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Accident Detection System by Using Navigation Devices

Priyanka Dodmise[1], Priya Mahadik[2], Nihalahmad Shikalgar[3],

UG Student, Department of Information Technology, AITRC, India[1,2]

Assistant Professor, Department of Information Technology, AITRC, India[3]

ABSTRACT: Transportation has great importance in our daily life and it's development has made many of our chores much easy. But it can cause disaster to us and even can kill us through accidents. During 2008, Road Traffic Injuries ranked fourth among the leading causes of death in the world. Nearly 1.3 million people die every year on the world's roads and 20 to 50 million people suffer non-fatal injuries, with many sustaining a disability as a result of their injury. Road traffic injuries are the leading cause of death among young people aged 15-29 years and cost countries 1-3% of the gross domestic product (GDP). If no action is taken, road traffic crashes are predicted to result in the deaths of around 1.9 million People annually by 2020. Thus accident detection system using GPS and GSM has gained attention. This system automatically informs accident to the preprogramed numbers i.e. to our Toll Plaza System.

It is easy to carry out help from Toll Booth to accident location. When accident occurs, this system sends short message to mobile number via GSM modem. Message will give longitude and latitude values. From these values location of accident can be determined.

KEYWORDS: Intelligent Transport System, GPS, GSM.

I. INTRODUCTION

Mobile The high demand of automobiles has also increased the traffic hazards and the road accidents. This is because of the lack of best emergency facilities available in our country. This design is a system which can detect accidents insignificantly less time and sends the basic information to first a id centre within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. A Switch is also providing din order to terminate the sending of a message in rare case where there is no casualty, this can save the precious time of the medical rescue team. When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of both Micro electro mechanical system (MEMS) sensor and vibration sensor. The Angle of the rolls over of the car can also be known by the message through the MEMS sensor. Transportation has great importance in our daily life and its development has made many of our chores much easy. But it can cause disaster to us and even can kill us through accidents. During 2008, Road Traffic Injuries ranked fourth among the leading causes of death in the world. Nearly 1.3 million people die every year on the world's roads and 20 to 50 million people suffer non-fatal injuries, with many sustaining a disability as a result of their injury. Road traffic injuries are the leading cause of death among young people aged 15-29 years and cost countries 1-3% of the gross domestic product (GDP). If no action is taken, road traffic crashes are predicted to result in the deaths of around 1.9 million People annually by 2020. [1] Thus accident detection system using GPS and GSM has gained attention. This system automatically informs accident to the preprogramed numbers. In this system Accelerometer and GPS tracking system are used for accident detection. When accident occurs, this system sends short message to mobile number via GSM modem. Message will give longitude and latitude values. From these values location of accident can be determined.

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II. RELATED WORK

A. *INPUT DEVICES*

- GPS:

The Global Positioning System (GPS) is a satellite based navigation system. Global Positioning System was originally developed for military. The USA owns GPS technology and the Department of Defense maintains it. The basis of the GPS technology is a set of 24 satellites that are continuously orbiting the earth. These satellites are equipped with atomic clocks and send out radio signals as to the exact time and their location. Using GPS technology, one can determine location, velocity and time, 24 hours a day, in any weather conditions anywhere in the world for free. GPS was formally known as the NAVSTAR (Navigation Satellite Timing and Ranging).

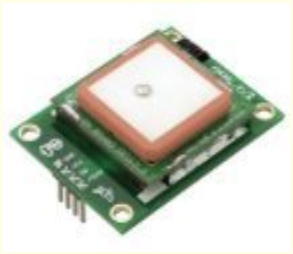

Fig 1 GPS receiver

- GSM

GSM is a cellular network. This is developed by European Tele-communication Standard Institute in 1992. GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the Americas (including Canada and the United States) use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated. Time division multiplexing is used to allow eight full-rate or sixteen half-rate speech channels per radio frequency channel.

