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// APROJECTREPORT Submittedby ABIRAME M R SMADHUPRIYAA NIKALYA RPRITHIUSHA M
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ANNAUNIVERSITY::CHENNAI600025 BONAFIDECERTIFICATE Certifiedthatthisprojectreport♦ACCIDENT
SENSING AND PREVENTION USING IOT♦ is the bonafide work of ♦ABIRAME M R S (621319205002),
MADHUPRIYAA(621319205018),NIKALYA R(621319205027),PRITHIUSHA M (621318205047)
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INTERNALEXAMINER EXTERNALEXAMINER ABSTRACT Traveling has become risky despite being a vital
necessity for human existence. The frequency of traffic accidents is rising over time.

According to a recent Times India study, there have been 2 lakhs of documented occurrences of fatal road
accidents. Additionally, the recorded mortality instances, almost two-thirds were the result of drunk driving and
delayed medical recovery. In this proposed project, NodeMCU is used to transmit messages when the vehicle
is met with an accident normally. Additionally, the system is going to detect whether the person who is driving
car is drunk or not and we are going to control the vehicle. This can be done using Arduino IOT Devices.

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When the driver is boozed, the alcoholic sensor will detect it, if the alcohol is detected then immediately it will be notified, and also the speed of the engine will be reduced. In case the vehicle met with an accident after the alcohol is sensed, immediately the vehicle engine will be getting stopped and to be get notified.

ACKNOWLEDGEMENT We wish to express our sincere gratitude to our beloved chairman Dr. P.S.K.R. PERIASWAMY for providing the facilitation to make us extensively inter-nationalized to meet global competence with almost perfection. We would like to express our sincere thanks to our Principal Dr. R.ASHOKAN, M.S., M.Tech., Ph.D.,

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Finally, we profound gratitude to the almighty for his presence and who gave

methebravery, privilege, power and belief to complete this project. TABLE OF CONTENT CHAPTER NO TITLE
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Engine Control Unit ITS Intelligent transportation systems AP Accident-prone FPR False Positive Rate
MLP Multilayer Preceptor DNN Deep Neural Networks DBN Deep Belief Network CNN Convolutional
Neural Network IoT Internet of Things ADC Accident Detection and Classification EMS Emergency
Medical Services NB Naive Bayes GMM Gaussian Mixture Model DT Decision Tree ALA Absolute
Linear Acceleration LCD Liquid Crystal Display IDE Integrated Development Environment CHAPTER
1 INTRODUCTION Public health is now very concerned about the problem of road safety. In 2019, there were
more than 1,37,000 road fatalities.

Driving while intoxicated has been a major contributing factor in many recent traffic accidents. The main goal
of the proposed system, dubbed "Drunk and Drive Detection using IOT," is to locate drunk drivers and avoid
collisions by disabling their cars. The car has this system fitted. When a driver is intoxicated and operating a
vehicle, an alcohol sensor installed inside the vehicle can identify alcohol on the driver's breath. Both the front
and rear of the car have UV monitors. If another car or another object is close by, the speed of the car will
reduce. The vehicle will be stopped and the buzzer will sound if no one is around. When an accident happens,
the vibration sensor alerts the relative's "Mobile phone-based drunken driving detection." Prior to being placed
inside the car, it must be oriented.

"Alcohol Detection with Vehicle Controlling" instantly cautions the driver or alerts the police or family if there is
any indication of drunk driving. This method is primarily used to stop accidents caused by inebriated driving.
The printed circuit board is linked to a sensor for alcohol. When the driver's blood alcohol content is above the
legal limit, the car should have a mechanism that turns off the ignition. An Android phone with a few sensors
and a programmer installed is required for this setup. The current sensor readings are compared to the
system's existing figures by this programmer. If a match is discovered, a message with the address and a
warning will be sent. According to this strategy, inebriated driving is the main contributing factor to accidents.

They created a system based on actual driving test scenarios to determine the driver's condition. The car has

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sensors and a mobile device fitted as custom hardware. Both physical and mobile gadgets contain software. The sensor measurements from the car are compared to the outcomes of the real-time test case while the driver is in charge. An alert message will be sent if there are any indications of a DUI or alcohol use. An ARM7 CPU linked to GSM is used in this. Driver weariness is detected by the GSM device. A sensor network will be used to transmit a message. The sensors in this system are pointed straight at the faces of the drivers. The Internet of Things is a network of numerous uniquely identifiable things that can communicate with one another online. In the IoT, a single gadget can be applied in a variety of ways.

It also examines various models that have already been put forth and makes an effort to take the best aspects of them into account. In order to detect intoxication and take preventative action, it analyses the alcohol level and the speed at which the car is turned. A warning will sound, the speed limit will be lowered, traffic control will be informed, and automatic operation will start. Wirelessly connected cars are expected to be the next development in the automobile revolution given the rapid advancement of information and communication technology.

Vehicle networking will open up new avenues for safe travel, intelligent transportation, and eco-friendly transportation. The demand for mobile internet connectivity among users, environmental preservation, and road safety are the driving forces behind wireless solutions for vehicular networking. Accidental fatalities happen more often now than they used to. A total of 3, 94, 982 accidental deaths occurred in India in 2021, a 1.0% rise from the year before. This equates to 4,098 more accidental fatalities in 2021 than in 2020. Urbanization is growing, so there is a rise. Large cities' high vehicle populations are to blame for traffic congestion and all of its negative side effects, including significant monetary expenses and environmental issues.

Vehicle networking is a term used to characterize wireless connections between an automobile's interior and exterior communications. To prove its viability, the benefits, drawbacks, and difficulties are discussed. Before providing a solution in each of the two parts, vehicle-to-road connectivity is described and inter-vehicle connectivity options are covered. 1.1 INTRA-VEHICLE CONNECTIVITY The Car communication Consortium was established by Daimler, General Motors, Honda, Hyundai, Toyota, and Volkswagen along with Nokia, Samsung, and other companies with the goal of developing common standards for mobile device and vehicle communication. Intra-vehicle wired connections require numerous cable connections between sensors and the Electrical Control Unit (ECU), where the sensors transmit event-driven or time-driven messages.

