

# Accident Prevention System using IOT for Car Safety

**Prof. Gaurav Vijay Barde<sup>1</sup>, Atharva Khandu Wagh<sup>2</sup>, Parth Rajendra Avhad<sup>3</sup>,  
Kartik Bhanudas Karvande<sup>4</sup> and Kedar Sitaram Hadke<sup>5</sup>**

Professor, Department of Computer Engineering<sup>1</sup>

Students, Department of Computer Engineering<sup>2,3,4,5</sup>

Loknete Gopinathji Munde Institute of Engineering and Research Center, Nashik, India

**Abstract:** Car accidents truly can be considered as one of the most disastrous phenomena. Though the reasons can be different for those accidents like the main problem can be driver's unawareness as well as speed. With the help of IoT we can try to prevent as well as reduce the number of accidents. IoT (Internet of things), is one of the most growing technology in IT industries and is used to decrease the burden of human beings. With the help of IoT we are creating a solution for the accident prevention. This is an intention to implement an innovative solution for this problem by developing An Accident Prevention System Using IOT for Car Safety.

In this project, we are developing a system which will monitor and help to reduce those accidents. This paper discusses the process of developing a accident prevention system. With the growing population the use of car as became superfluous and this has led to increase in the number of accidents at the alarm rate. This project aims at preventing the accident. In this project, we first applied Eclat algorithm to group the crime locations into 0 level, 1 level, 2 level accident location. Eclat algorithm takes accident level count as a factor to cluster the locations. Then we will use association rule mining to identify these locations. The rules show different factors associated with road Accident at different locations. For all this we will provide Accident data that are issue from Transport Ministry Officer. Safety driving suggestions will be marked based on Accident data. This idea is designed based on Arduino Microcontroller board and helps in controlling accidents. The system will also notify you if a driver has been that the speed limit has been exceeded then it is indicated through buzzer and displays on LCD. When accelerometer is triggered, it helps in detecting the accident and sending the signal to the Arduino of the system. The GPS technology is used to locate the position of the car in the form of latitude and longitude coordinates. So that police can trace the location through the GPS modem and necessary action will be taken. This idea is useful in preventing the accidents.

**Keywords:** Eclat algorithm, Clustering, Classification, GPS tracking, Accident.

## I. INTRODUCTION

The number of deaths due to traffic accidents is very high. Looking at the number of deaths and injuries due to road traffic accidents shows the global crisis of road safety. Nearly 1.3 million people are killed every year and about 50 million injured worldwide due to road accidents, which averages to 3,287 lives lost every day. More than 50 percent of road traffic deaths affect young adults between the age of 15-44. Around 400,000 individuals under the age of 25 dies in road traffic accidents every year. Even in countries with very good road safety measures, the number of road accident deaths is getting higher every year. More than 90% of road traffic deaths occur in middle-income countries. In low-income countries the figure is even higher. In India, the World Health Organization (WHO) has revealed in its first ever Global Status Report on Road Safety that more people die in road accidents in India than anywhere else in the world, including the more populous China. Calling road fatalities an "epidemic" that will become the world's fifth biggest killer by 2030, the report said while rich nations had been able to lower their death rates, these were sharply on the rise in the third world. It said 90% of deaths on the world's roads occur in low and middle-income countries (21.5 and 19.5 per lakh of population, respectively)

though they have just 48% of all registered vehicles. The statistics for India are chilling. At least 13 people die every hour in road accidents in the country, the latest report of the National Crime Records Bureau reveals. However, road safety experts say the real numbers could be higher since many of these accident cases are not even reported. "There is no estimate of how many injured in road accidents die a few hours or days after the accident," points out RohitBaluja, member of the UN Road Safety Collaboration and Commission of Global Road Safety representing Asia. Based on the records, India will become the world number 1 in Road Deaths due to the poor record of average 13 die every hour, which is 1.14 lakh per year. This will make India to be the first place. This causative information about the accidents is the intent to develop the proposed technology as scientific traffic engineering wings to reduce the fatalities due to accidents. This proposed methodology is the automatic system which will provide the solution for identifying the accident location. Nowadays accidents are increasing at an alarming rate. Speed is the cause of most number of traffic accidents. In this project, we first applied Eclat algorithm to group the crime locations into 0 level, 1 level, 2 level accident location. Eclat algorithm takes accident level count as a factor to cluster the locations. Then we will use association rule mining to identify these locations. The rules show different factors associated with road Accident at different locations. For all this we will provide Accident data that are issue from Transport Ministry Officer. Safety driving suggestions will be marked based on Accident data. This idea is designed based on Arduino Microcontroller board and helps in controlling accidents. The system will also notify you if a driver has been that the speed limit has been exceeded then it is indicated through buzzer and displays on LCD. When accelerometer is triggered, it helps in detecting the accident and sending the signal to the Arduino of the system. The GPS technology is used to locate the position of the car in the form of latitude and longitude coordinates. So that police can trace the location through the GPS modem and necessary action will be taken. This idea is useful in preventing the accidents. This will help to reach the family members and friends service in time and save the valuable human life.

