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IOT based Automatic Vehicle Speed Controlling and Accident Alert System

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ABSTRACT

Car accident tracking systems have gained popularity due to an increase in occurrences. Vehicle thefts often occur when parked or driving in unsecured areas. This study examines measures to avoid car theft and improve security to reduce accidents. This project outlines accident detection methods and future potential. Increased traffic and careless driving cause many highway accidents today. Family members, EMS, and police are often not notified promptly. Accident victims receive delayed aid. Most mishaps involve cars. The research aims to locate the vehicle using an onboard system. We won't be able to locate the accident site if we don't know where it will occur. GSM-based Real-Time Vehicle Detection and Accident Recognition tries to avoid such mishaps.

Key Words: Vehicle Detection and Accident Recognition, GSM, GPS, Vibration sensor, speeding controlling, MEMS sensor.

1. INTRODUCTION

The rising demand for autos has also resulted in an increase in traffic risks and the frequency of accidents on the roads. There is a big danger to the people's lives. This is due to the fact that our country lacks access to the most advanced emergency facilities available. This concept is for a system that can identify accidents in a fraction of the time it takes to discover them and communicate the necessary information to a first-aid centre in a matter of seconds. Geographic location, time, and the angle at which a car collision happened are all included in the data sent. In a short amount of time, this essential communication will be delivered to the search and rescue team, assisting in the successful attempt to save the priceless lives. When an accident occurs, a notification to the police station and the emergency response team is sent out right away. The GSM module is used to send the message, and the GPS module is utilised to pinpoint the exact site of the accident. It is feasible to identify the accident with pinpoint accuracy using both micro electro mechanical system (MEMS) sensors. The message received by the MEMS sensor can additionally include information about the angle at which the car is rolling over. This programme provides the greatest and most practical answer to the problem of insufficient medical services in the event of a road accident.

The initial inspiration for this project came from an ideology proposed by Hu Jian-ming,Li Jie, Li proposed a mechanism for recovering stolen vehicles. The system ensured a higher level of security and credibility. A vibration sensor and a C8051F120 microprocessor were used. Through GSM, the vehicle owner receives messages on the vehicle's location at predetermined intervals. Later T. Krishna Kishore emphasis was on a cost-effective system that also incorporates the modern internet facility for networking needs. The General Packet Radio Service was used in conjunction with the Linux operating system (GPRS). More precise identification of the vehicle's location at all times, data transfer ease, and freedom from software monitoring are only a few of the improvements. Finally I have learn some techniques from NiravThakor proposed Automatic Vehicle Accident Detection System Based on ARM & GPS was presented. The system uses a vibration sensor or a MEMS sensor to detect a car accident. The location of the automobile accident was acquired by the GPS module, and a message was sent through GSM modem. Another feature is available, which might be quite useful during times of crisis. If a person requires assistance for other reasons, such as heart attack symptoms.

Following a thorough examination of the papers and a step-by-step review of the results, the technologies were finalised as follows.

VIBRATION SENSOR

Piezoelectric sensors detect vibration. These bendable sensors can measure several processes. This sensor measures acceleration, pressure, temperature, force, and strain by transforming them into an electrical charge. By measuring capacitance and quality, this sensor can detect airborne smells.

MEMS

Micro-electromechanical systems (MEMS) These small devices are uniquely developed. 1-100 micrometre components make up these sensors. These may be small structures or massive electromechanical systems with many moving parts. A single package usually incorporates microsensors, microelectronics, microstructures, and microactuators**.**

IOT

The Iot technology refers to devices that have been assigned an Internet address and may collect and send data over a network without the intervention of a human. The car is the system's object, and its location coordinates are stored in a database over the internet.

2. EXISITING SYSTEM

Road accidents are tragic. They cause human pain and monetary losses through early deaths, injuries, and income. Despite new procedures like Antilock Braking System (ABS), Adaptive Cruise Control (ACC), and Anti Collision System (ACS) to avoid accidents, a high number still occur. This project proposes a mechanism for quickly providing medical care and other facilities following an accident.

There are delays and mistakes due to the witness's expressive problems

Fig.1: Existing method (Source: iot-based-automatic-vehicle-accident-and-rash-driving-alert-system)

We decided that these drawbacks would be our goals, and we were successful in achieving them by consulting a large number of references and the ideology presented in a large number of journals. Additionally, we implemented a speed controlling technique in order to cut down on the number of accidents that occurred by making use of a potentiometer and a motor driver component.

3. PROPOSED SYSTEM

Through this, we were able to integrate Arduino with MEMS sensors in addition to vibration sensors. An accident was likely the cause of the MEMS toppling over or being shaken about, as these are both indicators that one may have occurred. After that, the GPS will utilise the GSM to track the location, and it will transmit updates to the number that was specified in the programme. After that, the software will be installed. In the event that the brake is not functioning correctly, the person can slow the vehicle down by pressing the switch. Because of this, the speed of the car will gradually drop. By modifying the setting on this potentiometer, which functions as the speed control mechanism for the vehicle, we are able to either have the automobile go slower or go faster.

