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Accident Detection and Alert System (Current Location) Using Global PositioningSystem

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ABSTRACT
Road accidents are one of the leading causes of death in the US. An essential indicator of post-accident survival rates is the time between accidents and when paramedics are dispatched to the scene. Spending time between the occurrence of an accident and when first responders are sent to the background reduces the risk of death. Another way to eliminate delays between an accident and first responder is to use automatic vehicle accident detection systems and alerts, which are audible in the event of a road accident and immediately notify emergency personnel. Send a post-accident server, and provide status awareness with photos, GPS coordinates, VOIP communication channels, and accident data recording. This paper offers the following contributions to the traffic risk identification study for smartphones: we present the official risk detection model that combines sensor and contextual data and demonstrates how smartphone sensors, network connectivity, and web services can be used to provide conditions to alert first responders and provide robust results the effectiveness of the various methods used by smartphone risk detection systems to preventfalse positives

Keywords: GPS (Global Positioning System) - smartphones · traffic accident detection · cyber-physical systems · mobile cyber- physical systems

INTRODUCTION

Emerging styles and challenges Car accidents are one of the leading causes of death in the US, causing more than 100 deaths daily. In 2007 alone, more than 43,100 people died in 10.6 million road accidents. For every 100 licensed youth between the ages of 16 and 19, there will be 21 road accidents, making car accidents the leading cause of death in those U.S. years. [25]. Several technological and social improvements have helped reduce road deaths over the past decade, e.g., each 1% increase in seat belt use is estimated to save 136 lives [7]. Improved life-saving measures, such as electronic stability control, also show significant promise of injury reduction, e.g., crash analysis studies have shown that approximately 34% of fatal road accidents can be prevented using electronic stability control [19]. In addition, every minute when a traumatized victim does not receive emergency medical care can significantly affect their survival rate, e.g., 10]. Therefore, an effective way to reduce traffic deaths is to reduce the time between the occurrence of an accident and when first responders, such as medical personnel, are sent to the scene of an accident. Collision notification systems use sensors embedded in a vehicle to determine if an accident has occurred. These programs immediately send medical personnel into danger. The interval between the risk and the first responder delivery reduces mortality by 6% [26].

The ability to detect the dangers of traffic using smartphones has only recently been achieved due to advances in smartphone processing power and sensors. For example, the iPhone 4 includes GPS to determine the location of the phone, an accelerometer to measure the energy used on the phone, two separate microphones, and a 3-axis gyroscope to get the phone's shape.

LITERATURE SURVEY

A literature survey represents a study of previously existing material on the report's topic. This literature survey will logically explain this system, and a review of the literature gives a clearness and better understanding of studying the proposed plan:

1. Paper Name: Accident Alert System and Intimation for Ambulance and Hospital using LORA

Author Name: P Veeraraghavan, Syed Ajmal Deen Ali, K Ajay Subaiaya, M Hari Vaigundam, M Joshua Mani

Year:2020

Integration includes accident detection and ambulance transport by a licensed ambulance service from the emergency scene to the nearest hospital where emergency medical services may be performed. For this purpose, we have

implemented an efficient ambulance system using GPS and COLLISION sensors and LoRa technology. A heart rate sensor and accelerometer detect danger and transmit via the Bluetooth module. The heartbeat and accelerometer detect threats and are sent via a Bluetooth module. Here our recipient system can receive a signal or message via Lora. Lora on the receiver side can see the same Lora in the transmitted signal.

2. Paper Name: Accident alert system using IoT

Author: Akash Kumar Gupta, D. Sunilkumar, P. Prathima, V. Prashantha

Year: 2020

An IoT-based risk information and rescue system has been developed. The web server and the hardware system are connected via GSM / GPRS with a GPS shield. Vibration sensors, keypad, and bass are used to signal an incident. The project is designed to collect real-time data using a web application. We are introducing a new framework for automatic risk detection to solve the current problem. The signal is transmitted over the IoT network from a tiny controller to a central device. The GPS module provides the coordinates of the latitude and longitude of the target vehicle sent over the IoT network. The central unit sends areasto the nearest ambulance to pick up the victim. The main branch is located at the police station or hospital, where the vehicle unitreceives signals. An ambulance is given a warning near the scene of the accident.

3. Paper name: Modeling IoT Enabled Automotive system for Accident Detection and Classification Author: Nikhil Kumar, Anurag Barthawal, Divya Lohani

Year: 2020

An IoT-based system was developed for this function to report incidents, locations, and types of road accidents. The system usesthe built-in sensors of passenger smartphones to detect and identify hazards. Consistent with the incident and place, a model to classify the type of road accident is based on the Naïve Bayes category. The Vehicular Ad-hoc Network and the Internet-based Materials system have been developed to diagnose and evaluate road accidents' severity. The message is being conveyed to the control room about the accident detection, and the risk links are willing to find a nearby hospital for immediate medical attention.

