

# SMART ACCIDENT DETECTION SYSTEM USING IoT

**Er. Jagannath Ray.** Faculty at Gandhi Institute For Technology, Bhubaneswar (Affiliated To Biju Patnaik University of Technology).

**Saroj Moharana (1801298303),** Department of computer science, Gandhi Institute For Technology, Bhubaneswar (Affiliated To Biju Patnaik University of Technology)

**Jyotiprakash Mallick (1801298160),** Department of computer science, Gandhi Institute For Technology, Bhubaneswar (Affiliated To Biju Patnaik University of Technology)

**Jayaprakash Rout (1801298158),** Department of computer science, Gandhi Institute For Technology, Bhubaneswar (Affiliated To Biju Patnaik University of Technology)

## Abstract:

The paper explains how dynamic traffic circumstances on roadways in everyday life are causing a rise in accidents. We presented an IoT and cloud-based accident detection system paradigm. We propose a model for accident detection in this scenario, which will illustrate crash avoidance and braking systems for Adhoc vehicle networks such as the intelligent transportation System, which focuses on road safety and communication between on-road cars. The use of GPS and WIFI in an IoT-based vehicle accident detection system has gained traction. When an accident occurs, this technology sends a short message to a cellphone number's WhatsApp account through Wi-Fi across the internet. The location of the accident can be established using these values.

**Keywords-** Micro-controller, GPS, Vibration Sensor, WiFi, c language.

## INTRODUCTION:

The construction of a transportation system has been the driving force behind humankind's rise to the highest level of civilization among all creatures on the planet. Automobiles play a significant role in our daily lives. We use it to get to work, communicate with friends and family, and deliver our packages. However, it has the potential to cause us harm and even death through accidents. One of the most essential and fundamental risk factors in driving is speed. It has an impact not just on the severity of a crash, but also on the likelihood of being engaged in one.

Despite the numerous efforts made by various governmental and non-governmental groups all over the world through various initiatives to raise awareness about the dangers of irresponsible driving, accidents still occur on a regular basis. However, if the emergency services had received the collision information sooner, many lives could have been saved. As a result, effective automatic accident detection with automatic notification of the accident location to emergency services is a critical

requirement for saving precious human life. This seminar proposes to use a GPS receiver's capabilities to monitor a vehicle's speed, detect an accident based on the monitored speed, and report the position and time of the accident to the Alert Service Centre through the GSM network.

Automobiles are necessary for getting to work, visiting family and friends, and delivering things. However, they frequently pave the path for major tragedies. According to Wikipedia, an accident is an unanticipated and unplanned event or circumstance that occurs without aim or need. Road accidents are the most dreaded thing that can happen to a driver, despite the fact that they occur frequently. The worst part is that we do not learn from our blunders on the road. The majority of road users are aware of

the general guidelines and safety precautions to take when using roads, however it is only road users' negligence that results in accidents and wrecks.

### LITERATURE SURVEY

Many researchers have investigated accident detection systems. For night drivers, Aishwarya S.R presented an IoT-based vehicle accident prevention and tracking system. This research presents the Eye Blink Monitoring System (EBM), which warns the subject when they are drowsy. [1] Sadhana B used Raspberry Pi to demonstrate Smart Helmet-Intelligent Safety for Motorcyclists. After learning that the frequency of deadly traffic accidents has increased over time, the concept was born. This initiative aims to provide safety systems that allow motorcyclists to correctly wear their helmets. [2] Sarika R. Gujar discussed the sophisticated Embedded Vehicle Accident Detection and Tracking System. The basic goal of this method is to first locate the accident and then summon emergency responders.