A fascinating option where the ECU and sensor are connected by the same network is now feasible thanks to recent advancements in wireless sensor networking and communication. To build intra-vehicle wireless sensor networks, a variety of wireless technologies are accessible, and research has concentrated on the viability of

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different wireless options in such environment's challenges. 1. The intra-vehicle communication situation is difficult due to the severe scattering of sensors in a very compact area and the frequent loss of line of sight. 2. Bluetooth: The IEEE 802.1 Standard is used by Bluetooth, a 2.4GHz ISM frequency band wireless device, to share data over short distances. A main Bluetooth device can communicate with a maximum of seven devices. It permits data transfers between portable devices at speeds of up to 3 Mbps. 3.

ZigBee: A standard for personal area networks composed of mobile, low-power digital radios are the ZigBee family of high-level communication standards. ZigBee operates in the ISM radio spectrum and is based on IEEE 802.15.4 specifications. It usually operates at 2.4 GHz in most nations, while also operating at 784 MHz in China, 868 MHz in Europe, and 915 MHz in the USA and Australia. Data speeds vary from 20 kbps to 250 kbps. 4. Ultra-wide band: A large portion of the radio spectrum is utilized by UWB, a radio technology, for short-range, high-bandwidth communications at very low energy levels. The operating range of UWB, which has a 7.5GHz frequency, is 3.1 to 10.6 GHz. UWB can enable short-range conversations at data rates of up to 480Mbps. Low cost, high time domain resolution for tracking and localization apps, and resistance to wireless fading and shadowing are all benefits of UWB systems. 5.

60 GHz Millimeter Wave: Communications at the 60 GHz range, also known as millimeter-wave communications, which operate in the 57-64 GHz frequency range, offer an alternative method for building intra-vehicular connectivity. They can handle multiple-Gbps wireless connections over short distances for bandwidth-hungry multimedia applications. Growing research interest has been generated by the application of mm-Wave communication technology to multimedia transmission in the intra-vehicle environment, such as high-definition video transmission for seat monitors in the car. 6. Near field communication: Smart phones and other devices can interact wirelessly with one another using the NFC set of protocols by touching or bringing them close to one another, usually within 10 cm (3.9 in) or less.

Both NFC and Bluetooth are short-range communication technologies. NFC sets up more quickly than Bluetooth low energy, but it transmits data at a slower pace. The highest data transfer rate for NFC is lowers (424 kbps). CHAPTER 2 LITERATURE SURVEY TITLE 1: AI Enabled Accident Detection and Alert System Using IoT and Deep Learning for Smart Cities AUTHOR: Nikhlesh Pathik, Rajeev Kumar Gupta In this study, it is shown that as the number of cars rises, so do daily traffic accidents. The globe Health Organization estimates that 50 million people are injured and 1.4 million people die each year in the globe. The lack of medical assistance at the scene of the accident or the lengthy reaction times during rescue efforts is the main causes of death.

Intelligent transportation systems (ITS) are gaining significant attention in business and academia due to the increasing popularity of smart cities and are seen as a way to increase traffic safety in these areas. This paper suggested an artificial intelligence and internet of things-based accident detection and rescue system that mimics the cognitive processes of the human mind. When the DL module notices a mishap, it immediately

alerts all nearby emergency services, including the hospital, police station, mechanics, etc. Using ensemble transfer learning and dynamic weights, the erroneous detection rate is reduced. The absence of the dataset forces the generation of a personalized dataset from the different online videos. An evaluation of ResNet and InceptionResnetV2 is used to compare the proposed technique to the existing one.

The experiment's findings demonstrate that InceptionResnetV2 outperforms ResNet with training, validation, and test accuracy of 98% each. The suggested method is validated on the toy vehicle in order to gauge how well it performs in the real world. Advantages Advanced smart phone specifications can be used to create and build a low-cost, retrofit table solution for improved transportation systems. Disadvantages It can be challenging to communicate in some locations without GSM networks. TITLE 2:Accident Prevention Analysis: Exploring the Intellectual Structure of a Research Field AUTHOR:Rui Huang, Hui Liu, Hongliang Ma The content of this paper one of the major obstacles to social sustainable development is accident prevention, which is crucial in preventing or reducing all types of casualties and financial losses. Consequently, it has been a busy research area for many years all over the globe.

1294 papers from the SCIE and SSCI databases of the WOS retrieval platform were chosen as data samples from 1990 to 2021 in order to understand the research state of accident prevention and to explore the knowledge base and hot trends. Using bibliometric analysis techniques, co-occurrence, co-citation, co-authorship, and keyword analyses were carried out on the accident prevention study literature. According to the study, Georgia Institute of Technology had the most institutional publications and the United States had the most publications of any nation or region. The main journals in this field are Safety Science, Accident Analysis and Prevention, Pediatrics, and Reliability Engineering & System Safety.

The knowledge base in accident prevention studies includes system analysis and accident model establishment, analysis of construction accidents, road accident prevention, and safety culture and safety climate. Routine accident prevention, model-based research, systems analysis and accident prediction, and workplace safety and public health research are the four main research hotspots in accident prevention studies. The fundamental theory and organizational framework of accident prevention research are currently largely established, with numerous study avenues and a broad range of frontier branches. The frontiers of accident prevention study include safety management, public safety, Bayesian networks, and simulation. Advantages Urbanization problems are brought on by the increasing concentration of people in large towns.

Disadvantages Discovering the places where vehicle systems accidents occur is difficult. TITLE 3:Sensing accident-prone features in urban scenes for proactive driving and accident prevention AUTHOR:Sumit Mishra, Praveen Kumar Rajendran, Luiz Felipe Vecchiatti Traffic signs and other accident-prone (AP) features are likely to be missed by drivers in metropolitan areas due to the visual information on and along roadways. This paper suggests a visual notification of AP-features to drivers based on real-time images acquired via dash came to prevent accidents caused by failing to notice these visual cues.

