BIKE ACCIDENT DETECTION DEVICE

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ABSTRACT

In this project, an IoT based vehicle accident detection and rescue information system is developed in order to detect vehicle accident and send the location information of the accident place to vehicle owner, nearest hospital and police station via a web service. The communication between the web server and hardware device is established via GSM/GPRS shield, and the location is traced by using the GPS shield. The accident is detected through vibration sensors, keypad and buzzer. The project is developed for real time data fetching form the hardware device using sensors and store in the web server, and send notification to different users either through web application, android mobile application or SMS. This project approximately provides the accurate detection of the location of accident occurred, and send notification to the nearest police station and hospital.

Keywords – *Bike detection, vehicle Accident , Accident Detection and Bike crash detection, Iot ardiuno ,vehicle security vehicle accident detection ,Smart vehicle security,*

1. Introduction

The Internet of Things (IoT) is an systematic process of interconnected computing parts, mechanical and digital machines, objects, animals or individuals that are given one kind of an identifiers and the ability to exchange information over a system without requiring human-to human or human-to-PC communication. IoT is a new concept that has evolved from the convergence of not wired technologies.. In IoT devices equipped with Wi-Fi allow the machine to-machine communication.

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Now a days many research is going on IOT to interface with each other intent to exchange data and to manage Database to make human task more easy by machine

1.1 Major constituents of the GPS-based Accident tracking System are:

1. GPS tracking : The device fits into the vehicle and trace the GPS location information apart from other vehicle information at regular intervals to a central server. Other vehicle data that can contain fuel amount, engine temperature, latitude, longitude, reverse geographical programming, door open/close, tire pressure, cut off fuel, turn

off ignition, turn on headlight, turn on battery status, GSM area code/cell code decoded, number of GPS satellites in view, glass open/close, fuel amount, emergency button status, quantity increased, computed odometer, engine RPM, throttle position, GPRS status and a lot more functions. Capability of these components actually fix the actual capability of the whole tracking system; most vehicle tracking systems, in addition to providing the vehicle's location data, functions a wide range of communication ports that can be used to interfaced other on board systems, allowing to check their status and control or automate their results.

2. GPS tracking server : The tracking server has three main authority: receiving data from the GPS tracking unit, storing with high security, and serving this information on the demand to the user.

3. User interface : The UI determines how one will be able to access the information more easily, viewing the vehicle data, and to obtain important details from it.

Bike Crash Detection component which can send the SOS (Save Our Ship) signal on crash of vehicle to the centralized command center or Relative of the driver data is manage by Smartphone network (Hardware Device) Sensors collect information from the surrounding or object under measurement and turn it into useful data. This layer covers everything from legacy industrial devices to robotic camera systems, water-level detectors, air quality sensors, accelerometers, and heart rate monitors(MI BAND-3). And the scope of the IoT is enlarging rapidly, thanks in part to low-power wireless sensor network technologies and Power over Ethernet, which enable devices on a wired LAN to work without the need for an A/C power source Even with the recently focus given to security for IoT components, it can be easy to overlook the need for end-to-end security for an IoT platform. Every part of a platform should be analyzed for security purpose. From internet connections to the applications and components to the transfered and stored data, there is a potential for an attack vector. Without question, one of the most important & non-functional requirement of an IoT platform is that it also offers robust security