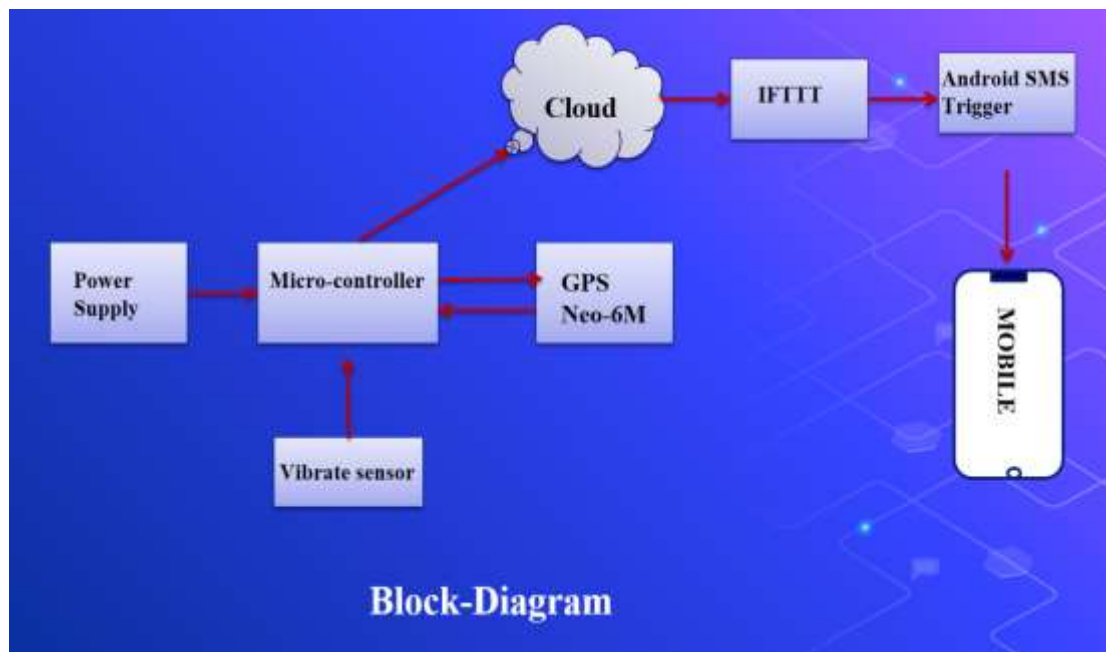
With the use of sensors, it is possible to identify vehicle accidents. The vehicle may be tracked with the use of a GPS and GSM module.

[3] Shailesh Bhavthankar explained how to use an accelerometer and GPS to create a wireless system for detecting and reporting vehicle accidents. In this study, an accelerometer sensor is utilised to detect a collision, and GPS is used to determine the vehicle's location. In the event of an accident, the system will send an automatic message through GSM to a pre-programmed number, such as a family member's phone number or emergency medical services. [4] The Raspberry Pi-based smart home was explained by Jagdish A.Patel. This paper intends to create a basic home automation application on the Raspberry Pi using an interfacing camera for security purposes, with the algorithm being written in the Python environment, which is the default programming environment given by the Raspberry Pi.

### BLOCK DIAGRAM

The block diagram of the proposed system consist of the following components: Micro-controller, vibration sensor , GPS Module , power supply.

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#### A. Micro-controller

A micro-controller (MCU for micro-controller unit) is a miniature computer built on a single MOS integrated circuit (IC) chip. A micro-controller is a computer that contains one or more CPU'S (processor cores), memory, and programmable input/output peripherals. A tiny amount of RAM, as well as programme memory in the form of ferro electric RAM, NOR flash, or OTP ROM, is frequently provided on chip. Micro-controllers, in contrast to the microprocessors found in personal computers and other general-purpose applications, are developed for embedded applications and consist of a number of discrete chips.



#### Vibrate sensor

Vibration sensors detect vibration using piezoelectric accelerometer. They're utilized to quantify variable accelerations or speeds, as well as typical vibrations. Process control systems, aerial navigation, and undersea applications are examples of applications where vibration sensors are used.

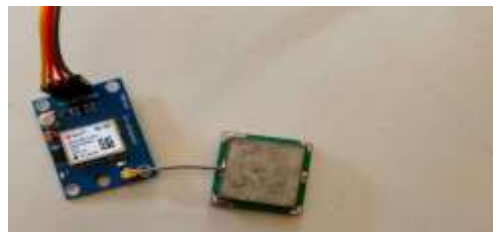
This vibration sensor sense the vibration of the helmet when it falls down during the accident, then it sends the signal to the Node MCU which then sends the message to the given number by IFTTT.



### C. GPS

The Global Positioning System (GPS) is a satellite-based navigation system that gives information on location and time. A GPS receiver determines its location by accurately timing the signal received by a GPS satellite. GPS receivers are now widely used and have become a vital feature of smart phones. It has a supply range of 3.2 to 5 volts, allowing it to interface with both 3.3 and 5 volt micro controllers. Each message string begins with the letter '\$,' followed by the message identification.