GSM is a digital mobile telephone system that is widely used in Europe and other parts of the world. GSM uses a variation of Time Division Multiple Access (TDMA) and is the most widely used of the three digital wireless telephone technologies (TDMA, GSM, and CDMA). GSM has over one billion users worldwide and is available in 190 countries.GSM is used to transmitting mobile voice and data services. The message sending module is SIM300; it is a Tri-band GSM/GPRS that works on frequencies 900 MHz, 1800 MHz and 1900 MHz.

Fig 2 GSM Module

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B. *IMPACT SENSOR*

- ACCELEROMETERS:

An accelerometer is a device that measures the vibration, or acceleration of motion of a structure. The force caused by vibration or a change in motion (acceleration) causes the mass to "squeeze" the piezoelectric material which produces an electrical charge that is proportional to the force exerted upon it. Since the charge is proportional to the force, and the mass is a constant, then the charge is also proportional to the acceleration.
There are two types of piezoelectric accelerometers (vibration sensors).

1. The first type is a "high impedance" charge output accelerometer. In this type of accelerometer the piezoelectric crystal produces an electrical charge which is connected directly to the measurement instruments. This type of accelerometer is also used in high temperature applications (>120C) where low impedance models cannot be used.

2. The second type of accelerometer is a low impedance output accelerometer. A low impedance accelerometer has a charge accelerometer as its front end but has a tiny built-in micro-circuit and FET transistor that converts that charge into a low impedance voltage that can easily interface with standard instrumentation.

- MICROCONTROLLER:

The AT89S51 is a low power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with In-System Programmable Flash on a monolithic chip, the Atmel AT89S51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded controlapplications.

The AT89S51 provides the following standard features: 4K bytes of Flash, 128 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, two 16-bit timer/counters, a five-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next external interrupt or hardware reset.

III. **WORKING PRINCIPLE**

In this project the client and server architecture is done. Client side means the vehicle in which we install that kit. In that kit we install the hardware like microcontroller,gsm,gps all this hardware is install in that the kit . We use impact sensor for the purpose of the to know the accident is occurs if the vibration of that vehicle is high then it indicate the accident is occurs. Then the sms' is send to the server side then the sms is send to the toll side. Then toll side means the server gets that the sms then we detect the location of that vehicle.

A. LITERATURE SURVEY

There are many road accidents that are not reported to the police. Injuries following road traffic accidents (RTA) are common in India. The response to injury is slow and haphazard .In India, motor vehicle accidents are detected and reported to the police or hospitals by way of telephone calls or physical visits. Accidents are detected by chance and in most cases after a considerable amount of time, when some victim's lives cannot be saved, injuries are extensive and property stolen or damaged.

The deficiency of a systematic way of reporting road carnage is a serious fault resulting to avoidable deaths at the accidents scene. In a study aimed at developing a road accident computerized system in Thailand observed there are

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problems of accident under-reporting and accident reported matching. This is due to the lack of asynchronous and efficient method of reporting and recording accidents.The number of cars is increasing rapidly and so is the number of car theft attempts. There are a lot of car security
Systems that had been produced lately, but the result is still disappointing as the number of cases still increases. Thethieves are inventing cleverer and stronger stealing techniques that need more powerful security systems. It also showsthat the alarm itself does not contribute much in preventing a car theft. The previous system is with the installation ofSMS feature during the thefts, the vehicle owner can be notified immediately so that he or she can take preventivemeasure to check their vehicle or save precious time if the vehicle is stolen by informing the police department as soonas possible. In most cases, the owner realized when the vehicle is stolen hours after the theft. The malfunction in carscan be indicated only using the signals in dash board. This will not help during a long distance travel since the ownershave to search for service centre which is available nearby. In spite of many safety precautions accidents have increasedin day to day life. In the previous system only the buzzer will raise during any accidents, and hence the patrol cannotexactly locate the accident spot. Sometimes, the alarm siren does not even attract the attention of most of the pubicbecause of the mentality of people nowadays that intend to ignore such alarms. Statistics show that 96% of the publicare not aware when they hear an alarm. The problem faced in the existing system is that there is no ignition control overthe car. In previous methods only after the theft of the car the location can be traced. There is no preventive measure.The theft or accident indication can be given by blowing off siren which cannot be heard over long distances. It is alsodifficult to identify the location of the accidents. Most of the times people ignoring such an alarm in this fast moving world. So this is not possible solution for safety of persons. Same alarm for most of the cars.