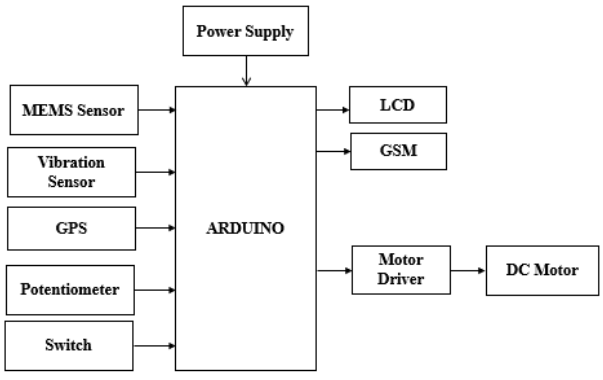

Fig.2: System block diagram

The sensors used to identify accidents are MEMS and vibration sensors. For the user's convenience, a push button is supplied to control the vehicle speed.

4. WORKING AND PRINCIPLE OF SYSTEM

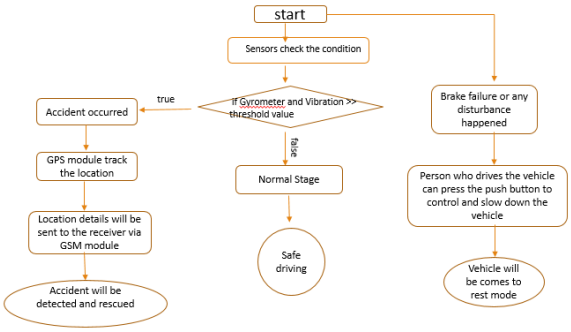

Fig.3: Flowchart of system

4.1. Detecting Accident:

Using this framework, the first thing that is done is a check on the current status of the gyrometer and the vibration sensor. When the vibration sensor reaches the threshold value, this indicates that there has been an accident. If the vibration sensor does not approach the threshold value, the stage will be regarded normal, and the vehicle can be driven without danger.

4.2. Vehicle monitoring and Accident notification:

The first thing that is done while utilising this framework is a check on the current state of the gyrometer and the vibration sensor. When the vibration sensor exceeds the value that constitutes a threshold, this signals that there has been a collision. If the vibration sensor does not come close to reaching the threshold value, the stage will be considered normal, and there will be no risk to the driver while operating the car.

4.3. Controlling the speed:

When driving, if the car's brakes fail or if there is a disturbance, the driver can press the button to control and slow down the vehicle, and then the vehicle can come to a halt, thereby preventing accidents. This is one way that we can reduce the number of accidents that occur.

5. RESULTS

Fig.4: This is a prototype of the proposed system, which comprises sensors and other pieces of hardware equipment to detect an accident and to manage the vehicle's speed. A message will also be sent to the rescue crew, the hospital, or family members by the system.

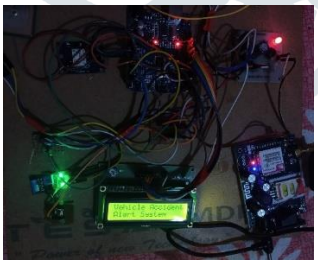

Fig.5: After the power supply has been connected, this is the Prototype of the system that is being suggested. It greets the user with the VEHICLE ACCIDENT ALERT SYSTEM displayed on the screen. Initially, sensors monitor the status of the device; if an accident happens, the gadget sends a message; otherwise, it continues functioning normally.

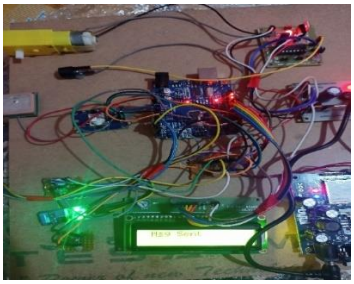

Fig.6: It is the step that happens when the Vehicle is involved in an accident. The mems and vibration sensor calculate the values, and if those values meet the threshold value that we set in the database, then the device sends the message to the respective phone number using the GSM module.

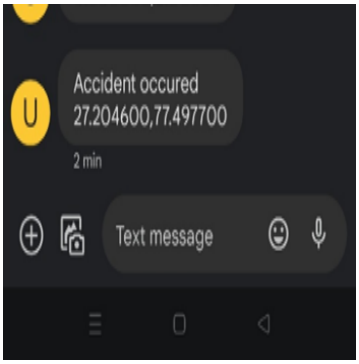

Fig.7: As soon as the vehicle is involved in an accident, the GPS will determine the accident's location, including its latitude and longitude, and thenIt will send this information to the right phone number with the assistance of the GSM module. This is shown in the above figure .

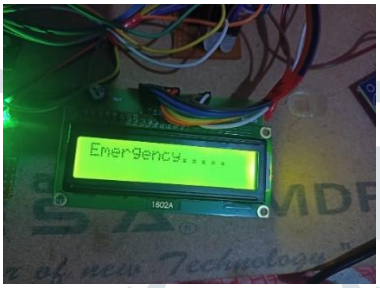

Fig.8: When a rider or driver becomes unconscious or the vehicle's brakes fail, the rider or driver can hit the emergency push button to regulate the vehicle's speed. After a short period of time, the vehicle will come to a stop, preventing accidents.

6. CONCLUSION AND FUTURE SCOPE

The goal of this project is to detect and prevent system failures. Data on accidents is available from a database. An alarm message is delivered to one of the contact people in the event of an accident. As well as a nearby hospital and police station, along with the location of the accident. An accident occurs when a message is sent over the GSM network. In real-world applications, the scheme was tested with automobiles. The test results will not trigger a false alert.

A wireless webcam can be added to this to capture images that can be used to provide driver assistance. This can also be improved by automatically locking all of the brakes in the event of an accident.

A wireless webcam (placed in the back of the car) can be connected to the system to gather photos for driver assistance.

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