A novel attention module is trained to classify a given urban scene into an accident hotspot or a non-hotspot using Google Street View images taken near accident hotspots (areas of dense accident occurrence) recognized by a real-accident dataset. On top of various CNN backbones, the proposed module uses attention learning at the channel, point, and spatial levels. When compared to CNN backbones alone, this produces better classification results and is more certain with greater contextual knowledge. Our suggested tool has a classification accuracy of up to 92%. By comparing three distinct class activation map (CAM) methods, which were used to inspect particular AP-features causing the classification decision, the proposed model's ability to detect AP-features was evaluated.

A pipeline for image processing was used to filter out only the AP-features that could be explained to drivers and alerted via a visual notification system from the outputs of CAM techniques. To demonstrate the effectiveness and AP-features of the system, a variety of tests were conducted. A given region's likelihood of being labeled as a non-hotspot increased by up to 21.8% when the AP-features taking up 9.61% of the total area in each image were eliminated. Advantages By offering alert systems that can halt the vehicle to avoid accidents, we can also prevent accidents by advancing technology. Disadvantages However, this can be prolonged by giving the mishap victims medicine on the scene.

TITLE 4:Safe Deep Driving Behavior Detection (S3D) AUTHOR: Ehsan Khosravi, Ali Mohammad Afshin Hematyar One of the most important factors in auto accidents and even traffic incidents is the human element. Driving events (maneuvers) and driver behaviors that are influenced by human variables include driving style. The first step in determining driving style is driving event detection, which makes it possible to anticipate potentially risky behaviors, avoid accidents, and place restrictions on high-risk drivers. In order to identify safe driving practices and driving incidents using real-time sensor signals from smart phones, this study suggests a deep hybrid model.

Each moving event sample is processed by the combination of Multi-layer Preceptor, Support-Vector Machine, and Convolutional Neural Network classifiers. We create an Android application to record data from Smartphone sensing signals in order to test our model. From 50 drivers, we collect about 24000 driving-related statistics. The fusion model outperforms each separate classifier, according to the results, in terms of accuracy, false positive rate (FPR), and specificity. (96.75, 0.004, and 0.996). This study offers advice to automobile makers on how to concentrate on the affordability and speed of driver monitoring apps for smart phones. Although some freight management and insurance businesses use smart phones as monitoring platforms, their market share is modest and could increase quickly with the promotion of new smart phones with improved processing and storage.

Advantages The main benefit of this strategy is that emergency assistance and the accident severity could be determined. Disadvantages The eye blink sensor tracks a person's level of sleep and notifies the driver via

buzzer when an unusual level of sleep is found. TITLE 5: Intelligent Traffic Accident Prediction Model for Internet of Vehicles with Deep Learning Approach AUTHOR: Da-Jie Lin, Mu-Yen Chen In order to analyze traffic accident data and pinpoint priority intersections for improvement, a high accident risk prediction model is created in this research.

An intersection accident risk prediction model based on various mechanical learning techniques was developed to estimate the potential high accident risk locations for traffic management departments to use in planning countermeasures to reduce accident risk after a database of the traffic accidents was organized and analyzed. This research found that road width, speed limit, and roadside markings are the major risk factors for traffic accidents. It did this by using Bayes theorem to identify environmental variables at intersections that influence accident risk levels. An accident risk forecast model was created using Naive Bayes, Decision Tree C4.5, Bayesian Network, Multilayer Preceptor (MLP), Deep Neural Networks (DNN), Deep Belief Network (DBN), and Convolutional Neural Network (CNN).

Additionally, this model can pinpoint the critical elements that influence the occurrence of high-risk intersections and give traffic control organizations a stronger foundation for making decisions about how to improve intersections. Using the same environmental factors as high-risk intersections as model inputs, one can predict the level of risk that might materialize in the future and use this information to avoid future traffic accidents. Additionally, it can serve as a model for upcoming environmental and junction design advancements. Advantages Recently, a number of hopeful mechanical developments have occurred. Disadvantages The driver may be intentionally failing to follow the sign or not be conscious of it.

TITLE 6: An IoT Based Vehicle Accident Detection and Classification System using Sensor Fusion AUTHOR: Nikhil Kumar, Debopam Acharya, and Divya Lohani The number one source of death and disability among young people is traffic accidents. The goal of current study on accident detection systems is to either shorten reporting times or increase accident detection accuracy. Platforms from the Internet of Things (IoT) have been heavily used recently to speed up relief efforts after accidents. This work shows an Internet of Things based automotive accident detection and classification (ADC) system that combines on-board and connected sensors from smart phones to not only detect but also report the type of accident. This innovative method enhances the effectiveness of rescue operations carried out by different emergency services, including EMS (emergency medical services), fire stations, towing services, etc.

Knowledge of the nature of the mishap is crucial when organizing and carrying out rescue and relief operations. After drawing conclusions about the injuries suffered by the victims and the vehicle damage, the emergency assistance providers can better prepare themselves for the situation. The best ADC model is determined in this study by comparing three machine learning models based on Naive Bayes (NB), Gaussian Mixture Model (GMM), and Decision Tree (DT) methods. Each candidate ADC model has been trained and tested using five physical factors linked to vehicle movement, including speed, absolute linear acceleration

(ALA), change-in-altitude, pitch, and roll, in order to determine the proper class of accident among collision, rollover, fall-off, and no-accident. With a mean F1-score of 0.95, the NB-based ADC model is determined to be extremely accurate. Advantages To facilitate contact between remotely operated underwater vehicles (ROV).

Disadvantages Three modes: manual, way point, and anchor were not supported. TITLE 7: Deep spatio-temporal graph convolutional network for traffic accident prediction AUTHOR:Le Yu, Bowen Du, Xiao Hu In real-world situations, traffic accidents frequently result in serious human casualties and significant economic losses. A timely, precise traffic accident prediction has a great deal of potential to safeguard public safety and minimize financial losses. Due to the complex causality of traffic accidents, which involves numerous factors such as spatial correlations, temporal dynamic interactions, and external influences in traffic-relevant heterogeneous data, it is difficult to forecast traffic accidents.

