ACCIDENT PREVENTION SYSTEM

J COMPONENT REPORT
INTERNET OF THINGS
(CSE3009)

Under the Guidance of
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CONTENT

ABSTRACT

Feeling sleepy while driving could cause hazardous traffic accident. However, when driving alone on highway or driving over a long period of time, drivers are inclined to bored and feel sleepy, or even fall asleep. Nowadays most of the products of driver anti-sleep detection sold in the market is simply earphone making intermittent noises, which is quite annoying and inefficient. As such, there is a high demand for cheap and efficient driver sleep detection. Therefore, we came up with an idea to develop a driver anti-sleep alarm system, which could effectively meet this demand. Detection of drowsiness of driver is a vehicle safety technology, which helps to put off accidents which caused by the driver being dozy. A variety of studies have recommended that around 20% of all road accidents are due to drowsiness of the driver. The developments of technologies for detecting or preventing drowsiness while driving is a major confront in accident evasion systems. Because of the peril of the tiredness while driving, different new methods need to be developed for counteracting the effect. The paper is based on an example for detection of drowsiness system. The intend of this paper is design of an automated system for safety of driver from improper driving. The system is designed such that it will precisely scrutinize the eye blink. In this paper, the eye blink of the driver is detected by using eye blink sensor which is IR based. The disparity across the eye will vary as per eye blink. The output is high, if the eye is closed or else output is low. It indicates closing or opening position of an eye. The IR output is given to circuit to signify the alarm. The controller will send a warning signal so that it is displayed on liquid crystal display screen. The buzzer, which is placed near the driver, will be activated and alters the driver when he falls asleep during driving. The alcohol sensor is also used to detect whether the driver is drunken which avoids accident caused by the drunken drivers. According to the intensity of light, the lights will be ON or OFF inside the vehicle, this saves power consumption. Tilt sensor is also used to detect whether the vehicle met with an accident or not. It is realistic because it does not irritate the user while driving because no sensing electrodes would be attached to user's body. In this paper, various methods are included by which the drowsiness can be detected and warning can be issued to the driver while driving. And also compared different parameters for different methods. Using GSM technology, the current detail of the car can be sent to a dedicated mobile. Also we can track the current location of vehicle using GPS technology in case of an accident.

LITERATURE REVIEW

A Low-Cost Prototype for Driver Fatigue Detection

This paper is proposing "A Low-Cost Prototype for Driver Fatigue Detection" .We know that thousands of road accidents This paper is proposing "A Low-Cost Prototype for Driver Fatigue Detection" .We know that thousands of road accidents occur every year, even with the large improvement in vehicle safety technology which has been happening over the many decades. Of all the traffic accidents, 10 to 20% are due to drivers with a diminished vigilance level. One of the reasons is driver inattention, monotony and fatigue. Major aspects from this to remember are Low cost sensor, ITS, driver assistance system, fatigue detection, distraction detection. This can be achieved by using several different methods that are defined in three

major categories :1)Driver’s current state. 2) Vehicle driving parameters. 3)Combination of both. The first one is to measure the driver’s current state. The most accurate way of doing it is to measure driver physiological parameters such as electroencephalogram (EEG), electrocardiogram (ECG), skin conductance, pulse beat and breathing frequency. The second category for measuring driver fatigue is to try to to it indirectly i.e., to live the vehicle driving parameters to detect abnormal wheel direction, vehicle speed or vehicle offset to lane lines, as they will be an indicator of driver drowsiness. The third category is that the combination of the previous two, driver current state and vehicle driving parameters, providing more reliable results than only counting on one among them. This approach needs an effective data fusion system that can combine all the sources and obtain a correct diagnostic on the driver’s state This work presented a non-intrusive, low-cost prototype, that respects driver’s privacy, because it doesn't use video cameras. The No-Sleep prototype aims to detect driver fatigue symptoms and provides an improvement to the system as it responds to environments with different lights and temperature condition which posed a problem with the solution used in this project. Tests showed that the utilization of a buzzer wasn't an honest option and thus it had been replaced by three small vibration motors, placed inside the wheel , similar to on-board systems that can already be found in some vehicles. To keep the value of such a driver assistance system as low as possible, while maintaining a good level of reliability, was the goal of this work occur every year, even with the large improvement in vehicle safety technology which has been happening over the many decades. Of all the traffic accidents, 10 to 20% are due to drivers with a diminished vigilance level. One of the reasons is driver inattention, monotony and fatigue. Keywords: Low cost sensor, ITS, driver assistance system, fatigue detection, distraction detection. This can be achieved by using several different methods that are defined in three major categories :1)Driver’s current state. 2) Vehicle driving parameters. 3)Combination of both. The first one is to measure the driver’s current state. The most accurate way of doing it is to measure driver physiological parameters such as electroencephalogram (EEG), electrocardiogram (ECG), skin conductance, pulse beat and breathing frequency. The second category for measuring driver fatigue is to try to to it indirectly i.e., to live the vehicle driving parameters to detect abnormal wheel direction, vehicle speed or vehicle offset to lane lines, as they will be an indicator of driver drowsiness. The third category is that the combination of the previous two, driver current state and vehicle driving parameters, providing more reliable results than only counting on one among them. This approach needs an effective data fusion system that can combine all the sources and obtain a correct diagnostic on the driver’s state This work presented a non-intrusive, low-cost prototype, that respects driver’s privacy, because it doesn't use video cameras. The No-Sleep prototype aims to detect driver fatigue symptoms and provides an improvement to the system as it responds to environments with different lights and temperature condition which posed a problem with the solution used in this project. Tests showed that the utilization of a buzzer wasn't an honest option and thus it had been replaced by three small vibration motors, placed inside the wheel , similar to on-board systems that can already be found in some vehicles. To keep the value of such a driver assistance system as low as possible, while maintaining a good level of reliability, was the goal of this work.

