Vehicle Management System To Reduce The Risky Factors Using Embedded Technology Enhanced With Wi-Fi

V Jacintha¹, K H Shakthi Murugan², Kaviya S³, Hemamalini V³, Harini B³, Haripriya V³
Research Scholar¹, Assistant Professor², Student³
Sathyabama Institute of Science & Technology¹, Jeppiaar Maamallan Engineering College²,³

shakthimuruganee@gmail.com

Abstract. Medium to medium is a quickly developing technique, which renders enhanced client servicing, occupation betterments via best usage of assets, enhanced techniques and production via communicating between distant machinery and vehicle Management System. Here, the vehicle status and location can be determined. Vehicle Tracker utilize GPS devices to give an account of the location information to the server. Accident is unplanned harm, is an unwanted, accidental, and unintentional consequence that must have been precluded had considerations and if there is no proper system human lives will be in danger. The main purpose of this technology is to identify an accident and give an indication signal to the control room, so that the affected individual can seek some support. The severity of the incident can be identify from the control room, without going to the sit in person. If this model is fix all vehicle, it will be very useful to identify how many vehicles undergoes in that specified accident and the extent to which it has taken place. In order that the aid from control room will be able to rescue and protect driver or passengers. The present board designed the tracking of vehicle and systems for accidents alert that makes it extremely valuable and utile. This board indicates to us driver abnormal condition and as well as accident identification. It additionally identifies the driver drowsiness.

Keywords: Asset utilization, Drowsiness, Unintentional injury, Vehicle management system

I. Introduction

In accident detection, using smart-phone is propose. However, if smart phones are utilize to identify accidents; in that case, there must be quiet number of filters in-built to prevent false warnings. The classification mechanism is construct by accumulating datasets from simulation of three accident cases that aids in creation of an artificial intelligence-based classification software [1]. Hence; it is difficult to identify minor accidents such as sideswipe collision. If an IR sensor is, utilize for accident identification, and then the model makes use of GPS, GSM for localization and communication. The IR sensor processes the radiation emit by each object. An Android dynamic time warping based smart phone architecture of the accident identification model together with experimental outputs are utilize [2]. In accident identification utilize airbag model is suitable only for four-wheelers; it is not applicable for two wheelers. However, there must be a model that is suitable for all kinds of transport. The
identification technique is apply onto a server utilizing pattern matching based on dynamic time warping [3]. There are some issues related to accident identification utilizing humanoid touch phone. Since every touch-phone model will possess varied processors with different working speed. Hence, the applications performance may deteriorate in few smart phones. In the proposed work, several ultrasonic sensors utilize in the identification of accidents. The objective is to apply the algorithms into the android phones in-built high tech sensors that are associated with GIS, GPS and Geo fence technologies [4]. An ultrasonic sensor is utilize for distance computation. The return time taken by the wave, decides the displacement from the sensor to the obstacle. The usage of ultrasonic sensor for accident identification has numerous advantages. It enables to identify accidents not only in several road situations such as junctions, subway or in service roads but also under varied climatic circumstances such as rains, foggy weather. Ultrasonic sensor seems to be very efficient since it rely on the principle of sound wave propagation. Also sound waves can propagate simultaneously and effectively through all kinds of matter such as solid, liquid and gas. This feature enables ultrasonic sensor to be an appealing alternative for automatic accident identification. There are a number of applications available [13-26].

II. Existing system
An affordable ultrasonic sensor is utilize to identify an accident. There are several state-of-the-art methods for automated identification of road accidents. They are using Android mobile, infrared sensor, airbag system. This system utilizing dual ultrasonic sensors is suitable for identification of road accidents. Varied computer simulation are execute utilizing MATLAB, to determine the factors that have an effect on the identification of accidents utilizing ultrasonic sensor. Based on the factors the model utilize two ultrasonic sensor modules HCSR04. First sensor module is mount on the vehicle front windscreen and the second sensor is fix on the vehicle rear windscreen. Then the distance from the sensor modules to their corresponding bumpers is evaluate and are termed as threshold distance 1 and threshold distance 2. When an object is displacing away from the vehicle, the distance between them is generally greater than the preset threshold distances. The identification of closed eyelids is effective even during varied circumstances, utilizing camera of any humanoid mobile [5]. A novel driver behavior detection framework that at its core makes use of in-vehicle Wi-Fi signals [6]. When an object collides with the vehicle, the threshold distance is infared and the processing system goes to ON condition. The system instantaneously determines the vehicles location utilizing GPS and sends to the rescue mission utilizing GSM. However, there are several disadvantages with respect to these approaches [28].The disadvantage of the existing system is as ultrasonic sensor’s measurement relies on the velocity of sound waves, so it requires prior calibration. The simulation results depicts that, as the velocity of the vehicle enhances, the fault in distance measurement simultaneously increments. This fault must be counterbalance by standardizing the ultrasonic sensor. With the help of machine learning, identified patterns in the behavioral and physiological factors that together helps to identify drowsy states from alert states for explicitly during driving[7].This system is totally hypothetical.