This article suggests a novel Deep Spatio-Temporal Graph Convolutional Network, called DSTGCN, to forecast traffic accidents in order to address the aforementioned problems. Three parts make up the suggested model. The first part is the spatial learning layer, which applies graph convolutional operations to spatial data to discover spatial relationships. The second element is the layer of spatio-temporal learning, which makes use of graph and conventional convolutions to record dynamic variations in both the temporal and spatial perspectives. The embedding layer, the third component, seeks to acquire meaningful and semantic representations of external data.

We gather extensive real-world data, such as accident reports, citywide vehicle speeds, road networks, meteorological conditions, and distributions of Points of Interest, in order to assess the suggested model. Experimental findings on actual datasets show that DSTGCN beats both traditional and cutting-edge approaches. Advantages For the purpose of recovering victims, the used electronic devices will be able to give police and ambulances a spontaneous message and their precise position. Disadvantages This results in a loss of life because the ambulance takes longer to get to the mishap scene or from there to the hospital.

TITLE 8: Preventive and Active Safety Applications AUTHOR: Levent G^öven Passive and active systems are the two main categories into which road vehicle safety systems can be divided. Passive safety systems are designed to lessen the likelihood that passengers will sustain injuries during and after a collision or overturn. The design of safety restraints, design for crashworthiness, seat belts, and air bags are examples of passive safety mechanisms. The goal of active safety, in contrast to passive methods, is to stop an accident from happening in the first place. Therefore, it makes sense to also refer to them as preventive mechanisms. The focus of this essay is on proactive and preventative safety measures.

This paper presents the current state of the art for some important preventive and active safety systems, along with a short explanation of the various methods employed. In some instances, the presentation is enhanced by findings from the author's research team. Also provided is a road plan of anticipated future developments in

the field of preventive and safety applications. Advantages They are easy to apply and have a strong propensity to guarantee safety. Disadvantages It can be challenging to communicate in some locations without GSM networks. TITLE 9: Energy Efficiency Characterization in Heterogeneous IoT System with UAV Swarms Based on Wireless Power Transfer AUTHOR: Yuanyuan Yao,Zhengyu Zhu, Sai Huang A large-scale heterogeneous Internet of Things (IoT) network made up of macro cells and energy-constrained IoT transmitters (IoT-Ts) is studied along with a swarm of unmanned aerial vehicles. In order to intelligently transmit energy to the energy-constrained IoT-Ts on the ground, the UAVs are used as flying robot swarms.

An associated Internet of Things device (IoT-D) is positioned at a fixed distance and in a random orientation for each IoT-T. By taking into consideration one-slot charging and two-slot charging according to three-dimensional (3D) locations, respectively, the transmission probability of the energy-constrained IoT-Ts is determined. Each variety of IoT-D's coverage probability is examined. The transmission capacity of the active IoT-Ts and the impact of the association biasing factor are taken into account when calculating energy efficiency. The energy efficiency is also maximized by using the optimum density of IoT-Ts. The accuracy of our theoretical analysis is validated by looking at the simulation outcomes.

Results show the illuminating impacts of the network parameters as well as practical recommendations for designing IoT and UAV swarm systems. Advantages In the event that everyone inside the vehicle is safe, a reset button can be pushed to stop the alert from being sent to the crisis contacts. Disadvantages The message will not be correctly received on the wrong mobile device. TITLE 10:A Comprehensive Study on IoT Based Accident Detection Systems for Smart Vehicles. AUTHOR:UnaizaAlvi, MuazzamA.Khan Khattak Population growth has resulted in a significant increase in vehicle demand, which has led to an alarming rise in traffic congestion and auto accidents. Both the proportion of traffic fatalities and the number of such accidents are rising exponentially.

However, the delay in emergency services is the main reason for the higher incidence of fatalities. Effective emergency efforts could save many lives. Traffic jams or erratic communication with the medical departments is to blame for the delay. To deliver assistance quickly, automatic road accident detection systems must be put in place. The literature contains numerous methods for automatic accident detection. The methods include machine learning methods, vehicular ad hoc networks, GPS/GSM-based systems, and Smartphonebased accident prediction. Because road accidents cause such high numbers of fatalities, road safety is the most important area that needs extensive research.

In order to ensure road safety and save precious lives, we present a critical analysis of the various current methodologies used for predicting and preventing traffic accidents in this paper. We emphasize their advantages, drawbacks, and challenges that must be resolved. Advantages Vehicle-to-vehicle wireless communication is made possible by vehicular ad hoc networks (VANETs), which operate without a centralized server. Disadvantages An abundance of information could make it easier for dishonest parties to breach users'

privacy. CHAPTER 3 SYSTEM ANALYSIS 3.1 EXISTING SYSTEM The frequency of traffic accidents is rising over time. Additionally, of the documented mortality instances, over speeding, late medical recuperation, and drunk drive.

In the existing system, if a person operating a vehicle is involved in an accident, there is a potential that person could sustain a serious injury or pass away instantly without anyone nearby to assist him. Additionally, the majority of collisions are caused by intoxicated driving and excessive speeding while intoxicated. So far, we haven't developed a workable, straightforward solution to this problem. Few of them have put some of the procedures into practice as the project has progressed, including sending messages and making an alarm sound for over speed. However, it has still not been put into action on a real-time basis. The system is therefore useful for real-time tracking, accident detection, and accident avoidance. 3.2

DISADVANTAGES OF EXISTING SYSTEM Removing the option to have a blood test performed when a breath test's conclusive result is less than 40% over the legal limit. Some drivers who had been drinking and driving got away with it because it took longer to get a blood test, which resulted in some drivers' blood alcohol levels dropping below the legal limit. 3.3 PROPOSED SYSTEM The major goal of this article is to develop a real-time application that utilizes NodeMCU and sensors to detect accidents. We intended to incorporate three modules in this project. When a vehicle is involved in an accident, a Notification alert is immediately sent over NodeMCU to the Configured App. Some accidents occurred as a result of drunk driving.