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Date- Received: 12 December 2018; Accepted: 28 January 2019; Published: 2 February 2019

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An EEG-based Perceptual Function Integration Network for Application to Drowsy Driving

This paper is proposing "An EEG-based Perceptual Function Integration Network for Application to Drowsy Driving" drowsy driving is among the foremost critical causes of fatal crashes. Thus, the event of an efficient algorithm for detecting a driver's state of mind demands immediate attention. for many years , studies have observed clear evidence using electroencephalography that the brain's rhythmic activities fluctuate from alertness to drowsiness. Recognition of this physiological signal is that the major consideration of neural engineering for designing a feasible countermeasure. This study also states that a perceptual function integration system which used spectral features from multiple independent brain sources for application to acknowledge the driver's vigilance state. The analysis of brain spectral dynamics demonstrated physiological evidenced that the activities of the multiple cortical sources were highly associated with the changes of the vigilance state. The system performances showed a strong and improved accuracy the maximum amount as 88% above any of results performed by a single-source approach. Major concepts used are Electroencephalogram, Independent Component Analysis, Multiple Classifiers System, Drowsy Driving. during this study, the proposed integration network was designed supported the perfect of the multiple classifier system to integrate different brain sources for the vigilance state classification. this technique contained five base classifiers trained from five brain sources that had different physiological characteristics and meanings in response to the changes of the driving performance and therefore the state of mind . The model could work albeit just one of the components of interest was extracted after the ICA processing. The experimental results showed that the parietal source classifier obtained the simplest accuracy among the five components of interest, and further, the proposed model outperformed the traditional signal-based classifier. Our results suggested that the underlying brain sources of multiple cortices were informative in characterizing the vigilance state of the driving force , and therefore the arrangement with the nonparametric feature extraction was a practical approach to strengthening the reliability and practicality for detecting vigilance states.

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Date- Received 30 October 2014, Revised 10 January 2015, Accepted 17 January 2015, Available online 29 January 2015.

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Detection and prediction of driver drowsiness using artificial neural network models

This paper is proposing "Detection and prediction of driver drowsiness using artificial neural network models" Not just detecting but also predicting impairment of a car driver's operational state may be a challenge. This study aims to work out whether the quality sources of data wont to detect drowsiness also can be wont to predict when a given drowsiness level

are going to be reached. Also, when we explore whether or not the adding data like driving time and participant information improves the accuracy of detection and prediction of drowsiness. 21 participants drove a car simulator for 110 min under conditions optimized to induce drowsiness. They have also measured the physiological and behavioral indicators which are pulse and variability, respiration rate, head and eyelid movements (blink duration, frequency and PERCLOS) and recorded driving behavior like time-to-lane crossing, speed, wheel angle, position on the lane. Different combinations of this information were tested against the important state of the driving force , namely the bottom truth, as defined from video recordings via the Trained Observer Rating. Two models using artificial neural networks were developed, one to detect the degree of drowsiness every minute, and therefore the other to predict every minute the time required to succeed in a specific drowsiness level (moderately drowsy). the simplest performance in both detection and prediction is obtained with behavioral indicators and extra information. The model can detect the drowsiness level with a mean square error of 0.22 and may predict when a given drowsiness level are going to be reached with a mean square error of 4.18 min. This study shows that, on a controlled and really monotonous environment conducive to drowsiness during a driving simulator, the dynamics of driver impairment are often predicted. he best models (those whose rates of successful detection or prediction are the highest) used information about eyelid closure, gaze and head movements and driving time. Performance on prediction is extremely promising, since the model can predict to within 5 min when the driver's state will become impaired. Moreover, modelling drowsiness as a continuum can cause more precise detection systems offering refined results beyond simply detecting whether the driving force is alert or drowsy. Future performance improvements might be achieved by using recurrent neural networks or dynamic neural networks to feature temporality to the model, or adding other features like context information (traffic, sort of road, weather etc.). These factors can influence the driver's state.

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Date- Submitted on 27 Apr 2018

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MACHINE LEARNING SYSTEMS FOR DETECTING DRIVER DROWSINESS

This paper is proposing "MACHINE LEARNING SYSTEMS FOR DETECTING DRIVER DROWSINESS" The advance of computing technology has provided the means for building intelligent vehicle systems.

Drowsy driver detection system is one among the potential applications of intelligent vehicle systems. Previous approaches to drowsiness detection primarily make pre-assumptions about the relevant behaviours of humans, that specialize in blink rate(Number of times human blinks their eyes), eye closure, and yawning. Here we employ machine learning to data mine actual human behaviours during drowsiness episodes. They also mentioned about the

Automatic classifiers for 30 facial actions from the Facial action writing were developed using machine learning on a separate database of spontaneous expressions of the respective human. These facial actions include blinking and yawn motions, also as variety of other facial movements. additionally , head motion was collected through automatic eye tracking and an accelerometer. These measures were passed to learning- based classifiers like Ad boost and multinomial ridge regression. The system was ready to predict sleep and crash episodes during a driving video game with 96% accuracy within subjects and above 90% accuracy across sub- jects. this is often the very best prediction rate reported so far for detecting real drowsiness. The facial outputs were passed to a classifier for predicting drowsiness supported the automatically detected facial behaviour. We compared to learning-based classifier, Add a lift and multinomial ridge regression. For the within-subject prediction, 80% of the alert and non-alert episodes were used for training and other 20% were reserved for testing. Moreover, the analysis revealed new information about human behaviours during drowsy driving. This paper presented a system which works on the automatic detection of driver's drowsiness through the video. Previous approaches focused on assumptions about behaviours which may be predictive of drowsiness. Here, a system for automatically measuring facial expressions was employed to data-mined spontaneous behaviour during real drowsiness episodes. this is often the first work to our knowledge to reveal significant associations between countenance and fatigue beyond eye-blinks. The project also revealed a possible association between head roll and driver drowsiness, and therefore the coupling of head roll with steering motion during drowsiness. Of note is that a behaviour that's often assumed to be predictive of drowsiness, yawn, was actually a negative predictor of the 60-second window before a crash. It appears that within the moments before falling asleep, drivers yawn less, not more, often. This highlights the importance of using samples of fatigue and drowsiness conditions during which subjects actually fall sleep.