III. Proposed System
The proposed system concisely reexamine chosen road accident identification methods and intend a resolution. In these methods, a model is utilize that automatically identifies an accident in a quick span of time and alerts the emergency center and police department with an outline of the incident. The proposed system is to provide an approach about transportation unit as well as the vehicle condition is update in the server. The driver drowsiness can be identify by using the camera. If any accidents occurs, it is identify by the vibration sensor. If any deviation happens, the buzzer will alert the driver and automatically reducing the motor speed. All the details should be update in the server via Wi-Fi. In some systems, MATLAB/Simulink functions as the primary software utilize in development of this application. Images and other data types are acquire utilizing Android devices sensors [8]. The accident location can be update in the server to intimate the police station, neighbors and a message is convey to the relatives. The Heartbeat of the person is identify by using a heartbeat sensor. In this proposed system developed an affordable and reliable system using pic microcontroller. Several algorithms for tracking heart rates while performing heavy exercise utilizing an 8-sec mean of heart rates that does not precisely
captivate huge changes in instantaneous heart rates[9]. The fig 1 denotes the block diagram of the proposed model. The 230 volts is convert to 12 volts by using the SMPS. Vibration sensor is utilize to identify an accident. There are several methods for the identification of road accidents automatically. These include smart-phones, Infrared sensor (IR sensor), camera, vibration sensor is to be measuring the driver heartbeat count, drowsiness and vibration of the car, that data will be continuously uploading the server via internet. This system is convenient since it utilize vibration sensors for detection of road accident. To assess the operation of the proposed framework of the block diagram shown in fig.1, different location and other factors will be monitoring the PC in the police or emergency department. The driver drowsiness will be detect by using camera. Heartbeat and drowsiness is detected by this system and based on the threshold condition the motor would be automatically stopped. These kinds of data are transmit to the server via internet using Wi-Fi with GPRS connection. GPS is use to find the location where the incident has occur. Then the emergency team and police department will rescue the respective individual. In addition, a buzzer will give an alert surrounding the accident spot. The hardware components used are PIC microcontroller, raspberry pi, SMPS, DC motor, heartbeat sensor and GPS.

A compiler is use to transform the source code written in a programming language into another computer language. The need for transformation is to create an executable program. Python is use in programs. It is a high-level language for easy programming.

Fig 1 Block Diagram of proposed system
IV. Simulation Results

These are the server upload data of the proposed system. The server data is vibration condition, heartbeat condition, eye drowsiness and location with date and time. These results will be continuously update in the server. In the server, the huge amount of data will be stored. That total data count also updated. Fig. 2. Shows the server output of the data received on particular date and time, vibration of the car is normal, heartbeat of the driver is normal eye drowsiness or eye status is normal.

![Server display output](image1)

Fig 2 Server display output

The simulation of proposed system demonstrates a driver drowsiness identification model utilizing Open CV in Raspberry Pi environs having a single camera view. The proposed model initially identifies the face utilizing Haar Cascade Classifier and other facial landmarks utilizing Drib predictor.

![Active Eye detection simulation output](image2)

Fig 3 Active Eye detection simulation output

Facial landmarks associated with eyes are fetch and Eye Aspect Ratio (EAR) is obtain. EAR is closely noted ceaselessly, if the value lies within a threshold value and never raises again connotes driver eye is closed. The Fig.3 shows the active eye of the person. Drowsiness is detect from this technique; the simulation output of the drowsiness of human eye is shown Fig.4.
V. Hardware Implementation

The vehicle accident detection system is implemented by requiring components that are properly connected as shown in the block diagram. First of all, the entire system will be ON when the person starts the engine of the vehicle. SMPS gives supply voltage from 230V battery to 12V supply for the proposed system, when the engine is started, the LED will blink and automatically Wi-Fi is connected to the mobile hotspot and the motor will rotate (i.e., vehicle movement). Compared with traditional piggybacking schemes, CoS is more reliable to transmit control messages from one node to many nodes [10]. For that any certain time the vibration sensor senses the vibration above the threshold value to alert the surrounding area by using a buzzer and also the information will be sent to the emergency and police department via the internet. The hardware implementation of the proposed system is shown in Fig.5.