- Problem Statement Faced With Previous Systems:
  The present security system is not efficient due to the following reasons:
- Distance- Cover Area, the siren cannot be heard over a long distance
- Same sound (siren) for most of the cars
- False Alarm
- Cannot be heard in buildings
- Cannot identify exact accident locations during accidents

B. PROPOSED WORK

The vehicle tracking systems are designed to assist corporations with large number of automobiles and sever al usage purposes. Besides, assignments can be scheduled in advanced based on current automobileslocation. So takingin action all these things we are going to design and develop a machine, which will track the real time location. knowledge of a vehicles location. Throughout the 1970"s and 1980"s, the Japanese government, in cooperation with industry, was continuously involved in launching initiatives which helped to mature vehicle navigation technology. Today, most Japanese car manufacturers offer factory-installed navigation systems in at least some of their models. Estimates indicate that, by the year 2000, per annum sales of vehicles with factory installed navigation systems will be reach 2.5 million

The goal was to come up with a prototype of a solution for near instant detection and reporting of a motor vehicle accident. The block diagram below represents the conceptual model of the solution. The solution is an innovation using existing technologies and it is in four modules, namely theAuthentication and UI Module, Accident Detection Module, Google Map ModuleAccident Detection Alert and Location Tracker Module etc.

- Authentication and UI Module

It provides membership management to access system as well as provides necessary UI required for Accessing System such as Hardware configuration, Toll Info, Accessing Google Map, Alerting Accident and its location etc.

- Accident Detection Module

It consists of impact sensors, Electronic Control Unit (ECU) for accident detection logic processing and signal conditioning electronics. The impact sensor senses all vehicle impacts and sends the appropriate signal to the processor (ECU). The electronic control unit (ECU) continuously checks the status of the sensors and determine impact signal that meets a pre-set threshold. It also sends the accident occurrence signal to the communication transceiver component of the GPS device. The impact sensors used in this system are based on accelerometers [6]. A motor vehicle crash

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impact is sensed as when the rate of deceleration exceeds a certain pre-determined threshold. In their quest to develop an intelligent safety system (ISS) for vehicles applications.

- Google Map Module

It displays Google Map and shows u exact location of accident and its details. It gets details from SMS from accident location.

- Accident Detection Alert and Location Tracker Module

It generates alert once Accident SMS arrived at System and Display Google Map window Where it automatically track accident location based on position specified in SMS and
Generate some kind of alarm.

IV. ADIWSN

There are three main modules discussed in the project. When a car meets with an accident, immediately the car's number and the GPS co-ordinates of the location are messaged to the nearby hospitals, thereby ensuring timely help to the needy. When the car is tried to crank, a text message is sent to the owner thereby intimating the status of the car. Acknowledging the text message allows the driver to proceed further to move else the car is immobilized. While during a long drive, if the car's engine goes faulty. The error signals from the dash board of the car and the GPS co-ordinates are captured and sent to the near-by service centre, thereby saving time. Here the GSM is used to send the text message and the GPS is used to track the exact coordinates of the car. The serial communication interface UART is used for the communication between the Microcontroller (PIC 16F877A), GSM and GPS module. The RS232 communication standard is used for the following purposes. Electrical signal characteristics such as voltageLevels, signalling rate, timing and slew-rate of signals, voltage withstand level short-circuit behaviour. The microcontroller that meets the requirements for the usage of serial data communication and Analog inputs is preferably the PIC 16F877A series, which provides good interrupt capabilities and reliability.

A. Algorithm

- KNN Algorithm Description:

The K-nearest-neighbour measures the distance between a query scenario and a set of scenarios in the data set.
The k-nearest neighbour algorithm (KNN) is a method for classifying objects based on closest training examples in the feature space.