### 1.1 OBJECTIVE & SCOPE OF PROPOSED SYSTEM

- Workplace safety: Accident prevention systems are often implemented to ensure the safety of workers in industries such as manufacturing, construction, mining, or oil and gas. This can include measures to prevent falls from heights, machinery accidents, hazardous material exposures, and other workplace risks.
- Road safety: Implementing accident prevention systems on roads can involve measures such as traffic rules enforcement, speed control initiatives like speed cameras or speed limits, driver education programs focused on safe driving practices, vehicle inspections and maintenance guidelines.
- Public spaces: Accident prevention systems may also focus on ensuring the safety of people in public spaces such as parks, shopping malls or transportation hubs. This may include implementing security measures like CCTV cameras for surveillance purposes and procedures for crowd management to avoid stampedes or overcrowding.
- Healthcare settings: Hospitals and healthcare facilities implement accident prevention systems to reduce the risk of patient harm during medical procedures or due to infections acquired while receiving care.
- Schools and educational institutions: Accident prevention systems at schools aim to protect students from various hazards within school premises including playground injuries due to faulty equipment or unsafe structures.
- Environmental hazards: Accident preventive measures can be implemented for natural disasters like earthquakes or floods in order to save lives by providing early warning signs & disaster mitigation plans.

### 1.2 FEATURES OF PROJECT

- To build an excessive speed indication system and warning alert system.
- To provide an accident prevention system condition monitoring system using GPS and maps.
- To provide location tracking using Google map plotting.
- To study scientific analysis of traffic data.
- To find out frequent accident location on road.

- To Reduce the Human Death Ratio due to Road Accident in India.
- If accident takes place, quick transmission of message to preconfigured contacts to intimate the victims.
- The main objective is to minimize the accidents response time when an accident occurs and the time emergency responders reach the accident seen in reducing human deaths due to the road accidents.
- To provide location tracking using Google map plotting.
- To provide security to the system which is placed inside the car .
- This uses IOT technology to store and visualize the data.
- These systems are designed to prevent accidents before they happen, by alerting drivers to potential hazards and taking proactive measures to avoid collisions

## II. LITERATURE REVIEW

Sadhana B have explained Smart helmet intelligent safety for motorcyclist using raspberry pi and open CV. The idea is obtained after knowing that there is increased number of fatal road accidents over the years. This project is designed to introduce safety systems for the motorcyclist to wear the helmet properly[1].

Sarika R. Gujar explained advanced Embedded System of Vehicle Accident Detection and Tracking System. The main objective of this system is to first detect the accident location and call for the emergency services. Vehicle accident detection is possible with the help of sensors. A GPS and GSM module helps to trace the vehicle[2].

Mohd Khairul Amri Kamarudin has established, "Smart Helmet with Sensors for Accident Prevention. This paper provides an intelligent system for two wheeler accident prevention and detection for human life safety. The prevention part involves, Smart Helmet, which automatically checks whether the person is wearing the helmet and has non-alcoholic breath while driving[3].

Vijay J, Saritha B, Priyadarshini B, Deepika S and Laxmi R (2011) has established, "Drunken Drive Protection System". International Journal of Scientific & Engineering Research. This system efficiently checks the wearing of helmet and drunken driving. By implementing this system a safe two wheeler journey is possible which would decrease the head injuries during accidents and also reduce the accidents due to drunken driving. An intelligent system has been embedded in the helmet itself [4].