A face image is first studied utilizing a landmark identifier and a group of interest points is obtained [27]. Facial landmarks associated with eyes are fetched, and Eye Aspect Ratio (EAR) is obtained. EAR is closely noted ceaselessly, if the value lies within a threshold value and never raises again connotes driver eye is closed. The measuring value will be displayed by using the LCD display. The Fig.6 is shown in the driver was awake condition that is the eye status of the driver.
The vibration sensor sensing the vibration value of the vehicle that is vehicle gets vibration value below or above the threshold value that is always exhibit by LCD display. The initial functioning band is focus at 850 MHz that provides for GSM applications, while the forthcoming frequency bands are focus at 1.57 GHz and 2.4 GHz provides for GPS and Wi-Fi wireless applications [11, 12]. For example the vibration sensor value is ‘0’ that is shown in Fig.7.

VI. Conclusion
Accident prevention denotes the plans, formulations and activities taken to avert or cease an accident prior to its happening. Accidents are subdivide as unplanned and unpredicted events may leads loss of property and human kind. In this project, the methods to implement certain autonomous features in a regular car was describe. Using this prototype the hardware was design and built. With the help of vibration sensor and GPRS the accident, happened place was update in server using Wi-Fi module, which is connect to our mobile hotspot. From the server the SOS signal will be send. The driver drowsiness will be detected using camera, which is interface with raspberry pi, and heartbeat will be detect. The buzzer will be alert to the surrounding people of the accident area. This project is to be save the people life from critical situation.

VII. Future Enhancement
The accident detection and avoidance system has varied proficient challenges that raise when data analytics for collision avoidance. Future research opportunities aims for implementing data analytics in safety precaution in fields like traffic management, adaptive network security, and data forensics.

REFERENCES
[1] P Joyce Beryl Princess Salaja Silas Elijah Blessing Rajsingh Machine Learning Approach for Identification of Accident Severity from Accident Images Using Hybrid Features Emerging Technology (INCT) 2020 International Conference for, pp. 1-4, 2020
[2] An Android smartphone-based prototype architecture of our accident detection system along with empirical results are present
[3] K Sasidhar and A. Upasini Two wheeler rash drive detection using smartphones 2019 11th International Conference on Communication Systems & Networks (COMSNETS), Bengaluru, India, 2019, pp. 754-758, doi: 10.1109/COMSNETS.2019.8711455
[4] N W Aung and T L L Thein Vehicle Accident Detection on Highway and Communication to the Closest Rescue Service 2020 IEEE Conference on Computer Applications(ICCA), Yangon, Myanmar, 2020, pp. 1-7, doi: 10.1109/ICCA49400.2020.9022855
[5] H K Dua S Goel and V. Sharma Drowsiness Detection and Alert System 2018 International Conference on Advances in Computing Communication Control and Networking (ICACCCN), Greater Noida (UP) India 2018 pp. 621-624 doi:10.1109/ICACCCN.2018.8748448.

[6] H. Saeed T Saeed M Tahir and M Uppal "Risky Driving Behavior Detection Using In-Vehicle WiFi Signals 2018 IEEE 88th Vehicular Technology Conference (VTC-Fall), Chicago, IL, USA, 2018, pp. 1-5, doi: 10.1109/VTCFAll.2018.8691013

[7] Chatterjee and S Roy Smartphone-based drowsiness detection system for drivers in real-time," 2019 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), GOA, India, 2019, pp. 1-6, doi: 10.1109/ANTS47819.2019.9117943.

[8] D Chilukuri S. Yi and Y. Seong Mobility Assistance for Vulnerable Road Users using Machine Learning 2019 SoutheastCon Huntsville AL USA 2019 pp 1-7 doi:10.1109 / Southeast Con42311.2019.9020506.