So, we can quickly identify if a person has consumed alcohol or not with the use of an alcohol sensor. Once the Alcohol is detected, immediately the speed of the engine will be getting reduced. Furthermore, the vehicle in which the alcohol is detected is met with an accident immediately the notification will be sent to the App and the engine motor will be stopped. 3.4 ADVANTAGES OF PROPOSED SYSTEM The other two pins are used for heating while the other two pins are used to connect to electricity and ground. Micro cylinders made of aluminum house the SnO₂ layer. The conduit also includes a heating element. The two main parts of an ultrasonic sensor are the emitter and receiver. The transmitter occasionally emits high frequency sound waves. At the speed of sound, they travel through the atmosphere.

The receiver detects their reverberation if they impact with anything. Distance is calculated using the delay between sound emission and echo receipt. An eye blink sensor is used to capture the eyelid movements. 3.5 DATA FLOW DIAGRAM A data flow graphic, like the one in Fig. 3.1, illustrates how data is transferred throughout a system or process. To increase productivity and design better processes, DFDs help you gain a deeper knowledge of how a process or system works. / Fig No. 3.1 Data flow Diagram CHAPTER 4 MODULES OF PROPOSED ACCIDENT ANALYSING SYSTEM 4.1 MODULES A separate component of hardware or software is known as a module.

Modular components typically have two characteristics: portability, which allows them to be used in a range of

systems, and interoperability, which allows them to interact with other systems' components. Accident Sensing Drunk and Drive Detection and Speed Control User Models Monitoring System Performance evaluations 4.2 ACCIDENT SENSING When a car accident happens, the details are shown on the dashboard and a prompt notification is sent to an App. The system will allow the driver 30 seconds to be found; if they are found within that time, they can abort the system and the constant beeping will stop. If not, the sound will get louder, which would suggest a potentially hazardous situation for a driver. / Fig No. 4.1 Accident Sensing 4.3 DRUNK AND DRIVE DETECTION AND SPEED CONTROL When a drunk driver operates a vehicle, an alert message is promptly sent to the owner or rescue personnel.

This module's goal is to determine whether the motorist is intoxicated or not. Because, majorly the car was driven by the drivers. Few people were driving independently means by own. As a result, knowing the driver's state will aid the person who is travelling with the driver. / Fig No. 4.2 Drunk and Drive Detection and Speed Control 4.4 USER MODULES New users can register by entering their accurate information on the user registration page, which includes an email address, user name, phone number, etc. A message cannot be displayed until all sections have been filled out by the user. The information is sent to the database when the user clicks the register button after filling out all the forms.

Here, it checks to see if the email address is already in the user table; if it is, an error notice is shown; if not, the data is saved in the user database. Users check the home website to see if all the information is correct. 4.5 DRIVERLEVEL MANAGEMENT The "Alcohol Detection with Vehicle Controlling" feature of this system is mainly used to prevent accidents brought on by drunk driving. The alcohol monitor is connected to the PCB. When the blood alcohol level is higher than the allowed maximum, the car's ignition is turned off. This system needs to be installed in the car. 4.6 MONITORING SYSTEM The sensors in this system are directly facing the driver's face. This system monitors the driver's eyes and uses LED and LDR technology to detect the pulse from their fingers to determine whether they are conscious or asleep. Analyze the sensor data to ascertain the level of fatigue. 4.7 PERFORMANCE EVALUATIONS It's not a new concept to use IoT to identify DUI. There are numerous instances in written works. However, no one tactic has been employed frequently.

Complexity, scalability, and implementation trouble are problems that the various approaches raise. Therefore, in new versions, accuracy, simplicity, and affordability must be preserved. IoT usage creates unique challenges in this field. Although readily available, alcohol content detection sensors are not well integrated inside of cars. Once the alcohol sensor detects alcohol levels above a predetermined range, the alarm is triggered, alerting both the driver's family and the local traffic control. When the alcohol content exceeds 200 mg/L, the engine is switched off. The basic system is built around the simple alcohol monitor.

CHAPTER 5 SYSTEM REQUIREMENTS HARDWARE REQUIREMENTS Ignition Switch (ON/OFF) Vibration sensor MQ3 Alcohol sensor Buzzer Transformer Power Supply Unit Motor Arduino Board LCD display Engine control module 5.2 SOFTWARE REQUIREMENTS Tools: ARDUINO IDE Language: Embedded C App: Blynk

IoT (Mobile App) CHAPTER6 SYSTEM DESIGN Systems design is the process of defining a system's architecture, modules, interfaces, and data to satisfy predetermined standards. You could conceive of systems design as product development that incorporates systems theory. There are some regions of overlap between the disciplines of systems analysis, systems design, and systems engineering. 6.1 ARCHITECTURAL DESIGN The automatic car engine locking system uses alcohol detection. The relay motor driver IC (ULN2003), alcohol detector (MQ-3), and microcontroller are the main parts needed to construct a system. (AT89S52).

The alcohol detection sensor will be linked to our microcontroller. A person's breath is used by the alcohol detection sensor to determine the input for the microcontroller. The sensor's alcohol levels are compared to preset boundaries in the following scenario. If the set limit of alcohol consumption is less than the amount consumed by the individual, the system of activating relay is activated, which in turn activates the automatic lock on the car, halting the motor rotation if it is in a running state or unable to start. At the same time that the engine locks, an automatic buzzer will also play. We can stop accidents by keeping an eye on the drivers who use the roadways. As the system's software was being developed, embedded C software was produced. / Fig No.

6.1 Architectural Design CHAPTER7 SYSTEM IMPLEMENTATION 7.1 HARDWARE REQUIREMENTS The open-source Arduino UNO microcontroller board was developed by the Arduino Company and is based on the Microchip ATmega328P microprocessor. The board's groups of digital and analogue input/output (I/O) pins can be used to connect with a range of expansion boards (shields) and other circuits. The board's 14 digital lines and 6 analogue pins can be programmed using the Arduino IDE (Integrated Development Environment) via a type B - USB connection. / Fig No. 7.1 Arduino UNO Although it can run on voltages between 7 and 20 volts, it can also be powered by a USB connection or an external 9-volt battery. It is similar to both the Arduino nano and the Leonardo.