PROBLEM STATEMENT

Road accidents are one of the major problems facing the world. One of the significant causes of road accidents is overcrowdingand overcrowding. Reducing road accidents is one of the biggest challenges as most deaths worldwide are due to road accidents. There is, therefore, a need to provide better transport services that can reduce the risk of road accidents and save lives. One of the proposed solutions in this paper is to use IR sensors and Arduino Uno technology. The program has two phases - Risk Detection and Risk Prevention. The detection phase is performed using IR sensors that can detect and alert people by sending anSMS using the GSM module containing pre-defined numbers and the location of the accident using the GPS module. Phase Two, Accident Prevention, is performed using IR sensors to alert the driver of neighboring vehicles when the distance between them is excessive.

PROPOSED SYSTEM

Today, advances in the automotive industry are booming, leading to more injuries and road accidents. Lives are at stake. This isbecause emergencies in our country do not exist. In short, we will create a notification system app with a login page if the user is not registered in the app for new users to use as a private dashboard. Where there will be a little and all the entry details wherewe can see, and they can give us the car details and grip that will be needed. This situation prevails. Many people in our countryhave lost their lives because of incidents due to accidents or intervention by the emergency team. We overcome this by providingan effective solution and minimizing the loss of life as much as possible. In our view, device design allows us to see crashes concisely and transfer necessary information to a first aid center.

Links to the location, time, and angle of the motor vehicle incident are included. This distress message will soon be sent to the rescue team, and a mobile phone number has been reported. This program saves many precious lives in real-time. The message is transmitted via GSM and GPS. The basic idea is to locate the car device by collecting real-time car location via GPS and transmitting data via GSM via SMS. We are introducing a new framework for automatic risk detection to solve the current problem. Each vehicle has a touch sensor, and signals are sent to the controller in the event of an accident. The movement is transmitted over the IoT network from a tiny controller to a central device. The GPS module provides the latitude and longitude coordinates of the target vehicle sent over the IoT network. The central unit sends places to the nearest ambulance to pick up thevictim. The main branch is located at the police station or hospital, where the vehicle unit receives signals. A collision sensor comes in handy when you need to get vibration and helps send a password to the Arduino controller.

Excessive temperature sensors to warn drivers will avoid further damage. If a person experiences a minor accident, the driver may inform him that there is no need to pay attention to interrupting the message using a switch. This is done to

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avoid spendingtime with doctors and the police team. Arduino sends an alert message about a local GSM modem. This accepts the SIM card and activates the purchase from the mobile operator. An ambulance is given a warning near the scene of the accident. The ambulance also has a GPS receiver that will map the location of the accident. This allows ambulances to enter the area and rescuethe victim on time.

