLE is also known as Bluetooth Intelligent, and there are two distinct differences in the products that incorporate Bluetooth 4.0.

They are divided into Bluetooth smart ready devices that are devices that use the full range of Bluetooth 4.0 devices, as well as Bluetooth smart devices that collect specific information and send it to Bluetooth smart ready devices. In the Bluetooth smart ready phone; there are also two different wireless radios, the dual-mode radios. Such radios endorse both classic and BLE links. The Bluetooth smart devices have a single mode radio that enables them to make low-energy Bluetooth communications only.

1. *Light Dependent Resistor:-*

A Light Dependent Resistor (LDR) is a device whose resistivity is a function of the electromagnetic radiation incident. Therefore, they are devices that are light sensitive. These are also referred to as camera conductors, photo conductive cells or just photocells. They consist of high-resistance semiconductor materials. There are many various symbols used to denote an LDR, the diagram below indicates one of the most widely used symbols. The arrow shows light falling on it. The electrons in the valence band of the semiconductor material are excited to the conductive band when light falls, i.e. when the photons fall on the device. These photons should have more energy than the band gap of the semiconductor material in the incident light to make the electrons jump from the valence band to the conductive band. So, as light has enough energy, more and more electrons become excited to the conduction band on the unit, resulting in a large number of charge carriers. The effect of this cycle is that more and more current continues to move and therefore the device's resistance is said to have reduced. A light-dependent resistor operates on the photo conductivity theory. Photo conductivity is an optical process in which the conductivity of the components (hence resistivity) reduces when the substance absorbs light.

**CONCLUSION**

Due to the fatigue of the driver, traffic accidents with an annual increase of a high rate. This paper shows the new algorithms and techniques for fatigue detection using sensors such as eye blink, alcohol, impact, etc. The exhaustion will be observed automatically in this strategy and the incident driver and third party will be trapped periodically. Via work outlined in this article, we are suggesting a smart car system to prevent collisions and make the world a much safer and secure place to live.

**REFERENCE**

[1] O. A. Mohamad, R. T. Hameed, and N. Ţǎpuş, “Design & implementation of real time tracking system based on Arduino Intel Galileo,” in *Proceedings of the 8th International Conference on Electronics, Computers and Artificial Intelligence, ECAI 2016*, 2017.

[2] V. Vujovic, M. Maksimovic, B. Perisic, and G. Milosevic, “A proposition of low cost Sensor Web implementation based on GSM/GPRS services,” in *2015 IEEE 1st International Workshop on Consumer Electronics - Novi Sad, CE WS 2015*, 2017.

[3] Kamesh and N. Sakthi Priya, “Security enhancement of authenticated RFID generation,” *Int. J. Appl. Eng. Res.*, 2014.

[4] V. Rajaraman, “Radio frequency identification,” *Resonance*, 2017.

[5] J. Charthad, M. J. Weber, T. C. Chang, and A. Arbabian, “A mm-Sized Implantable Medical Device (IMD) With Ultrasonic Power Transfer and a Hybrid Bi-Directional Data Link,” *IEEE J. Solid-State Circuits*, 2015.

[6] G. Gibbs, H. Jia, and I. Madani, “Obstacle Detection with Ultrasonic Sensors and Signal Analysis Metrics,” in *Transportation Research Procedia*, 2017.

[7] T. S. Ng, “Microcontroller,” in *Studies in Systems, Decision and Control*, 2016.

[8] A. R. L. Travis, T. A. Large, N. Emerton, and S. N. Bathiche, “Wedge optics in flat panel displays,” *Proc. IEEE*, 2013.

[9] Y. S. Choi, J. U. Yun, and S. E. Park, “Flat panel display glass: Current status and future,” *J. Non. Cryst. Solids*, 2016.

[10] Bluetooth Special Interest Group (SIG), “Bluetooth Core Specification Version 5.0,” *Bluetooth Core Specif. Version 4.2*, 2016.

[11] S. Raza, P. Misra, Z. He, and T. Voigt, “Building the Internet of Things with bluetooth smart,” *Ad Hoc Networks*, 2017.

[12] Usha Yadav, Gagandeep Singh Narula, Neelam Duhan and Vishal Jain, “A Novel Approach for Precise Search Results Retrieval based on Semantic Web Technologies”, 10th INDIACom; INDIACom-2016, 3rd 2016 International Conference on “Computing for Sustainable Global Development”, 16th – 18th March, 2016 having ISBN No. 978-9-3805-4421-2/, page no. 1357 to 1362.

[13] Usha Yadav, Gagandeep Singh Narula, Neelam Duhan, Vishal Jain, “Ontology Engineering and Development Aspects: A Survey”, International Journal of Education and Management Engineering (IJEME), Hongkong, Vol. 6, No. 3, May 2016, page no. 9 – 19 having ISSN No. 2305-3623.

[14] Vishal Assija, Anupam Baliyan and Vishal Jain, “Effective & Efficient Digital Advertisement Algorithms”, CSI-2015; 50th Golden Jubilee Annual Convention on “Digital Life”, held on 02nd to 05th December, 2015 at New Delhi, published by the Springer under ICT Based Innovations, Advances in Intelligent Systems and Computing having ISBN 978-981-10-6602-3 from page no. 83 to 91.

[15] P. Lavanya, R. Meena, R. Vijayalakshmi, Prof. M. Sowmiya, Prof. S. Balamurugan , “ A Novel Object Oriented Perspective Design for Automated BookBank Management System”, International Journal of Innovative Research in Computer and Communication Engineering, Vol.3, Issue 2, February 2015.

[16] P.Andrew , J.Anishkumar , Prof.S.Balamurugan , S.Charanyaa, “ A Survey on Strategies Developed for Mining Functional Dependencies”, International Journal of Innovative Research in Computer and Communication Engineering, Vol.3, Issue 2, February 2015.

[17] SV Amridh Varshini, R Kaarthi, N Monica, M Sowmiya, S Balamurugan, “Entity Relationship Modeling of Automated Passport Management System”, International Journal of Innovative Research in Science, Engineering and Technology , Vol. 4, Issue 2, February 2015

[18] R S Venkatesh, PK Reejeesh, S Balamurugan, S Charanyaa, “Investigations on Evolution of Approaches Developed for Data Privacy”, International Journal of Innovative Research in Computer and Communication Engineering , Vol. 3, Issue 1, January 2015

[19] R.Santhya , S.Latha , Prof.S.Balamurugan , S.Charanyaa “ Investigations on Methods Developed for Effective Discovery of Functional Dependencies,”, International Journal of Innovative Research in Computer and Communication Engineering, Vol.3, Issue 2, February 2015,

[20] T.Kowshiga, T.Saranya , T.Jayasudha , Prof.M.Sowmiya and Prof.S.Balamurugan “ Developing a Blueprint for Preserving Privacy of Electronic Health Records using Categorical Attributes,”, International Journal of Innovative Research in Computer and Communication Engineering, Vol.3, Issue 2,