On the Arduino website, you can download the hardware standard design, which is available under a Creative Commons Attribution Share-Alike 2.5 license. For some hardware variants, layout and production files are also available. The release of Arduino Software 1.0 is denoted by the Italian term "UNO", which means one. Later versions of Arduino were built on top of the UNO hardware and Arduino Software version 1.0. The standard for the platform is the UNO board, the first in a series of USB Arduino boards. The Arduino UNO's ATmega328's pre-programmed boot loader makes it possible to transfer new code to it without the use of an external hardware programmer. It communicates using the dated STK500 protocol. Another way the UNO differs from all previous boards is through the FTDI USB to serial driver chip. As an alternative, an ATmega16U2 that has been set up as a USB to serial converter is used.

GENERAL PIN FUNCTIONS LED:Built-in LED powered by digital port 13 is present. The LED is on when the pin has a HIGH value; it is off when the pin has a LOW value. VIN:The Arduino/Genuine board's input voltage

when using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). This pin can be used to access voltage that has been supplied via the power jack or to give voltage to it. 5V: This pin provides a controlled 5V output from the board's regulator. The board's VIN pin, the USB connector (5V), or the DC power jack (7 to 20V) can all be used to supply electricity to it. (7-20V), bypassing the regulator by supplying power through the 5V or 3.3V wires risks damaging the circuit board.

3V3: An internal regulator-generated 3.3-volt source. A 50-mA maximum power draw is allowed. GND: Ground pins. Reset: Usually applied to shields that obstruct the board's reset mechanism. SPECIAL PIN FUNCTIONS Each of the Uno's 14 digital pins and 6 analogue pins can be used as an input or output by using the pin Mode (), digital Write (), and digital Read () functions. They operate on 5 volts. A 20k Ω 50k ohm internal pull-up resistor is present on each pin and is by default disconnected. Under recommended working conditions, it can send or receive 20 mA. The highest current draw of any I/O pin must not be exceeded to prevent long-term damage to the microcontroller. Each of the six analogue interfaces on the Uno, with the letters A0 through A5, has a resolution of 10 bits.

In addition, some pins have specialized functions: Serial / UART: pins 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB to TTL Serial chip. External Interrupts: pins 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. PWM (Pulse Width Modulation): 3, 5, 6, 9, 10, and 11 Can provide 8-bit PWM output with the analog write () function. SPI (Serial Peripheral Interface): 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library. TWI (Two Wire Interface) / I²C: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library. AREF (Analog Reference): Reference voltage for the analog inputs. 7.4

LCD DISPLAY There are many applications for LCD (Liquid Crystal Display) screens, an electronic display module. A very basic module that is frequently used in many various devices and circuits is a 16x2 LCD monitor. In comparison to multi-segment LEDs with seven segments and other segments, these units are preferred. A 16x2 LCD has 2 lines, each of which can display 16 letters. On this LCD, each character is displayed using a 5x7 pixel grid. This LCD's two registers are the Command and Data registers. An LCD device receives an instruction when someone tells it to do something, like initialize it, clear its screen, move the cursor, control the display, etc. The data register stores the information that will be displayed on the LCD. The data is the ASCII meaning of the character, which will be displayed on the LCD. Learn more about the interior workings of an LCD. / Fig No. 7.2

LCD Display \diamond Pin No Function Name 1 Ground (0V) Ground 2 Supply voltage; 5V (4.7V \diamond 5.3V) Vcc 3 Contrast adjustment; through a variable resistor VEE 4 Selects command register when low; and data register when high Register Select 5 Low to write to the register; High to read from the register Read/write 6 Sends data to data pins when a high to low pulse is given Enable 7 8-bit data pins DB0 8 DB1 9 DB2 10 DB3 11

DB4 12 DB5 13 DB6 14 DB7 15 Backlight VCC (5V) Led+ 16 Backlight Ground (0V) Led- Table
no.7.1 Specification of LCD Display 7.5 POWER SUPPLY An electrical load is supplied with energy by a device known as a power source.

The primary function of a power supply is to transform electric current from a source into the appropriate voltage, current, and frequency to power the application. Power supplies are also referred to as electrical power converters as a result. While some power supplies are separate, stand-alone pieces of machinery, others are integrated into the load appliances they power. Although some power supplies power their loads without wired contacts by using wireless energy transfer, the input and output are typically hardwired circuit connections. Some power supplies have additional inputs and outputs for things like external monitoring and administration. 7.6 STEPS INVOLVED IN POWER SUPPLY Step 1: Circuit Designing 1. Decide the regulator to be used and its input voltage. 2.

Decide the transformer to be used 3. Decide the value of the filter capacitor 4. Decide the PIV (peak inverse voltage) of the diodes to be used. Step 2: Circuit Drawing and Simulation A power source is an electrical circuit that converts ac voltage to dc voltage. Most of its parts consist of transformer, rectifier, filter, and regulator circuits. Power supply units are used by computers, amateur radio transmitters and receivers, and every other piece of electrical equipment that takes dc voltage as an input. An uninterruptible power source is required for computers that periodically store volatile data. By doing this, data degradation due to low voltage and power disruptions is prevented.

The transformer is a static device that transfers electrical energy from the primary winding to the secondary winding without affecting frequency. 7.7 FILTER The ripple component is kept out of the output with the help of the power supply's filter. Its goal is to convert the pulsing DC levels in rectifier circuits into an appropriate steady DC level. The two main types of power source filters are capacitance filters and RC filters. The C-filter is the easiest and least expensive type of filter. To lessen the voltage fluctuation across capacitor filters, RC-filters are an option. Its primary function is to attenuate the AC component of the transmission while primarily transmitting the DC component. 7.8 MQ3- ALCOHOL GAS SENSOR As a gas detecting element, MQ3 Liquor is a low-cost semiconductor sensing element that can identify the presence of alcohol vapor gas at amounts between 0.05 and 10 mg/L.

