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Vehicle Accident Detection and Emergency Alert System

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Abstract: In recent years' injuries due to accidents are among the leading causes of hospitalization in humans, often resulting in a rapid decline in functionality and death. Rapid response can improve the patient's outcome, but this is often lacking when the injured person meets with a huge accident and the nature of the injury complicates calling for help. The lack of efficient accident detection and help management system that will help in times of need. One common scenario during accidents is that the activity of rescue and relief is not well-coordinated.

For this reason, there is a need for a system that will help in the efficient provision of rescue and relief to accident affected people after increasing the chances of life. So in our project we are going to develop a system which will try to prevent and manage accidents with various sensors and an Arduino kit.

The data will continuously have transmitted to the Android Phone of the driver. The phone will give instructions to avoid accidents. If then also an accident occurs the kit will send an alert to Android application of driver which in return will send location updates of the accident to concerned authorities for rescue work and to the nearest hospital. The Concerned authority will then track the rescue work.

The location and alert system will be sent to the cloud at real time which will help monitor the accident at real time with the help of a desktop application and Google Maps. The data on the cloud will be secured by encryption and decryption base AES algorithm.

Keywords: Accident Detection, Tracking systems, GPS, Android, Server, Google Spreadsheet, AES and Cloud Computing.

I. INTRODUCTION

A. Motivation

Now a day, there are lots of inventions occurred in the different environments from vehicle transport to healthcare facilities. For the accident detection and prevention system purpose there is much wider use of IOT, Android phones and cloud computing together. In case, the light remains on in the accident detection and response system a door may be open and the manager or supervisor is aware about all the locations and where about of an accident and its location at real time which can be viewed using Google Maps. He can monitor the help provided to it at real time. It will help in saving a lot of lives.

B. Problem Statement

First of all, accident detection systems were first implemented for the shipping industry because people wanted to know where a ship was caught in disaster in a huge space of water. These days, however, with technology growing at a fast pace, automated vehicle accident detection system is being used in a variety of ways to track and display vehicle accident locations in real-time. The traditional system consists of a phone call based where the driver has to call a helpline number after the accident. Then they will help. It wasted a crucial time for locating and attending the accident spot. It gave rise to loss of lives without fast treatment. It is avoidable by incorporating the latest technology.

II. LITERATURE SURVEY

A. Tracking Object based on GPS and IMU Sensor

This technique was proposed in 2018 by Wahyudi and others tabled this idea which explains the system as Unmanned vehicles required a tracking system to monitor the movement of the object. Tracking system needs because the object is controlled from remote location and the movement of an object is too far from an operator. This tracking system needs object location and attitude. Global Positioning System (GPS) and Inertial Measurement Unit (IMU) sensor can be used to obtain information about object location and attitude.

B. UiTM Campus Bus Tracking System Using Arduino Based and Smart- phone Application

In 2017 M.T. Kamisan, A.A. Aziz, W.R.W. Ahmad and N. Khairudin published this paper which explains A prototype campus bus tacking system is designed and implemented for helping UiTM Student to pinpoint the location and estimate arrival time of their respective desired bus via their smartphone application. This project comprises integration between hardware and software. An Arduino UNO is used to control the GPS module to get the geographic coordinates. An android smartphone application using App Inventor is also developed for the user not only to determine the time for the campus bus to arrive and also will be able to get the bus information.

C. Android based Vehicle Anti-Theft Alarm and Tracking System in Hand-held Communication Terminal

In 2018 Manyi Qian, Hailin Gao and Weihong Liu published this paper which explains with the rapid development of China's automobile industry, the number of cars is increasing rapidly. Development of automobile is very important of transportation for people. However, while people are enjoying the convenience and speed brought by the vehicle travel, the theft of vehicles is causing more and more concern. Owing to the importance of vehicles safety, how to prevent vehicles from being stolen is becoming a hot topic in the field of artificial intelligence. In this paper, a vehicle anti-theft alarm and tracking system based on Android operating system in hand-held communication terminal is designed and developed. By using the built-in sensors of the terminal based on Android Operating System (OS), such as a smart phone, the abnormal information of a vehicle will be sent to the owner's smart phone through communication network.