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Visual Analysis of Eye State and Head Pose for Driver Alertness Monitoring

This article presents a visible analysis of the state of the eyes and therefore the posture of the top (HP) for continuous monitoring of the vigilance of a vehicle driver. Most of the already existing approaches to visually detect non-inert driving patterns believe either closing your eyes or nodding angles to work out drowsiness/distraction. The scheme proposed within the article uses visual characteristics, namely, Eye Index (EI), Pupil Activity (PA) and HP to achieve important information on the non-inertia of a driver. IE determines whether the attention is open, half closed, or closed from the ratio of pupil height to eye height. The AP measures the speed of deviation from the centre of the pupil from the centre of the attention over a period of your time . supported the video segments, HP calculates the amount of head movements of the driving force by analysing deviations of the Euler angles (nodding, shaking and tilting) relative to the top position during normal driving. HP gives us very critical and

useful information about lack of attention, especially when the eyes of the driving force aren't visible or highly blurry thanks to occlusion caused by large head movements. A support vector machine (SVM) classifies a sequence of video segments into driving events with or without alerts. Experimental results for this have shown the proposed scheme regarding high classification of accuracy with errors which are acceptable and false alarms for people from various ethnic origins and gender under actual driving.

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Monotony of road environment and driver fatigue: a simulator study :

This deals with Studies which have shown that sleepiness and hypo-vigilance occur frequently while driving on the highway which they will have serious consequences in terms of accident causality. the most focus of this text is on the task-induced factors involved within the development and implementation of those phenomenon. A study on the driving simulator was conducted to guage the impact of monotony on visual stimulation on the road employing a wheel movement analysis procedure (SWM). Fifty-six male subjects each drove for 2 different 40-minute periods. In one case, the visual stimuli of the road were very importantly repetitive and monotonous, while within the other the environment contained different visual elements aimed toward disturbing the monotony without changing. The subject's driving performance was compared under these conditions to work out whether monotonic disturbances can have a positive effect and help reduce driver fatigue. The results reveal a primary effect of your time on activity on driving performance for the 2 driving periods and a way more frequent SWM when driving during a more monotonous road environment, which means a discount of fatigue and vigilance. The implications of some counter measures for driver fatigue are discussed in article.

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A novel helmet design and implementation for drowsiness and fall detection of workers on-site using EEG and Random-Forest Classifier

This study deals with: Sleep deprivation has been linked to an increased response to worry , body pain, amnesia and poor thinking ability. thanks to these factors, within the workplace, sleep deprivation reduces the general performance of employees at work and causes sleepiness. Furthermore, it could compromise individual safety and be harmful within the workplace. A study conducted in 2014 showed that workers with sleep deprivation had a greater risk of injury than workers with normal sleep patterns. Since then many approaches are devised to assess whether an individual is sleepy thanks to sleep deprivation. the foremost

well-known non-invasive methods involve the utilization of video processing to characterize an individual's face (extract features like eyelid closing intervals, skin tone, mouth yawns) like fatigued or alert. ECG signals were also wont to determine a person's level of sleepiness; to draw features from the guts rhythm during active and passive states.

However, EEG signals have proven to be the foremost accurate and in most cases are used as a reference model for brand spanking new methods of detecting sleepiness. Motion sensors, like the accelerometer and gyroscope, along side EEG signals are wont to provide greater precision in determining sleepiness in individuals. Gang Li and Wan-Young Chung developed a wearable watch that uses EEG, gyroscope and transcranial DC (TDC) stimulation for the first management of driver sleepiness. The proposed mechanism showed an accuracy of 93.67%. In another project Leng used PPG, galvanic skin response sensor, accelerometer and gyroscopic sensors. The features extracted from the data of those sensors were applied to a Support Vector Machine (SVM) and produced an accuracy of 98.3%. Until now, most models were wearable watches / bands designed for drivers. during this document, we propose a prototype of an intelligent safety helmet. The functionality of the helmet is to work out if the user is sleepy, to see if the user has fallen, and also to alert nearby occupants with the assistance of an Android app. All helmets are going to be connected wirelessly to an area server via Wi-Fi.

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Date- January 2019

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Delay-Aware Accident Detection and Response System Using Fog Computing

Summary: Emergencies, by definition, are unpredictable and a fast response may be a fundamental requirement in Emergency management. Globally, a big number of deaths occur annually , caused by an excess delay in rescue activities. Vehicles incorporated with these sophisticated technologies, along side equipped roads with advanced infrastructure, it can play an important role within the timely identification and notification of the roadside accidents. However, such infrastructure and technologically rich vehicles are rarely available within the least developed countries. Therefore, low-cost solutions are needed in these countries to deal with the matter . Systems supported the web of Things (IoT) have began to be wont to detect and report road accidents. the bulk of systems designed for this purpose involve the utilization of the cloud to calculate, manage and store information. However, the centralization and remoteness of cloud resources can cause a rise within the delay that increases serious concerns about its feasibility in emergency situations; in life-threatening situations, all delays should be minimized wherever possible. to deal with the latency issue, fog computing emerged as middleware paradigm that brings cloud-like resources closer to finish devices. In light of this, the research proposed here takes advantage of the subtle smartphone and fog computing features to propose and develop a low-cost, delayed accident detection and response system, which we call an emergency response and Disaster Management System. An Android application is developed that uses the smartphone sensors for detecting accidents. When an event is detected, an action plan is developed. at first, a close-by hospital is found using the worldwide positioning system (GPS). The ER of the hospital is informed of the accident that directs an ambulance to the accident site.

additionally , the family the victim's contact details also are informed of the accident. All the specified calculation is performed on the fog knots available nearby. Furthermore, the proposed scheme is simulated using iFogSim to guage and compare performance using fog nodes and cloud data centers.

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Date- Received February 20, 2019, accepted March 11, 2019, date of publication May 1, 2019, date of current version June 11, 2019.

Link- https://www.researchgate.net/publication/332814935_Delay-Aware_Accident_Detection_and_Response_System_using_Fog_Computing

An IoT Cloud System for Traffic Monitoring and Vehicular Accidents Prevention Based on Mobile Sensor Data Processing

The sudden traffic slowdown especially in fast scrolling roads and highways characterized by a scarce visibility is one of the major causes of accidents among motorised vehicles. It can be caused by other accidents, work-in-progress on roads, excessive motorized vehicles especially at peak times and so on. Typically, fixed traffic sensors installed on roads that interact with drivers' mobile App through the 4G network can mitigate such a problem, but unfortunately not all roads and highways are equipped with such devices. In this paper, we discuss a possible alternative solution for addressing such an issue considering mobile traffic sensors directly installed in private and/or public transportation and volunteer vehicles. In this scenario a fast-real-time processing of big traffic data is fundamental to prevent accidents. In particular, we discuss an IoT Cloud system for traffic monitoring and alert notification based on Open GTS and MongoDB. Our IoT Cloud system, besides for private drivers, it is very useful for drivers of critical rescue vehicles such as ambulances. Experiments prove that our system provides acceptable response times that allows drivers to receive alert messages in useful time so as to avoid the risk of possible accidents.