It has a high sensitivity to alcohol and a deft resilience to disturbances brought on by smoke vapor and gasoline. The sensing element's sensitive material is SnO₂, a substance whose conductivity decreases in pure air. Alcohol vapor gas production will increase, which will improve transmission. The concentration of alcohol sustains the analogue resistive output that the sensing component generates. The motor circuit is extremely straightforward, requiring only a resistance. A simple connection could be a 0-3.3V ADC. The MQ3 alcohol detecting element module has straightforward protocols for working with microcontrollers, Arduino boards, Raspberry Pi, etc. / Fig No. 7.3 MQ 3 Sensor 7.9 MOTOR DRIVE Motor drivers are circuits that

move motors. Consequently, they are commonly used for motor coupling. The selection of a drive circuit depends on the sort and rating of the motor being used, and they are all easy to interface with the motor.

7.10 GEARED DC MOTOR The DC motor, whose Insight specifics have already been explained here, can be viewed of as an extension of geared DC motors. A geared motor is made by coupling a gear system to a DC motor. The strength of a motor is gauged by its revolutions per minute, or RPM. The creation of the gear head and, consequently, the operation of the geared DC motor will be covered in great depth in this insight.

CHAPTER8 HARDWARE &SOFTWARE REQUIREMENTS 8.1 ARDUINO IDE Although the Arduino IDE is extremely simple, it offers a nearly perfect environment for the majority of Arduino-based projects. Standard menu items such as "File" (new, load, save, etc.), "Edit" (font, copy, paste, etc.), "Sketch" (for compiling and programming), "Tools" (useful choices for testing projects), and "Help" are available in the upper menu bar. The simple text interface in the middle of the IDE is where you enter program code.

The output pane, which can be found at the base of the IDE, is where you can see details like memory utilization, compilation status, program errors, and other useful messages. Because programming a microcontroller is somewhat different from writing a computer, there are numerous device-specific tools available. (e.g., changing pin modes, output data on pins, reading analog values, and timers). The Arduino IDE makes use of the Java Platform. Because of this, Java has a wide range of IDEs that make using the language for a particular purpose simpler. Eclipse, however, does not enable the commands and operations that take place on an Arduino board. Therefore, before burning code into the Arduino prototype board, it is modified, compiled, and debugged using the Arduino IDE. 8.2

EMBEDDED C In order to address issues with compatibility between C extensions for different systems, the C Standards Committee created Embedded C as a collection of language extensions for the C programming language. Named address spaces, fixed-point math, and basic I/O hardware addressing are just a few of the elements that are absent from standard C. An add-on for the C programming language called Embedded C facilitates the development of successful apps for embedded hardware. It does not belong to C. Embedded C is one of the most popular and commonly used programming languages when developing embedded systems. An embedded system is best described as having both the required hardware and software to carry out a specific purpose.