Harish Chandra Mohanta, Rajat Kumar Mahapatra and Jyotirmayee Muduli(2014), " Anti-Theft Mechanism System with Accidental Avoidance and Cabin Safety System for Automobiles". An anti-theft system is any device or method used to prevent or detect the unauthorized appropriation of items considered valuable. Theft is one of the most common and oldest criminal behaviors [5].

Sudarsan K and Kumaraguru Diderot P (2014), "Helmet for Road Hazard Warning with Wireless Bike Authentication and Traffic Adaptive Mp3 Playback". Helmet for road hazard warning is designed with wireless bike authentication and traffic adaptive mp3 playback. The main aim of this project is to encourage people to wear helmet and prevent road accidents, which is achieved. Thus road accidents can be prevented to some extent and safety of bike riders is ensured [6].

Safety measures for "Two wheelers by Smart Helmet and Four wheelers by Vehicular Communication", The small voltage of ignition of the two wheelers is grounded. In normal condition when the helmet is wearied the pressure is senses pressure and the RF transmitter radiates the FM modulated signal [7].

Nitin Agarwal Anshul Kumar Singh, Pushpendra Pratap Singh, Rajesh Sahani, "SMART HELMET", International Research Journal of Engineering and Technology, volume 2, issue 2, May 2015, " Next generation motor cycle helmet with sound control and 360 degree vision that will transform your ride. The cross helmet X1 is a revolutionary motor cycle helmet that will transform your ride [8].

D Kumar, S Gupta, S.Kumar, S.Srivastava "Accident detection and reporting system using GPS and GSM module", It aims at finding the occurrence of any accident and reporting the location of the accident to the previously coded numbers so that immediate help can be provided by ambulance or the relative concerned.. Jennifer William, Kaustubh Padwal, Nexon Samuel, Akshay Bawkar Smita Rukhande, "Intelligent Helmet", The intelligent helmet band is an idea which makes motor cycle driving safer than before. This is implemented using GSM and GPS technology. Limit switch is placed in the helmet which will detect whether the rider has worn the helmet or not. If not the bike will not start [9].

C. The paper titled “An IoT Based Accident Prevention & Tracking System for Night Drivers.” stated that This paper presents an internet-based system entitled ‘Eye Blink and head movement watching System’, which is able to facilitate drivers to alert in somnolence. This method is predicated on the principle of watching eye movements of the driver unendingly using an IR sensing element and head movement using an accelerometer. If he/she falls asleep, then an alarm can ring to wake him/her up[10].

**III. REPRESENTATION OF THE METHODOLOGY**

The main elements of the prototype model of an Accident prevention system using IOT for car safety messaging are GSM module and Arduino UNO. The working of this model will be made in Accelerometer: It is used to measure speed of vehicle. If there is any change in the acceleration and beyond the threshold value. The Microcontroller of the hardware gets activated and at the same time, GPS module is triggered ON. It detects the latitude and longitudinal position of the car. GPS means Global Positioning System. It is used to get the longitude and latitude to find the exact location. We have used a GPS. It has high sensitivity for the various indoor applications, which makes it more reliable to use. The latitude and longitude position of the car is sent as a message through the Global System for Mobile Communication(GSM)to the pre-saved numbers. This is used to send exact accident location via SMS. When High Speed is detected system will display message on LCD to inform driver about the speed of vehicle. If speed is high then buzzer will be ON else the buzzer will be OFF.