An Arduino MEGA is used here for automation technique and controlling of the other supporting components those are GPS, GSM, vibration sensor, LCD display, puss switch, buzzer etc. Actually this paper gives a practical model of a vehicle accident detection and rescue information system which can do routing, tracing the vehicle & moving vehicle as well as detect accident in large environment. Actually this system consists of two section, the first one is capturing location which is done by GPS in it and as the car travels the location of the car change systematically, the GPS observes the location in terms of two co-ordinates that are longitude and latitude. These two coordinates communicate with GSM modem which is shown in the block diagram. The second one is detection of accident through vibration sensor. To detect accident, a threshold is set to a highest vibration value. If the vibration value is greater than the threshold value, then it will consider that accident occur and wait up to 60 second for a confirmation of incident. After detection of an accident the system request the accident location to the web server. The web server then responses the car owner ,nearest police station and hospital through web service using web application/ mobile application/ mobile SMS system.
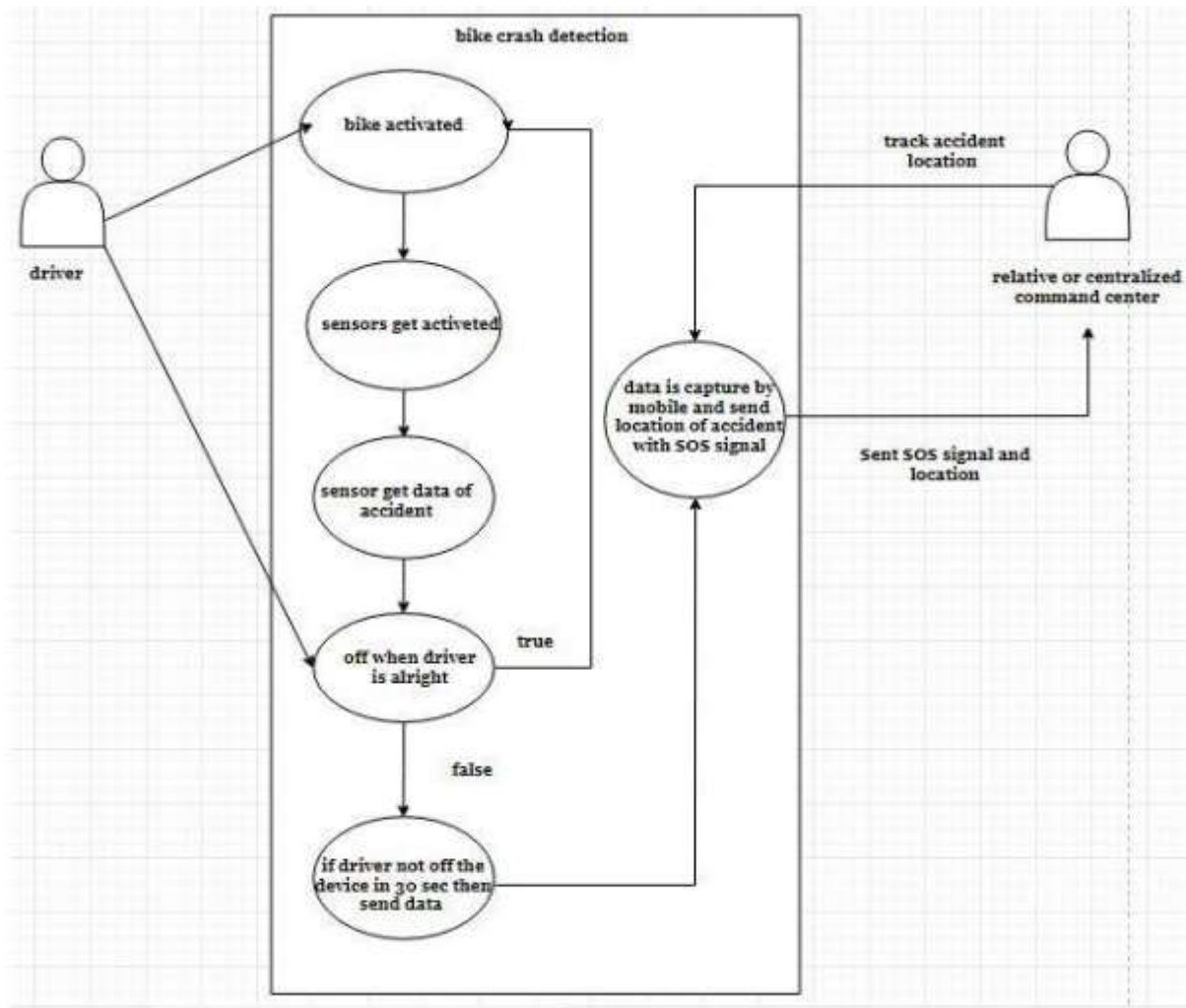
Figure 1 Block Diagram

2. Mobile Application

An android application has been developed for android mobile phones that receive request data from the web server. This android application serves all the features available in the website.