KNN is a type of instance-based learning, or lazy learning where the function is only approximate
Locally and all computation is deferred until classification.
Algorithms:

An object is classified by a majority vote of its neighbours, with the object being assigned to the class most common amongst its k nearest neighbours (k is a positive integer typically small).

If k = 1,

Then the object is simply assigned to the class of its nearest neighbour.

In pattern recognition, the k-nearest neighbour algorithm (k-NN) is a method for classifying objects based on closest training

Examples in the feature space. K-NN is a type of instance-based learning, or lazy learning where the function is only Approximated locally and all computation is deferred until Classification. The k-nearest neighbour algorithm is amongst the Simplest of all machine learning algorithms: an object isclassified by a majority vote of its neighbours, with the object being assigned to the class most common amongst its k nearest

2. Euclidean distance measuring:
DE(x, y) = Niyx12121

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KNN Algorithm:

The algorithm on how to compute the K-nearest neighbours is as
Follows:

1. Determine the parameter K = number of nearest Neighbours beforehand.
2. Calculate the distance between the query-instance and All the training samples. It can use any distance Algorithm.
3. Sort the distances for all the training samples and Determine the nearest neighbour based on the K-thMinimum distance.
4. Since it is supervised learning, get all the Categories of Training data for the sorted value which fall under K.
5. Use the majority of nearest neighbours as the prediction Value. Neighbours (k is a positive integer, typically small).
If k = 1, then
The object is simply assigned to the class of its nearest neighbour.

The neighbours are taken from a set of objects for which the Correct classification (or, in the case of regression, the value of the property) is known. This can be thought of as the training set for the algorithm, though no explicit training step is required. The k-nearest neighbour algorithm is sensitive to the local Structure of the data. Nearest neighbour rules in effect compute the Decision boundary in an implicit manner. It is also possible to compute the decision boundary itself explicitly, and to do so in an efficient manner so that the computational complexity is a Function of the boundary complexity. Usually Euclidean distance is used as the distance metric; however this is only applicable to continuous variables. In cases Such as text classification, another metric such as the overlap Metric (or Hamming distance) can be used. Often, the Classification accuracy of "k"-NN can be improved significantly if the distance metric is learned with specialized algorithms such As Large Margin nearestNeighbour or Neighbourhood components Analysis.

- DISTANCE

The distance between two scenario using some distance function Is d(x, y) where scenarios are composed of features such that

V. CONCLUSION

Automatic accident detection and reporting system is designed in this project. When accident occurs, it is sensed and Short message including location of accident obtained using GPS, is sent via GSM network. It provides more than 70% safety for four wheelers. It is the fact that implementation of system will increase cost of vehicle but it is better to have some percept safety rather than having no precent of safety.

REFERENCES

[1]. AboliRavindraWakure, "Vehicle Accident Detection and Reporting System Using GPS and GSM",International Journal of Engineering Research and Development,Volume 10, Issue 4 (April 2014).
[2]. Shital Y. Gaikwad, "Automatic Toll Collection by Using QR Code Capturing", International Journal of Computer Science and Information Technologies, Vol. 5 (5) , 2014.
[3] Jayanta Kumar Pany, R. N. Das Choudhury, "Embedded
Automobile Engine Locking System Using GSM Technology,"International Journal of Instrumentation, Control and Automation (IJICA)" ISSN: 2231-1890 Volume-1, Issue-2, 2011.
[4] Visa M. Ibrahim, Asogwa A. Victor, "Microcontroller Based Antitheft Security System Using GSM Networks with Text Message as Feedback ", International Journal of Engineering Research and Development e-ISSN: 2278-067X, p-ISSN: 2278-800X, Volume2, Issue 10 (August 2012), PP. 18-22.
[5] Vinoth Kumar Sadagopan, UpendranRajendran, Albert Joe Francis, " Anti-Theft Control System Design Using Embedded System", *978-1-4577-0577-9/11 -2011 IEEE.*
[6] Mohammad A. Al-Khedher, " Hybrid GPS-GSM Localization of Automobile Tracking System," International Journal of Computer Science & Information Technology (IJCSIT) Vol 3, No 6, Dec 2011.