I. DIAGRAM

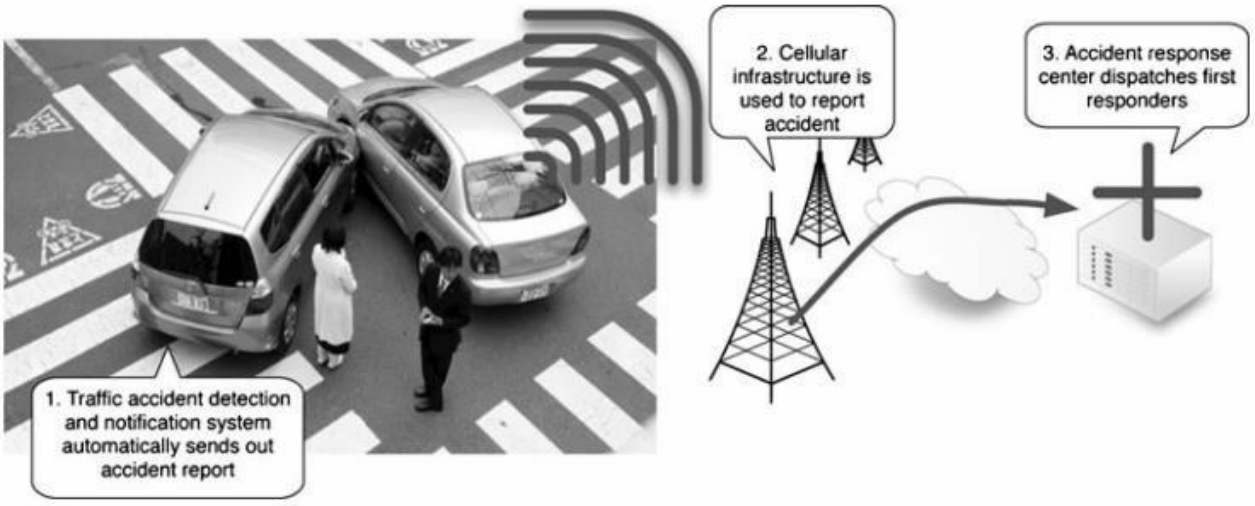

Figure 5.1: A vehicle-based accident detection and notification system

ADVANTAGES

1. Smartphone sensors may measure power close to those received by the victims. In the event of an accident, if the smartphone is in the user's pocket, the smartphone will face the same power and acceleration experienced by the occupants of the car. In addition, if the smartphone stays upright compared to a vehicle during a collision, it is possible to use the data collected on thesmartphone to recreate and make an example of the power received.

2. Smartphones' ubiquitous availability and low cost can help improve accident detection and the notification system. Many existing accident detections and traffic monitoring systems require the entry and exit of vehicle infrastructure for proper operation. Although some of the proposed detection systems use an existing cellular network, they have traditionally focusedonly on the power of the voice and have never been widely available. Smartphones allow the public use of voice and data infrastructure without the need for additional automotive hardware. Because customers and manufacturers do not have to purchase new computer hardware, the acceptance of smartphone-based risk recognition systems may likely be higher than other non-smartphone devices.

3. Reducing the complexity of software storage through improving smartphone applications Another complexity that exists in traffic monitoring and risk recognition systems is the need to upgrade those systems to fix bugs and improve performance overtime. Repairs can be costly with thousands or millions of car accident detection systems.

4. Smartphone awareness programs can be augmented with cloud-based services. Although the internal sensors are excellent at detecting immediate danger, they are usually limited in processing and information skills as smartphones connected to the datanetwork can access cloud services to expand their calculation and storage capabilities. In addition, new data analysis servicescan be connected to servers without the need for complex client upgrades.

DISADVANTAGES

While smartphones show significant benefits in risk detection and traffic monitoring, there are potential impacts that encourage future research and refinement, as discussed below.

1. Risk detection systems use a significant amount of battery power. GPS receivers use a lot of energy, and self-sampling at the required speed to determine the rate reduces the device's battery life by a few hours. To overcome this limitation, users can plug their smartphones into the car's headlights to give them power. Requiring users to connect smartphones helps find the required context to eliminate false ideas and reduce the power consumption of the GPS receiver.

2. Safety systems reduce the impact force. Car safety systems are designed to reduce the power for the occupants of a car in the event of an accident and as a result, the power received by phone may be significantly lower than the power received by the accelerometers in the car. Inside the vehicle, internal accelerometers are mounted on the car's chassis, so its movement shows the vehicle directly and will gain much power in the car experience. Smartphones, however, may be stored in a pocketor holster.
3. Degradation of the smartphone may prevent the delivery of an accident notification. It is essential to prioritize data transmission to increase the chances of an accident being reported.

4. In the foreseeable future, a smartphone-based risk detection system will operate as an application installed on a smartphone operating system (OS). Companies developing smartphone OS control the power of sensor software. This methodmeans that the software must work within the confines of the platform architecture.

5. Complex production quality testing The main concern of the smartphone risk detection system is the need to avoid false positives. When this requirement is combined with high levels of freedom (e.g., speed, good conditions, device location,etc.), it is difficult to ensure an advanced smartphone-based system for legal detection. For this work to achieve production quality reliability, mechanisms to assess the effectiveness of risk-taking strategies.

APPLICATIONS

- They are alerting hospitals to provide immediate attention.
- They are alerting drivers regarding over-heating to prevent further damage.
- Prevent the probability of leakage in the system.
- Notifying family members as there are minimum chances of delay for the rescue of the victim.

CONCLUSION

The proposed plan includes a warning and detection of the incident. The microcontroller node MCU is the system's backbone that helps transmit a message to various scenarios. The impact sensor used as the main module on the device will receive an accident. In the event of an accident, the Impact Sensor is active, and information is transferred via the GSM module to the registered number. Position can be moved using GPS by country location tracking system. To improve the use of automated accident detection and notification systems, smartphones can detect indirect risks through their internal sensors, such as accelerometers. Many challenges need to be overcome, especially the potential for adverse effects from accidentally dropped phones. Due to many phantom (accidental) calls in emergency services, reducing the false level of smartphone accident detection is essential. Using a combinationof contextual data, such as determining when the user is in the vehicle, sensor data, such as the accelerometer and acoustic information, and filtering sensitive sensor data, risk detection systems can be created against false assumptions. For example, airbag shipping starts only over 60G's acceleration.

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