[9] Y Kong and K H. Chon Heart Rate Tracking Using a Wearable Photoplethysmographic Sensor During Treadmill Exercise in IEEE Access, vol. 7, pp. 152421-152428, 2019, doi:10.1109/ ACCESS.2019.2948107.

[10] B Feng C Zhang J Liu and Y Fang Turning Waste into Wealth:Free Control Message Transmissions in Indoor WiFi Networks in IEEE Transactions on Mobile Computing, doi:10.1109/ TMC.2019.2924000.

[11] A Basit M I Khattak A R Sebak A B Qazi and A A Telba Design of a Compact Microstrip Triple Independently Controlled Pass Bands Filter for GSM, GPS and WiFi Applications,” in IEEE Access, vol. 8, pp. 77156-77163 2020, doi: 10.1109/ACCESS.2020.2989377

[12] R J Vidmar (1992 August) On the use of atmospheric plasmas as electromagnetic reflectors. IEEE Trans Plasma Sci. [Online] 21(3), pp. 876—880.Available: http://www.halcyon.com/pub/journals/21ps03-vidmar

[13] K. H. Shakthi Murugan A Jasmine Vijithra A 40 Gbps Ro-FSO transmission system for 5 G applications Optoelectronics and Advanced Materials - Rapid Communications 14 7-8, July-August 2020 pp.306-309 (2020).

[14] K H Shakthi Murugan et al A novel rescuebot for borehole accidents 2020 IOP Conf. Ser Mater. Sci. Eng. 872 012044

[15] Shakthi Murugan KH, Sumathi M (2020). Performance Analysis of Millimeter waves over FSO System under Fog Weather Conditions. International Journal of Advanced Science and Technology 29(8s) 3462-3477

[16] K.H.Shakthi Murugan P Abisheik Advanced Smart Home Security Alert System International Journal of Scientific Research in Computer Science Applications and Management Studies Volume 8 No. 2, 2019 pp 1-5

[17] Murugan, KH & Manickam, Sumathi (2018) Design and implementation of 5G optical Communication System for various Filtering operations using wireless optical transmission. Results in Physics 12. 10.1016/j.rinp.2018.10.064.

[18] KH Shakthi Murugan K Sumathi Maqsooda Naaz S Judy Simon Low Cost Micro Strip Patch Antenna International Journal of Pure and Applied Mathematics, Volume 119 No. 15 2018, 573-579

[19] H. Shakthi & Manickam, Sumathi. (2018). Millimetre Waves Over Free Space Optics System for 5G Application. Journal of Optical Communications. 10.1515/joc-2018-0159

[20] Shakthi Murugan,K.H. K.Sumathi Advanced Smart Home Security Alert System International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE) ISSN: 0976-1353 Volume 25 Issue 6 – May 2018, pp 96-101

[21] K.H.Shakthi Murugan V.Jacintha Judy Simon Safety System For Gold Mining Process Using Visible Light Communication International Journal of Pure and Applied Mathematics, Volume 117 No. 16 2017, 371-376

[22] Manickam Sumathi & Shakthimurugan KH & Sumathi K (2016) Performance study of 4:1 multiplexer CMOS logic structures. International Journal of Control Theory and Applications, Vol 9. 565-574.

[23] Shakthimurugan KH (2015) Multi-carrier frequency offset estimation for carrier aggregation-orthogonal frequency division multiplexing communication. 10. 31035-31041.

[24] Shakthimurugan KH (2014) Hardware implementation of TCP/IP over visible light communication on FPGA (A concept of light fidelity). 10. 31095-31101.

[25] S M K H S T J M Jerold P S A Peeran A and A P Wearable ECG Electrodes for Detection of Heart Rate and Arrhythmia Classification 2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), Coimbatore, India, 2019.
[26] K. H. Shakthi Murugan and M. Sumathi BER and Eye Pattern Analysis of 5G Optical Communication System with Filters 2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), Coimbatore, India, 2019, pp. 1-6, doi: 10.1109/ICECCT.2019.8869396

[27] V Jacintha Judy Simon S Tamilarasu R Tamizhmani K Thanga yogesh J Nagarajan A Review On Facial Emotion Recognition Techniques IEEE International Conference on Communication & Signal Processing (ICCSP) April 2019

[28] Jacintha V S Karthikeyan A Survey On Various Fabric Defect Detection Methods IEEE International Conference on Communication & Signal Processing (ICCSP) April 2019