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Date- date of publication 24 November 2017

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A Review of Machine Learning and IoT in Smart Transportation

With the rise of the Internet of Things (IoT), applications have become smarter and connected devices give rise to their exploitation in all aspects of a modern city. As the volume of the collected data increases, Machine Learning (ML) techniques are applied to further enhance the intelligence and the capabilities of an application. The field of smart transportation has attracted many researchers and it has been approached with both ML and IoT techniques. In this review, smart transportation is considered to be an umbrella term that covers route optimization, parking, street lights, accident prevention/detection, road anomalies, and infrastructure applications. The purpose of this paper is to make a self-contained review of

ML techniques and IoT applications in Intelligent Transportation Systems (ITS) and obtain a clear view of the trends in the aforementioned fields and spot possible coverage needs. From the reviewed articles it becomes profound that there is a possible lack of ML coverage for the Smart Lighting Systems and Smart Parking applications. Additionally, route optimization, parking, and accident/detection tend to be the most popular ITS applications among researchers.

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Date- Received: 19 March 2019; Accepted: 8 April 2019; Published: 10 April 2019

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IoT based framework for Vehicle Over-speed detection

Automatic vehicle monitoring has turned out to be a very crucial scenario in the current years. It may develop into possibility by executing the following technologies. This project targets to propose a system, which detects speeding vehicles over a specific speed limit and immediately report to concerned authorities. At present, road accidents rates have raised so, there is a necessity for developing a system that detects an over speeding vehicle. The implementation of present Smart Vehicle Over Speeding Detector using Internet of Things determines all the road traffic information automatically with intelligence. The smart vehicles are suitable with over speeding detector that has capability for recording, storing and information sharing about the vehicle's speed. The system contains GPS module, Radar, Google maps and IoT module. The safe regions are identified automatically using GPS and IoT technologies. Electronic tracking device runs in 12 V lithium batteries with network of GPS sensing and IoT implementation. The battery life of this device is range from 5-10 hours. A smart vehicle over speeding sensor is employed and is combined with IoT in order to decrease the vehicle's speed at particular places like accident prone zones. If this smart sensor technology is used the safety parameters, then avoidance of accidents may be attained. The system sends the data wirelessly. If the over speeding vehicle is detected, then the sensor alerts by sounding an alarm. The purpose of the proposed sensor is to decrease high death rates because of accidents in Middle East countries and in Oman.

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Accident Tracking & Emergency Response Management using IoT

Road safety has become an issue of concern, particularly in large populations, over recent years. Indian roads are extremely disaster-prone. According to a survey made by the Ministry of Road Transport & Highways, road accidents are responsible for one death approximately every four minutes. Further breaking down the statistics, the data revealed that at least 17

deaths were a result of the 55 accidents reported on average every hour. Hence, the prompt deployment of Emergency Medical Services is extremely crucial to minimise the loss of lives. The objective of this paper is to set in place a fully automated system design that will minimise the time gap between the occurrence of an accident and deployment of medical response. This can be done by combining accident detection and Emergency Medical Services systems. The proposed design makes use of an accelerometer and a piezoelectric sensor to trigger the Arduino microcontroller, which retrieves the user's location through the GPS. Communication between the IoT device and the database is done using a GSM/GPRS module. An Android app is designed to collect the relevant health information of the user, emergency contact information, and hospital details during initial registration.

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Recent developments on driver's health monitoring and comfort enhancement through IoT

At present, many automakers are paying attention to develop vehicles with IoT enabled including healthcare, accident prevention, vehicle safety, driver safety, driver and passenger comfort, vehicle monitoring, etc. This paper focused on reviewing the recent developments in driver's health and comfort monitoring through IoT. The literature review was performed with popular search engines/databases like PubMed, ScienceDirect, Elsevier Science, Scopus, and Google Scholar. The search was based on keywords like "Healthcare Monitoring", "Seating Comfort", "IoT developments", "Smart Sensing", "Embedded Sensors", "Wearable Sensors", "in-vehicle smart assistance", "Autonomous Vehicle/Car". Later, the articles were sorted out according to the relevance of this paper's focus (i.e., driver's health and comfort monitoring through IoT) by reading title, abstract, and full article. The results show that there have been many IoT based health and comfort monitoring developments concerning the vehicle. We have classified and summarised the developments as health monitoring through seat pan, seat back, seat belt, steering wheel, eye tracking and face tracking, and comfort monitoring/enhancement through smart seating, smart seat cushion, smart door module, smart air-bag, smart seat belt buckles. This survey would be giving in-depth knowledge on recent developments in the field of automotive and IoT.

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IoT based car accident detection and notification algorithm for general road accidents

With an increase in population, there is an increase in the number of accidents that happen every minute. These road accidents are unpredictable. There are situations where most of the accidents could not be reported properly to nearby ambulances on time. In most of the cases, there is the unavailability of emergency services which lack in providing the first aid and timely service which can lead to loss of life by some minutes. Hence, there is a need to develop a system that caters to all these problems and can effectively function to overcome the delay time caused by the medical vehicles. The purpose of this paper is to introduce a framework using IoT, which helps in detecting car accidents and notifying them immediately. This can be achieved by integrating smart sensors with a microcontroller within the car that can trigger at the time of an accident. The other modules like GPS and GSM are integrated with the system to obtain the location coordinates of the accidents and sending it to registered numbers and nearby ambulance to notify them about the accident to obtain immediate help at the location.