CHAPTER9 IMPLEMENTATION OF CODING 9.1Accident.h #include /* LCD RS pin to digital pin 8 * LCD Enable pin to digital pin 9 * LCD D4 pin to digital pin 10 * LCD D5 pin to digital pin 11 * LCD D6 pin to digital pin 12 * LCD D7 pin to digital pin 13 * LCD R/W pin to ground * LCD VSS pin to ground * LCD VCC pin to 5V*/ #include const int rs = 13, en = 12, d4 = 11, d5 = 10, d6 = 9, d7 = 8; int m11=2; // rear motor int m12=3; int m21=4; // front motor int m22=5; int sen=0; void backward() { digitalWrite(m11, HIGH); digitalWrite(m12, LOW); digitalWrite(A3,HIGH); digitalWrite(A4,LOW); } void forward() { digitalWrite(m11, LOW); digitalWrite(m12, HIGH); digitalWrite(A3,LOW); digitalWrite(A4,HIGH); } void Stop() { digitalWrite(m11, LOW); digitalWrite


```
(m12, LOW); digitalWrite(A3,LOW); digitalWrite(A4,LOW); } SoftwareSerialgsm(6,7); LiquidCrystal lcd(rs, en,
d4, d5, d6, d7); void setup() { lcd.begin(16, 2); lcd.setCursor(0,0); lcd.print("SMART ACCIDENT");
lcd.setCursor(0,1); lcd.print("DETECTION"); delay(3000); gsm.begin(9600); Serial.begin(9600); pinMode(m11,
OUTPUT); pinMode(m12, OUTPUT); pinMode(m21, OUTPUT); pinMode(m22, OUTPUT); delay(5000);
deviceInitialise(); } void serialdata() { while(gsm.available()) { Serial.print(gsm.read()); } } void loop()
{ sen=analogRead(A0); Serial.println(sen); delay(1000); if(sen<=900) { Stop(); lcd.clear(); lcd.setCursor(0,0);
lcd.print(♦ACCIDENT♦); lcd.setCursor(0,1); lcd.print(♦DETECTED♦); delay(1000); gsm.println
("AT+HTTTPARA=\"URL\", \"http://www.isquaresoftware.com/hcc/acupdate.php?flag=1\""); delay(5000);
serialData(); gsm.println("AT+HTTTPARA=\"CID\",1"); delay(5000); serialData(); gsm.println
("AT+HTTTPACTION=0"); delay(1000); delay(10000); } // Serial.println(analogRead(A2)); if(analogRead(A5)
<=750) { forward(); delay(1000); } //Serial.println(analogRead(A5)); if(analogRead(A2)<=750) { backward();
delay(1000); } Stop(); } void deviceInitialise() { lcd.clear(); lcd.setCursor(0,0); lcd.print("INITIALISING....");
delay(5000); gsm.println("AT"); delay(10000); serialData(); gsm.println("AT+CGATT=1"); delay(5000);
serialData(); gsm.println("AT+SAPBR=3,1,\"Contype\",\"GPRS\""); delay(5000); serialData(); gsm.println
("AT+SAPBR=3,1,\"APN\", \"internet\""); delay(5000); serialData(); gsm.println("AT+SAPBR=1,1"); delay(5000);
serialData(); gsm.println("AT+SAPBR=2,1"); delay(5000); serialData(); gsm.println("AT+HTTTPINIT"); delay
(5000); serialData(); lcd.setCursor(0,1); lcd.print(" READY TO USE "); } void serialData() { while(gsm.available
()) Serial.write(gsm.read()); } 9.2Alcohol.h #include
```

```
/* LCD RS pin to digital pin 8 * LCD Enable pin to digital pin 9 * LCD D4 pin to digital pin 10 * LCD D5 pin to
digital pin 11 * LCD D6 pin to digital pin 12 * LCD D7 pin to digital pin 13 * LCD R/W pin to ground * LCD VSS
pin to ground * LCD VCC pin to 5V*/ #include const int rs = 13, en = 12, d4 = 11, d5 = 10, d6 = 9, d7 = 8; int
m11=2; // rear motor int m12=3; int m21=4; // front motor int m22=5; int sen=0; void backward() { digitalWrite
(m11, HIGH); digitalWrite(m12, LOW); digitalWrite(A3,HIGH); digitalWrite(A4,LOW); } void forward()
{ digitalWrite(m11, LOW); digitalWrite(m12, HIGH); digitalWrite(A3,LOW); digitalWrite(A4,HIGH); } void Stop()
{ digitalWrite(m11, LOW); digitalWrite(m12, LOW); digitalWrite(A3,LOW); digitalWrite(A4,LOW); }
SoftwareSerialgsm(6,7); LiquidCrystal lcd(rs, en, d4, d5, d6, d7); void setup() { lcd.begin(16, 2); lcd.setCursor
(0,0); lcd.print("SMART ALCOHOL"); lcd.setCursor(0,1); lcd.print("DETECTION"); delay(3000); gsm.begin
(9600); Serial.begin(9600); pinMode(m11, OUTPUT); pinMode(m12, OUTPUT); pinMode(m21, OUTPUT);
pinMode(m22, OUTPUT); delay(5000); deviceInitialise(); } void serialdata() { while(gsm.available())
{ Serial.print(gsm.read()); } } void loop() { sen=analogRead(A0); Serial.println(sen); delay(1000); if(sen>=400)
{ Stop(); lcd.clear(); lcd.setCursor(0,0); lcd.print("DRIVER CONSUMING"); lcd.setCursor(0,1); lcd.print
("ALCOHOL"); delay(1000); gsm.println
("AT+HTTTPARA=\"URL\", \"http://www.isquaresoftware.com/hcc/alupdate.php?flag=1\""); delay(5000);
serialData(); gsm.println("AT+HTTTPARA=\"CID\",1"); delay(5000); serialData(); gsm.println
("AT+HTTTPACTION=0"); delay(1000); delay(10000); } // Serial.println(analogRead(A2)); if(analogRead(A5)
<=750) { forward(); delay(1000); } //Serial.println(analogRead(A5)); if(analogRead(A2)<=750) { backward();
delay(1000); } Stop(); } void deviceInitialise() { lcd.clear(); lcd.setCursor(0,0); lcd.print("INITIALISING....");
```

```

delay(5000); gsm.println("AT"); delay(10000); serialData(); gsm.println("AT+CGATT=1"); delay(5000);
serialData(); gsm.println("AT+SAPBR=3,1,\"Contype1\",\"GPRS\""); delay(5000); serialData(); gsm.println
("AT+SAPBR=3,1,\"APN\",\"internet\""); delay(5000); serialData(); gsm.println("AT+SAPBR=1,1"); delay(5000);
serialData(); gsm.println("AT+SAPBR=2,1"); delay(5000); serialData(); gsm.println("AT+HTTPINIT"); delay
(5000); serialData(); lcd.setCursor(0,1); lcd.print(" READY TO USE "); } void serialData() { while(gsm.available
())!=0) Serial.write(gsm.read()); } CHAPTER10 SCREENSHOTS // Fig No. 10.1

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IGNITION OFF STATE // Fig No.10.2 IGNITION ON STATE // Fig No.10.3 ACCIDENT DETECTED STATE // Fig No.10.4 ALCOHOLDETECTED STATE Fig No. 10.5 ALCOHOL AND ACCIDENT DETECTED STATE CHAPTER11 TESTING 11.1 SYSTEM TESTING System testing is the process of testing a completed, fully integrated software product. Typically, software is just a small part of a larger computer-based system. Software ultimately establishes connections with hardware and other software. System testing is actually a collection of different tests carried out exclusively to put the complete computer-based system to the test. 11.2 UNIT TESTING Unit testing is a type of software testing where individual software components are assessed. Verifying that each piece of software performs as designed is the aim. A unit is the lowest testable portion of any program. Typically, it has one output and one or more inputs. In procedural programming, a specific program, function, process, etc.

can all be regarded as units. An object-oriented method, which can be found in a super class, abstract class, or child class, is the simplest building block in an object-oriented program. The use of frameworks, drivers, prototypes, and fictitious items helps unit testing. 11.3 INTEGRATION TESTING Integration testing is the stage of software development where different software components are combined and tested as a whole. This level of testing aims to find problems with the interactions between integrated components. Test drivers and test proxies are helpful for integration testing. In the integration testing phase of software testing, different software modules are combined and assessed simultaneously. Integration testing is performed to see if a system or component satisfies a set of practical requirements.

Between unit testing and assurance testing, it happens. By using modules that have completed some of the unit testing and integration testing in a test plan as inputs, integration testing aims to create an integrated system that is prepared for system testing. CHAPTER 12 CONCLUSION & FUTURE WORK In comparison to the current systems, the proposed approach is significantly more dependable and may be more efficient. In proposed system we are able to detect accident normally also the accident happened because of consuming alcohol. When the Alcohol is detected the engine speed will be reduced automatically.

The key benefit of this research is that, it allows us to prevent the over speed during intoxicated. In the future, we planned to implement in a real time basis, also with the help of GSM and GPRS we sent an alert message and current locations to the rescue team or relatives. CHAPTER 13 REFERENCES [1] Nikhlesh Pathik, Rajeev Kumar Gupta, Yatendra Sahu ♦AI Enabled Accident Detection and Alert System Using IoT and Deep

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