**IV. PROPOSED SYSTEM ARCHITECTURE**

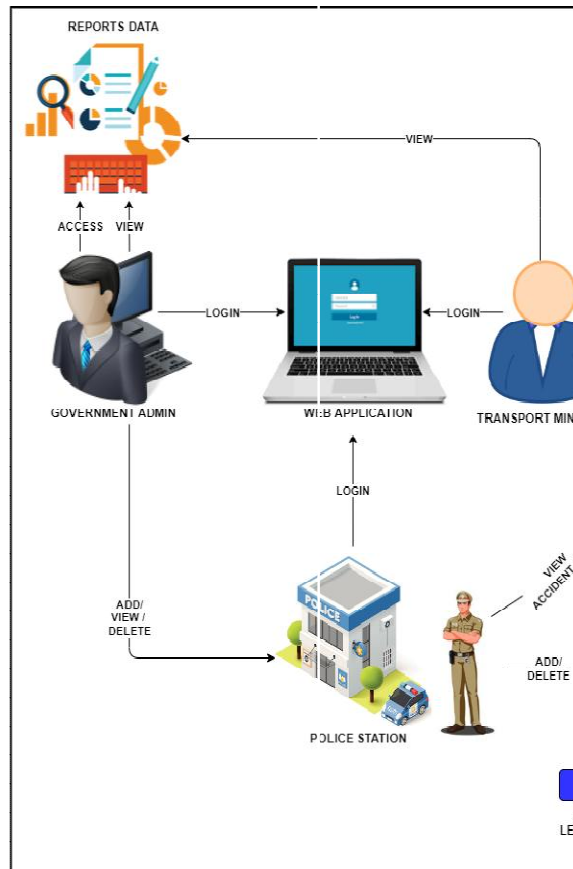


Figure: Proposed System Architecture

#### **V. ADVANTAGES**

- Avoid accident on roads.
- Saves thousands of lives.
- Easily implementable to the existing roads.
- Fully automated (No person is required to operate).
- Installation cost is very less.
- Car monitoring systems can be implemented easily.
- Avoids the life loss in accidents.
- Provides quick security for patients.
- Provides security for vehicles.
- Alerts the driver from damage.
- Reduces loss of life & property.
- Easy to communicate.
- Efficient and saves time, money.
- GPS exact location of the Car can be traced on MAP.

#### **VI. APPLICATION AREAS**

- Automotive and transport vehicles
- Security, remote monitoring and transportation and logistics
- This system also can be interfaced with vehicle alerting system
- This system can be used on highways
- Exchange messages wirelessly
- Distance measurement
- Automatic speed control
- Automobiles
- Security Guard Cabins
- Operators at nuclear power plants where continuous monitoring is necessary
- Pilots of airplane
- Military application where high intensity monitoring of soldier is needed

#### **VII. HARDWARE REQUIREMENTS**

- Processor – i3
- Hard Disk – 5 GB
- Memory – 1GB RAM
- Arduino UNO
- Buzzer
- LCD
- Accelerometer
- SOFTWARE REQUIREMENTS
- Operating System: Windows XP and later
- Database: MySQL
- Font End: HTML,CSS,JS
- Programming Language: Java
- Algorithm: Eclat



### **VIII. TEST DATA REQUIREMENTS**

#### **Unit Testing:**

Unit testing, also known as component testing refers to tests that verify the functionality of a specific section of code, usually at the function level. In an object-oriented environment, this is usually at the class level, and the minimal unit tests include the constructors and destructors. These types of tests are usually written by developers as they work on code (white-box style), to ensure that the specific function is working as expected. One function might have multiple tests, to catch corner cases or other branches in the code. Unit testing alone cannot verify the functionality of a piece of software, but rather is used to assure that the building blocks the software uses work independently of each other. In our project we will test following modules separately.

#### **Integration Testing:**

Integration testing is any type of software testing that seeks to verify the interfaces between components against a software design. Software components may be integrated in an iterative way or altogether. Normally the former is considered a better practice since it allows interface issues to be localized more quickly and fixed. Integration testing works to expose defects in the interfaces and interaction between integrated components (modules). Progressively larger groups of tested software components corresponding to elements of the architectural design are integrated and tested until the software works as a system.

### **IX. CONCLUSION**

We have proposed system for accident prevention and making the world a much better and safe place to live. The outcome of the project is basically has two applications. One is to prevent and control the vehicle from the accidental situations. Second is to detect the accident occurred area, which is helpful to track and rescue. The proposed system is developed to provide the information about the accident occur and the location of the accident .It helps to easily provide the assistant and help to the victim of the accident. This system uses GPS module to locate the vehicle. GSM is used to provide the information of accident. The results of the proposed systems are satisfactory. Main motto of the accident prevent system project is to decrease the chances of losing life in such accident which we can't stop from occurring. Whenever accident is alerted, the paramedics are reached to the particular location to increase the chances of life. Thus this work ensures the reduction of death ratio and fatalities in the country like India and also which will have a greater importance in day to day life.

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