- Messenger
- Phone call application
- Android OS

In this, automatic detection of accidents using smartphones is explained. Car manufacturers like BMW or GM have incorporated a built-in automatic collision notification system, They use various sensors like accelerometer and airbag deployment monitors in their vehicles to determine an accident event and send this information by using built-in cellular radios to response center. uncertainly most cars do not have automatic collision notification system. So in place of this system, smartphone is used which not only detects the incidents but also after detecting, this information is send to the concerned department on its own as well. ,

3. In the proposed system there will be two interface i.e.

3.1 User side (mobile application)

• Crash Detection & Emergency Response
• Driving Analysis
• 24/7 Driver Care Support
• Login of driver
• Link to bike device
• Live tracking of accident
• User friendly GUI

3.2 Device side (safety detection kit)

• Gather information or status of the bike
• Sensor sense data and perform alert and send to application
• Accurate detection and call to center centralized command center or Relative of the driver
• Low cost and power and compact

4. Literature survey

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[2] GSM modem http://www.developershome.com/sms/atCommandsIntro.asp
[3] Acceleratometer http://www.engineersgarage.com/articles/accelerometer

5. Problem statement :

I want to develop a hardware device for Bike Crash Detection , Device which can send the SOS signal on crash of vehicle to the centralized command center or Relative of the driver data is manage by smartphone network (Hardware Device)to solve accident problem which is very serious issue of the world

6. Hardware requirement :

- Arduino Mega 2560 : The Arduino Mega 2560 is a microcontroller board supported on the ATmega2560. It has 54 digital I/O pins (of which 15 pins can be used as PWM outputs), 16 pins are used as analog inputs, 4 UARTs (contains hardware serial ports), a 16 MHz crystal oscillator, a USB port for connection, a power jack, an ICSP header, and a reset button for reload or update . It contains everything needed to support the microcontroller; simply connect it to a monitor with a USB cable/wire or power it with a Analog Curent-to-Digital Current(AC-DC) adapter or battery to get started. The Mega 2560 board is compatible with most shields architectured for the Uno and the former boards Duemilanove or Diecimila.
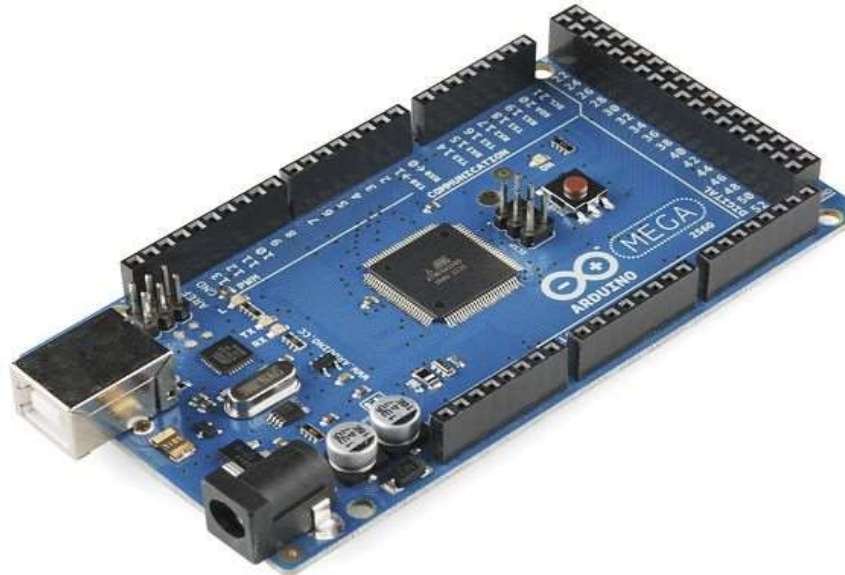
Figure 2 Arduino Mega 2560