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Author- Shivani Sharma, Shoney Sebastian

Date- 5 October 2019

Link- https://d1wqtxts1xzle7.cloudfront.net/64022882/14%2025apr19%2018apr19%2016okt18%2016079%20%28edit%20lia%29.pdf?1595774495=&response-content-disposition=inline%3B+filename%3DIoT_based_car_accident_detection_and_not.pdf&Expires=1596619364&Signature=K1TFDe6gJE98lYJsAZVl3dNYPhN91McMSOeDamGj4VYfF3NcRHdfDVrHJogR5lEdh7tESVwEESuVt187dL0Zzezy0gGLM5b65wGsaL-pF9QDVvo-BuFiZGlgard7jgz476nRpkcisgNXGWQy4ckqPLTKWEaTq5axsoXnktBcA1NGBqi1pyqxwMdZc2Pu~jaIxCI1-j3QZ2oHP8-Vp9TjR177CGJ3-g7hjNjXMyLWUyxawLoR27IOajkoxSbW0R1IMxUbkj50fKx~F5RDuZsBnAS3HDZCYk00Q~10ceNE~vhbiztf3L8gE8bmPPfXx4pgqEG0SgqhAolB6aVqexEpeg__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

SAFE DRIVING USING IOT SENSOR

This paper proposes that “Most of the accidents that take place on the road are due to rash driving or drunk and driving. Major aspect about this paper which is eye-catching is the usage of various sensors to detect them. Few of those sensors are alcohol detection sensors, eye blink sensor, over-speed control sensor. Each one of these sensors has specific features:1) alcohol detection sensor works on sensing the amount of alcohol consumed. 2)Eye Blink sensors work on checking number of times the driver is blinking in order to find out whether the driver is sleepy or not and it also works on the eyeball rotation or movements. Accordingly, it will trigger the alarm to help the driver to stay awake.3) The over speed controller sensors work on the speed limit and will use various methods to decrease the speed and maintain the normal and safe condition. In serious conditions, these give a heads up to the driver, driver’s family and also inform local police and hospitals. They have also mentioned regarding where these sensors will be located according to the activities, they are meant to b doing like the eye blinking sensor on the steering of the car. When it comes to

alcohol detectors is the unique feature it has. which is- it will identify only the driver is drunk or not it will not check the rest of the persons in the car, because the sensor will be fixed in the steering of the car so the capacity of the sensor is up to 5-10 cm to identify the alcohol consumption of the driver alone and it will also send the SMS to their driver relatives and the local police

References:-

Author-A. Jesudoss, Muthuram, Lourdson Emmanuel.

Year- 2018

Link-https://acadpubl.eu/hub/2018-118-21/articles/21e/3.pdf

An IoT Based Car Accident Prevention and Detection System with Smart Brake Control

This paper proposes that “Car accidents which are considered as one of the most destructive phenomena and many lives are lost due to this. Though there are many different reasons behind car accidents, most accidents occur due to driver's unawareness or unconsciousness (being drunk or sleepy) and uncontrolled speed. Also, there seems to be a problem reaching the spot of accident in time for lack of awareness. If we work on decreasing the time taken for the information of an accident received to the police or hospital then a lot of lives can be saved and many deaths can be prevented. As a solution, the advent of Internet of Things (IoT) technologies can reduce the number of accidents. They also mentioned about a smart system which is described that alerts and controls the speed of a vehicle, also notifies the individuals accordingly when an accident occurs. This system always monitors the distance between vehicles and obstacles that are in front, using distance sensor. It will alert the driver to control the speed and reduce the speed by itself when a critical distance comes. Whenever an accident takes place for uncertain condition, an email alert will be sent to the accountable individual with car details.

References:-

Authors: Mubashir Murshed, Md Sanaullah Chowdhury

Published Date: January 2019

Link: https://www.researchgate.net/publication/333984519_An_IoT_Based_Car_Accident_Prevention_and_Detection_System_with_Smart_Brake_Control

DRIVER FATIGUE DETECTION USING IMAGE PROCESSING AND ACCIDENT PREVENTION

This paper proposes that “Driving at night has become a tricky situation with a lot of accidents and concerns for the transport authorities and common man especially because of the increasing heavy vehicle movement. The drivers are forced to drive with minimal rest which takes a toll on their driving capability after a few days of continuous driving leading to reduction in their reflexes and thus causing accidents. In most of the cases of accidents, fatigue is found to be the reason for nodding off. In this paper, a system is developed to detect if the driver is sleepy through eye movement detection of the driver who is driving the car. Analysis and detection is carried out by means of image processing and alert system to alert

the driver as well as others is developed in hardware along with a control system to stop the car after ascertaining the position of the car and nearby vehicles.

References:-

Authors: Ramalatha Marimuthu, A. Suresh, M. Alamelu and S. Kanagaraj

Published Year: 2017

Link: http://acadpubl.eu/jsi/2017-116-11-12/articles/11/10.pdf

Development and Implementation of the Technical Accident Prevention Subsystem for the Smart Home System:

This paper proposes that prevention of accidents will be taken as subsystem model based on the petri network. The structure of this technical accident prevention subsystem has neem developed and implemented in this. The model has been based on the neural network whereas the physical model is based on using the Arduino microcontroller in the development process. The subsystem research results with the use of the developed models, soft- and hardware tools are also presented and explained thoroughly in this.

References:-

Author: Vasyl Teslyuk, Vasyl Beregovskyi, Pavlo Denysyuk, Taras Teslyuk and Andrii Lozynskyi

Published on-January 2018

Link- http://j.mecs-press.net/ijisa/ijisa-v10-n1/IJISA-V10-N1-1.pdf

Alcohol Detection and Accident Prevention of Vehicle

This paper proposes that a safe driving system of vehicle for drunk and driving cases, In this project we have used an alcohol detecting sensor in vehicle which senses and detects alcohol gases and sends messages continuously to their relatives within every 5 minutes. In this process arm7 microcontroller is connected with GSM and GPS modules. GPS module gets the position of vehicle with longitude and latitude then via GSM it sends the messages to the relative of the driver until he reaches home safely. We have also used car accident prevention technology with ultrasonic sensor which also sends messages via GSM to relatives of the driver while accident happens of vehicle.

References:-

Author: Vijay Savania, Hardik Agravata and Dhrumil Patela

Published in- 2015

Link- http://www.makeitortakeit.in/documents/467/Bus__Truck_Drunk_Driving_Alert_Using_PIC.pdf

Creating New IoT-driven Insurance Services

This paper proposes that while insurance companies have traditionally responded (paid claims) after incidents occur, factors such as diversifying policyholder needs and advances in information and communication technologies are calling for the reformation of that role. To prepare for that reform in the insurance industry, Hitachi has been using its NEXPERIENCE methodology (which provides a systematic method for creating new service businesses) to enable more effective collaborative creation activities with insurance companies. These efforts have involved studying how best to design new IoT-driven insurance services by looking at how insurance services can be reformed from reactive to proactive types. This work is one example of how NEXPERIENCE is being used within Hitachi. This article presents the results of this study and looks at the future outlook for insurance industry reform.