The Department of Defense of the United States created the Global Positioning System. It transmits precise microwave communications using between 24 and 32 Medium Earth Orbit satellites. GPS receivers can use this information to establish their current location, time, and velocity. The United States Air Force maintains the GPS satellites. a car or in densely populated places The amount of time it takes to get a GPS lock depends on how the GPS receiver starts.



### D.WIFI

A WiFi network is essentially a wireless router that shares an internet connection with multiple devices in a home or business. The router is a hub that connects directly to your internet modem and broadcasts the internet signal to all of your Wi-Fi enabled devices. You'll be able to stay connected to the internet as long as you're within your network's coverage region.

### E.C LANGUAGE:-

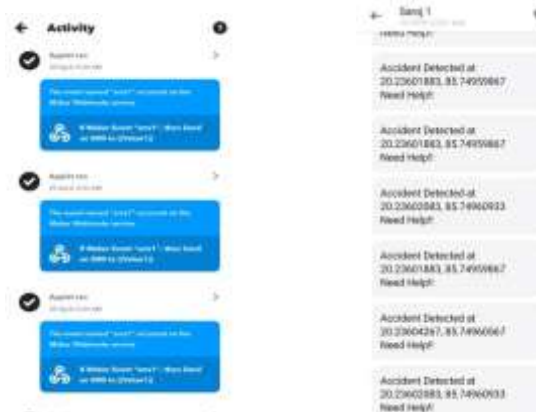
C is a widely used, easy-to-learn and-use general-purpose computer language. It's a machine-independent structured programming language that's commonly used to develop a wide range of apps, operating systems like Windows, and other complex programmes like the Oracle database, Git, and Python interpreter, among others. The programming language C is said to be used by gods. C is a computer language that can be thought of as a foundation. If you know 'C,' you can easily comprehend knowledge of other programming languages that use the concept of 'C.' It's critical to have a firm grasp on computer memory systems while dealing with the C programming language.

## F. ARDUINO IDE: -

The Arduino Integrated Development Environment (IDE) is a cross-platform application written in C, C++, and Java functions. It's used to write and upload programmes to Arduino-compatible boards, as well as other vendor development boards with the support of third-party cores. The Arduino IDE is a free and open-source programme for developing and compiling code into Arduino is a microcontroller module. It is official Arduino software that makes code compilation so simple that even a non-technical person may get their feet wet with the learning process. The Arduino IDE can be downloaded from the Arduino Software website. Make sure you get the right version for your computer. Double-click the Arduino IDE.zip file in the location where it is stored to open the archive. This will unzip the Arduino application from the Downloads folder.



## OUTPUT



#### IV. ADVANTAGES

- -We can track down the vehicle's position.
- For distant information, send an alert message to a mobile phone.
- It is possible to change your phone number at any moment.

#### D. LIMITATIONS

- Expenses are higher, and data transmission is not secure.
- The technology is ineffective in areas with inadequate network connections.

#### VII. APPLICATIONS

- Automobiles and transport vehicles, as well as security, remote monitoring, and transportation and logistics, are all covered.
- The system can also be linked to a vehicle alerting system.

#### VII. CONCLUSION

One of the most common reasons of an accident is speed. In today's world, a GPS receiver is an essential component of any car. Aside from being useful for various things, the GPS can also be used to track speed and detect accidents. It can convey the accident location to the alert service centre using a relatively inexpensive and widely used GSM modem. It can also communicate the last speed before the accident, which will aid in determining the severity of the collision, as well as initiate a voice call. Aside from the automatic detection system, the person of the car will be able to send a manual message.

By activating the manual detection switch, you can have a better understanding of the accident circumstances. Many lives can be saved if rescue procedures are taken in a timely manner with enough preparedness at the appropriate location. As a result, the purposed mechanism can greatly benefit humanity, as human life is extremely valued.

#### IX. FUTURE SCOPE

The purposed system is in charge of accident detection. This can be further enhanced by administering medication to accident victims on the scene. We can also avoid accidents by boosting technology by offering alert systems that can stop the car to avoid an accident.

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