- GSM SIM 900A: This is an ultra compactible and it is most reliable wireless device . The SIM900A is a totally Double -band GSM/GPRS solution in a SMT component which can be embedded in the customer use allowing us to benefit from small dimensions and cost-effective solutions. Additionaly an industry-standard interface, the SIM900A produce GSM/GPRS 900/1800MHz output for voice, SMS, Data, and Fax in a small form factor and with less power consumption. With a small configuration of 24mm x 24mm x 3 mm, SIM900A can interfaced to almost all the space needed in your applications, especially for slim and compact demand of construction.

Figure 3 GSM SIM 900A

- GPS module : This GPS antenna adjust about 10mA and will give you an additional 28 dB of gain. It's got a 5 meter large cable so it will easily reach wherever you need it to. The antenna is magnetic so it will stick to the top of a car or bus (or any other steel structure)

Figure 4 GPS module

- The ADXL335 is a total 3-axis acceleration measurement system. The ADXL335 has a measurement range of ±3 g less priority . It contains a polysilicon surface-micromachined sensor and signal conditioning circuitry to implement basically an open-loop acceleration measurement architecture. The signals of result are analog voltages that are proportional to acceleration. The accelerometer can capture the static acceleration speed of gravity in tilt-sensing applications as well as dynamic acceleration speed that resulting from motion, shock, or vibration etc.
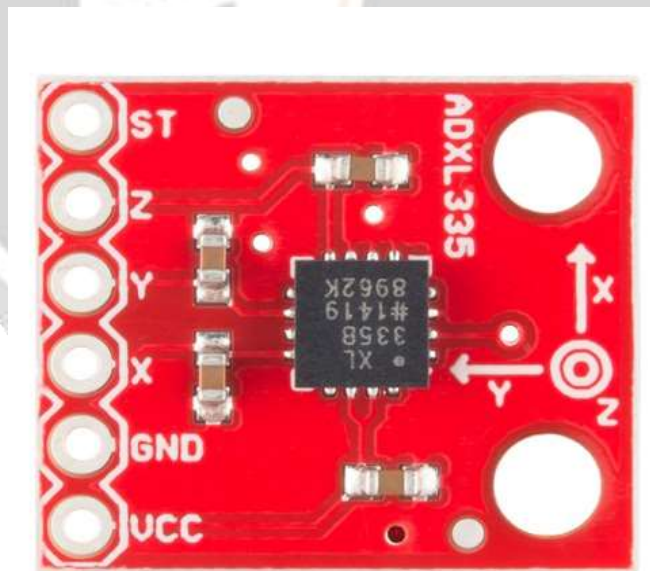

Figure 5 Accerometer Adxl335

- Jumper pins : A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end point of the pin, which is normally used to interlinked the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering the pins

Figure 6 jumper wire

- Firewire : It is just a printer wire to exchange the data to ardiuno from the ide of computer

Figure 7 printer cable /firewire

- Mobile : it is required to accept the message and the location from the device when accident is detected

Figure 7 : mobile to receive sms

7. Software requirement

- The Arduino is an integrated development environment (IDE) : It is the open-source Arduino Software (IDE)that makes it easy to write code and upload it to the board(breadboard). It executes ,compile on Windows, Mac OS X, and Linux. The surrounding area is written in Java and it is also based on Processing and other open-source of software

Figure 9 Arduino Software (IDE)

8. CONCLUSIONS

The IoT Based Vehicle Accident detection and rescue system is successfully implemented using database server and API and fulfils all the requirements to be an IoT based framework. This device is capable of reading and collecting the required data and sends them securely to the database stored in server. This system can do tracking of a vehicle which have this device. Besides, if an accidentoccur this system can communicate nearest hospital and police station. Police station and hospitals authority can see the shortest route to reach the accident spot using this system which have a web application and mobile application. Web based real time data visualization makes this system more convenient to see all the data in a clean, formatted and user friendly way.

9. REFERENCES

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