References:-

Author: Takahide Shinge, Genta Nishikawa, Masataka Araki

Published in- 2017

Link- https://www.hitachi.com/rev/archive/2017/r2017_01/pdf/41-45_R10-06.pdf

VEHICLE ACCIDENT PREVENTION USING SENSORS

This project mainly related to road accidents that happen in sleepy and lethargic / half sleep or otherwise intoxicated persons while in driving mode. The eye blink sensor detects the half sleep persons and alert the alarm by using buzzer. Accidents can be performed due to lethargic and it is controlled and prevented with the help of eye blink sensor using Infrared rays. This sensor will be connected with the Intel Galileo kit. The Intel IoT Developer Kit can develop the sensor by using C, C++, Python, and Nodejs /JavaScript.

References:-

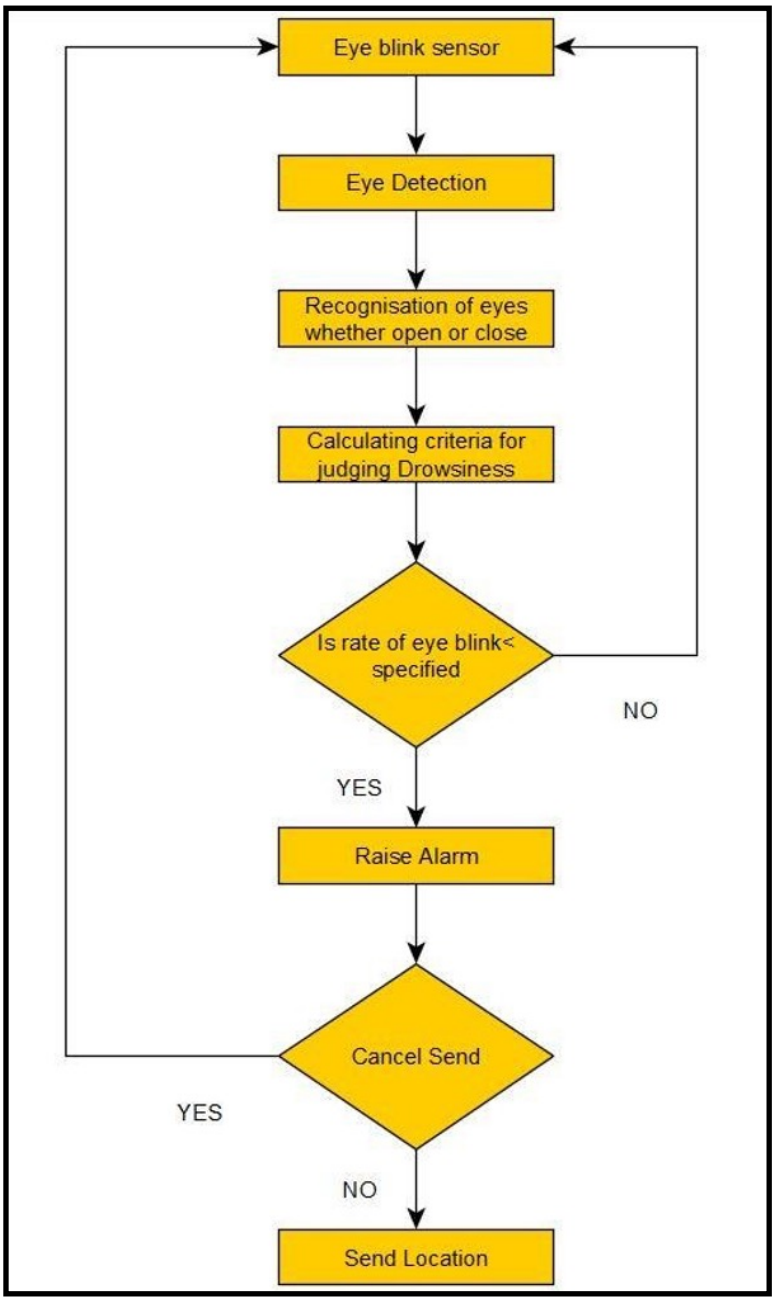
Author: R. Saranya, R. Arun Kumar

Published in- October 2017

Link- https://d1wqtxts1xzle7.cloudfront.net/54977108/IRJET-V4I10162.pdf?1510399147=&response-content-disposition=inline%3B+filename%3DVEHICLE_ACCIDENT_PREVENTION_USING_SENSOR.pdf&Expires=1596626269&Signature=eOmn0BZMDoLo8mDgAplZhne9614wHztDn20Rckt8FGiOHv2E9uNZewY5nVbS1pndZA1uqR44~tgiEztPeSNiBUV~Zt5WiCUJpGoiajfaNiWjRw5IqwRA1A2VSJYTghX16Ne0udCKnkwb-G16YjkP5e8uNEwJoURIENn~fmTC6K5NceVxeUqBTdiUTIMXpx6z0d6roIhvAiG0wnPHnILxwT~Pt9H4WR9twHsDE8qJHdefTlr8ZkJOW0jYtdDIIIGNumH669F~GcS5tDkYPoUoazdpmvHdUzPQEP-DJ9sZLOkyr-dSG49oWAeDamhUIVEy4~neMuCjG5k7c-M2~v27LA__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

PROPOSED METHOD

FLOW DIAGRAM



PROPOSED ALGORITHM:

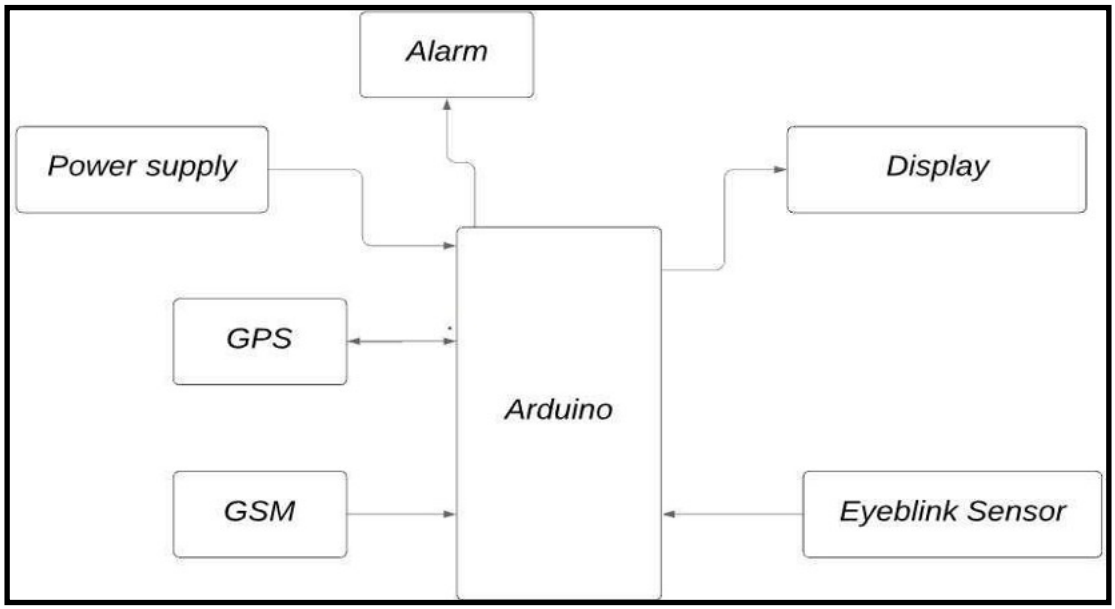
This section deals with the theoretical and mathematical explanation of the various approach made for face and eye detection. In the beginning of this chapter Principal Component Analysis (PCA) method was described. Latter through this Eigen face approach is explained which incorporates mathematical description of its subparts like Eigen Values and Eigen Vectors.

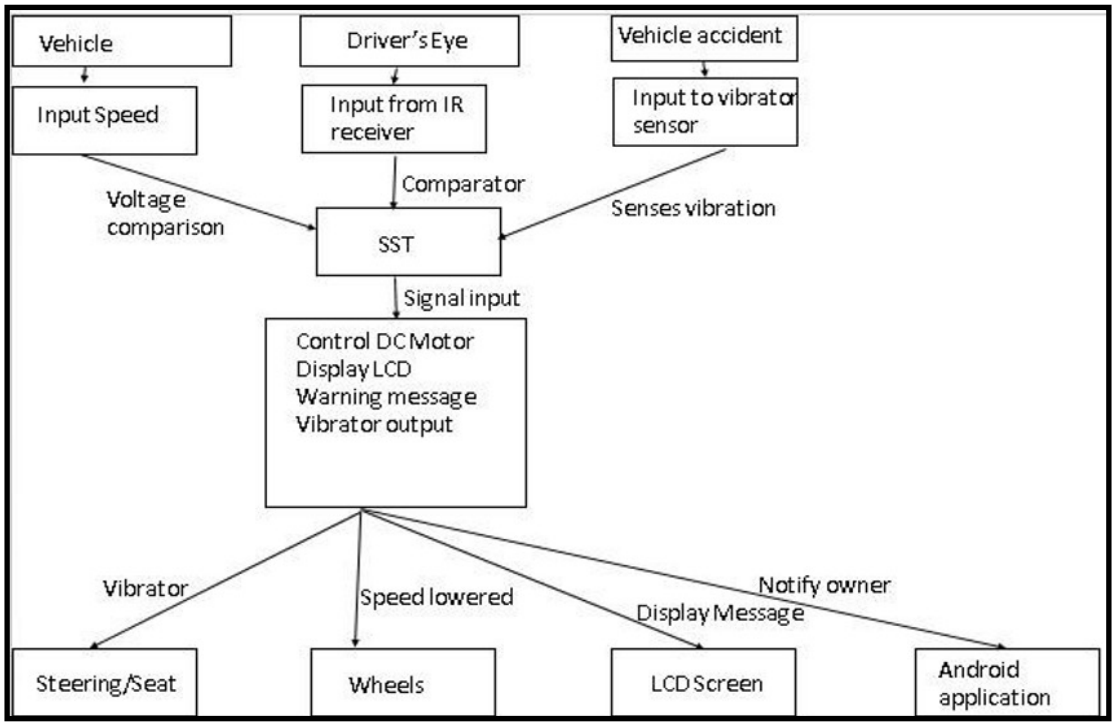
i. Principal component analysis (PCA) was invented in 1901 by Karl Pearson. If the resulted data is repeated again and again or has redundancy the PCA helps in

reducing this redundancy. PCA basically removes the variables to reduce redundancy. So after reduction of variables we'll get less variables named as Principal Components. Principal components will generally represent all the variables present within the obtained variable. But it only reduction of variables doesn't solve the aim . Main Problem appears once we attempt to achieve face recognition during a more and high dimensional space. The main objective of PCA is to decrease the no of dimension also as retain more and more possible variation within the given data set. But we all know that reduction in dimension leads to information loss as information are directly linked with dimension. Hence we will overcome the matter of knowledge loss by choosing the simplest principal components as main principal components determines the low dimension. Though use of PCA has many advantages but mostly it's used for eigen face approach. In eigen face approach the reduction of size of the info base is achieved for recognizing the test images. The obtained images are stored within the data base in vector form which also are called feature vectors. And these are acknowledged from set of Eigen face obtained by projecting it over trained image. So basically, PCA is employed for Eigen face approach for the reduction of dimensionality with our causing the loss of knowledge.

ii. Eigen face approach Eigen face approach for face recognition is very efficient and helpful because of its speed of operation simplicity in using and capability of learning. In computer vision face detection is completed by use of eigen face which are basically set of eigen vectors. This approach is essentially an appearance- based approach which does face recognition by capturing the variation during a set of face images and this information is employed for comparison and encoding of each individual face in proper manner. What we mean by eigen faces is that they are Principal components of distributed faces which are represented in the form of covariance matrix of set of faces. In this method a face image is represented within the sort of one-dimensional matrix. We know we will represent a face in two-dimensional sort of pixels as N x N matrix in N2 dimension space. These N x N matrices is shifted to the form of row matrix. Many works on this were already done but it has ignored the fact of face stimulus which assumes that the given predefined measurements on face recognition are important and adequate. Which means that coding and encoding of available face images probably give information of face images which point outs the important significant features. But an opportunity is there that the obtained features may or might not be associated with the known and required facial feature like nose, eyes, lips, hair etc. So, the extraction of required information from a face image is required. After extraction is completed, we encode it with high efficiency and therefore the result's compared with a database of faces encoded within the same fashion. For this purpose, we capture the variation with a set of face images which may be a very simple approach for the extraction of the knowledge content. The next step is to seek out the Principal Component of the face distribution or from the obtained covariance matrix the Eigen vectors of the set of face images can be found out. Every row of image is taken into account as a vector stacked one after another during a single row which helps in displaying the Eigen vector as a kind of face. A liner combination of face images is taken to represent each face images. We find that the sum of all expected eigen faces is set by total number of given input images within the prepared set. An approximation is often finished faces by the utilization of Eigen face for those having large eigen values which set the foremost variance in just in case of obtainable set of images. To increase the computational efficiency, use of fewer Eigen face is done.