III.PROPOSED SYSTEM

A. Goal And Objectives

1)   Help to prevent and detect accidents at real time.
2)   To analyse the accident spot.
3)   To send alert of nearest hospital for help after accident detection automatically.
4)   To secure data on the cloud using AES algorithm.

B. Statement Of Scope

1)   *IOT:* The system can be used to collect various sensor data from Arduino for prevention and detection of Accidents.
2)   *Android:* The System can be used to connect at real time to Arduino and receive data on the phone. The data will be analysed and real time detection and prevention measures will be applied using the data.
3)   *Cloud Computing:* The System can be used to handle location data and handle alerts if a vehicle is caught in accident. The data will be helpful in providing information to rescue workers and monitoring using Google Maps.

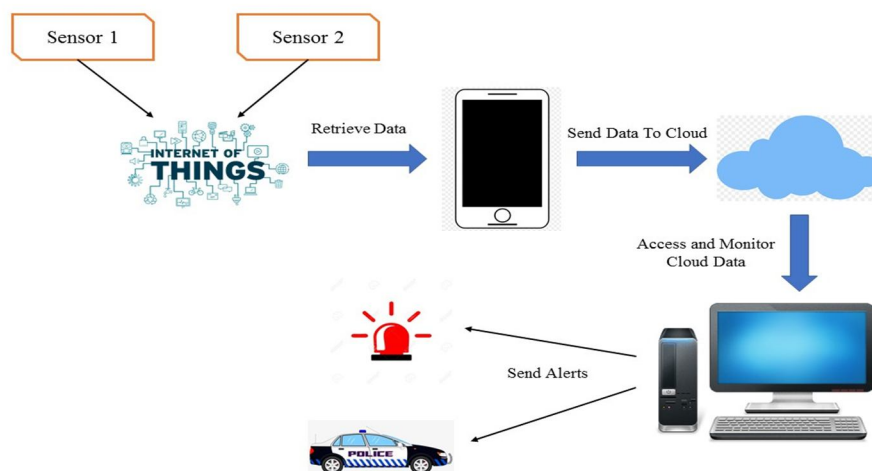### IV.SYSTEM ARCHITECTURE

A. System Architecture

Fig: System Architecture

This system works on IoT based mechanism. The system contains various sensors collect data from their environment and retrieve by mobile application. The collected data sends over the cloud, access and monitor by administrator and sends necessary alerts to rescue management.

B. Algorithm

AES (Advanced Encryption Standard)

The Advanced Encryption Standard (AES), was also called as Rijndael. AES uses the concept of Symmetric key (Round keys) encryption. It is observed that AES is six times faster than triple DES.

Features of AES algorithm:

1) It uses symmetric key and symmetric block cipher technique.
2) It has 128-bit data.
3) Keys are of size 128/192/256 bits
4) It provides full specification and also detail designing.
5) The software is implemented in C and Java.

The encryption process uses round keys. Keys are applied, along with other operations, on an array of data that holds exactly one block of data that is the data to be encrypted. The array is called as state array.

Steps of encryption for a 128-bit block:

1) Select the set of round keys from the cipher key.
2) Initialize state array with the block data (plain text).
3) Add first round key to initial state array.
4) Perform state manipulation in nine rounds.
5) Perform last round (tenth) of state manipulation.
6) Copy the final state array as the resulted encrypted data (cipher text).

V. APPLICATIONS

The same system can be use in the following applications of tracking:

A. Patient Monitoring
B. Child Monitoring
C. Disaster Monitoring

VI. CONCLUSION

In this paper, we are developing a novel approach to provide Smart solution for a real time accident prevention, detection and help system. The basic idea of the project is integrating IOT, Android Application, Desktop Monitoring, cloud computing and AES together to achieve a user independent accident prevention, detection and help system. We have assembled IOT, mobile computing, cloud computing and desktop together to build a whole new system which is secured and reliable. It is more intelligent in preventing, recognizing a vehicle accident and provide help in the aftermath to save lives at real time. The data is secured using AES.

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