CIRCUIT DIAGRAM





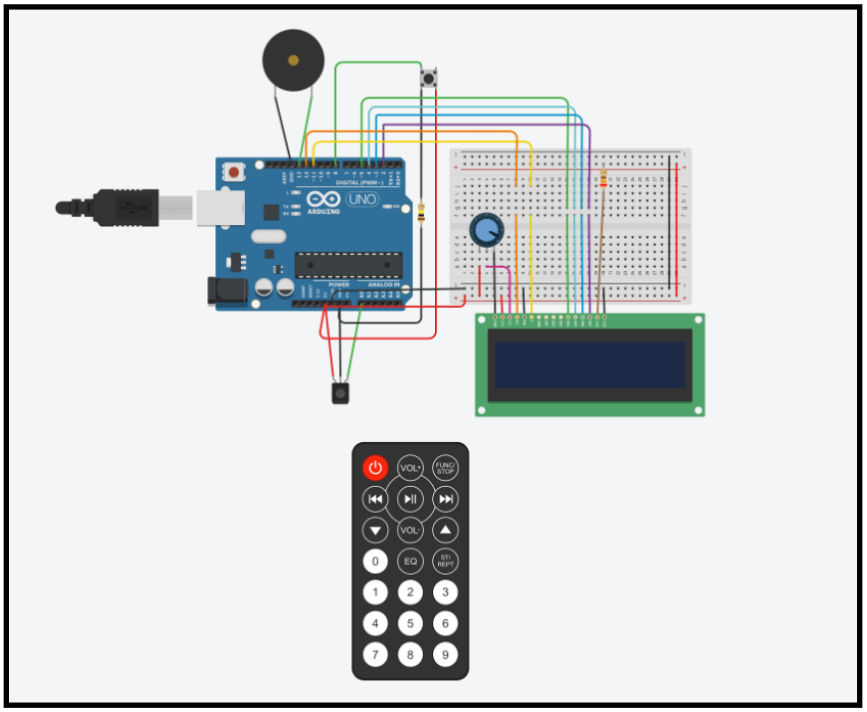
IMPLEMENTATION

In this project the driver wears a goggles/spectacle fitted with sensors. This spectacle is connected to microcontroller device. Whenever the driver's eye blinking period is more than certain amount of time, we consider this condition under drowsiness i.e driver is drowse. Immediate action will be taken and alarm/buzzer will immediately blow up and alerts and wake up the driver. The drowsiness condition can also be reported to remote person using GSM module. The location of the driver can also be shared to remote person automatically

using the GSM and GPS module. The vibration sensor activates and sends an immediate notification in case of any object hits the vehicle.

Eye blink sensor: An eye blinking is mandatory in this work, since it is used to impel the device and to activate events. Instruction were written in image processing that if there is no eyelid movement establish for the definite phase of preset i.e. time greater than the time of eye blinking of normal human then it considered as “blink” [10]. In this paper time is to be set as 10 seconds or more than it, as “blink event” is distinct from “normal eye blinking”. The test is to be conducted for normal blinking of human eye.

IR SENSOR To identify the drowsiness, eye blink sensor is used, IR sensor consists of infrared transmitter and receiver. Infrared transmitter emits infrared rays. The transmitted IR rays are received by IR receiver. The IR transmitter and IR receiver are arranged in parallel. When the signal is given, the IR sensor starts functioning and IR transmitter emits the infrared rays to the receiver. The comparator is coupled with IR receiver. The operational amplifier is attached to comparator. To the inverting input terminal of the comparator the reference voltage is given, the comparator is linked to receiver. When there is a disruption is present in the IR rays between sender (transmitter) and recipient (receiver), the IR receiver will not conduct. Hence the voltage at the inverting input terminal is lower than the voltage at the non-inverting input. Therefore, the output of comparator is high. The output voltage of comparator is given to microcontroller. When IR receiver receives the rays from transmitter, the IR receiver becomes conducting since the voltage at the non-inverting terminal is lower than voltage at the inverting terminal. Therefore, output of comparator is low. Hence the output of comparator is set to controller. This circuit is used for counting eyelid movement. Buzzer Section To alert or indicate the completion of process, buzzer is used. Buzzer is for signify the start of the embedded system by alerting. LCD Section This LCD section is used to illustrate the status of the event. The Liquid Crystal Display (LCD) is used to display or prompt for necessary information.



FEATURES OF THE PROJECT

- Drowsiness detection using the eyeblink (here IR) sensor and Alcohol Detector will be used.
- SMS alert to personal contacts/ambulance in case of emergency.
- Even the location of the driver can also be obtained.
- Immediate alert notification in case of accident i.e if vibration/tilt detected.
- Alarm/Buzzer while drowsiness detected.

CONCLUSION

- So this project will be helpful in detecting driver drowsiness in advance and will give a warning output in form of sound (which is an alarm).
- Not only drowsiness but also detects if the driver has consumed the alcohol or not and takes respective measure.
- Also the GSM and GPS modules helps the remote person to track the driver in case of emergency.
- Hence we can consider this as a non-intrusive method of drowsiness detection.

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- https://www.researchgate.net/publication/330896089_A_Low-Cost_Prototype_for_Driver_Fatigue_Detection
- https://www.sciencedirect.com/science/article/abs/pii/S0950705115000143?via%3Dihub
- https://www.researchgate.net/publication/321588366_Detection_and_prediction_of_driver_drowsiness_using_artificial_neural_network_models
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