Smart Helmet With Location Identification System

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ABSTRACT:

The objective of Smart Helmet is to provide appropriate location for detecting and reporting crash. Different type of sensor and IOT infrastructure are used for assemble the system. When the accident is happens system tells firstly location details are send to the emergency number by using IOT system. The location of vehicle is obtain with the help of GPS module. The system assure safe and fast delivery of information of the accident in less time accessed by IOT. These are the feature of smart helmet are build for accident detection.

Keywords-: Smart helmet, rider's protection, accident awareness, fall-off detection, location.

Introduction.

In India tremendous number of road accident happen each year. The accident may happen due to numerous reason like drink and drive, beyond speed limit and driving rashly. Many time the person who get injured is not also responsible for the accident. It may happen due to other vehicle rider but at the end both rider will get injured. Due to shortage of medical services and first aid on time sometime rider may die. Some deaths happen due to emergency service not reached on accurate location on the time. In these case to avoid the these type of situation the system get started which make sure that rider get emergency service in less time. In India many people use bike or moped rather than cars and many accident happen only of bike rider and rider get injured mainly on head so in these case smart helmet play very significant role in protect life of motor biker.

PROBLEM DEFINITION AND MOTIVATION.

There is very large increase in the total number of demises due to road crash in last one or two years[1]. In the survey that carried out by WHO is confirmed that around 11,10,000 deaths happen in year 2022, these count increased to 13,19,000 in year 2023. The main cause for the road crash demises are due to breaking of traffic rules, riders not wearing helmet. More than $1/3^{rd}$ of the victims would have remain alive if they wear the helmet. Study prove that wearing helmet can reduced crash rate by 30 to 40%. The amount of two wheelers is rising day by day by 20 times, as population is also increasing. The rate of death caused by motorcycle accidents is 2.5 times more than that of not following the traffic guidelines and also by not wearing helmet.

Block diagram.

fig 1 . block diagram.
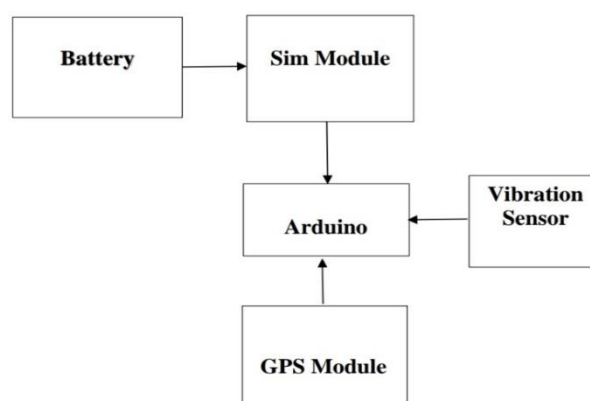
Arduino Nano:

This device is small version of arduino uno and thus both have almost similar function. It is widely used in various applications for instance robotics, control system, instrumentation and automation. The Arduino nano is microcontroller based device which consists of fourteen digital pins, this pins can be used for various purposes. This device can be used from any minor to major industrial projects. This component consists of AT mega 328 microcontroller. B type USB connector is used to install the programming code in this device. Operating voltage for this device is in the range of 7v to 12v. The dc current required for input pins is 20mA. The crystal oscillator available this system comes with the frequency of 16MHz
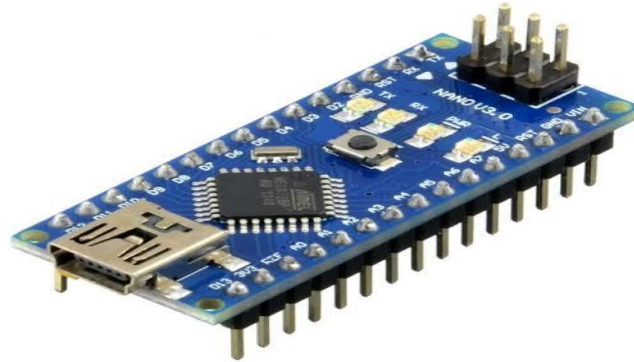
FIG 2.ARDUINO NANO

Sim Module :

Sim 800a is used as sim module in project. This module have sim800a gsm chip and rs232 interface that can enable quick connection with computer or laptop using usb to serial connector. The input dc power supply voltage is in the range of 7v to 12v. This device have in built simcard holder. The network status of the device is indicated by led. The device comes with sma antenna for better network range[2]. This device consumes very low power. The operating temperature of the system is in the range of -40°C to 85°C.

FIG 3. SIM MODULE

Gps Module :

This device is based on NEO- 6M. These components is used for latest new technology to give us the best accurate possible result positioning to give us the best accurate possible result positioning information. A rechargeable battery is aslo included in this to obtain a gps lock faster. This device has serial TTL output, it consider of four pins: VCC, TX, RX and GND. It has 5Hz position update rate. The device have operating temperature from -40^0 to 85^0 CUART TTL socket. This device has two different start time one is cold start time which is 38s and another is hot start time which is of 1s[3]. The required supply voltage to operate this device is 3.3v.

FIG 4. GPS MODULE

Vibration Sensor :

Vibration sensor module SW-420 is used in this project to detect if there is any vibration that beyond the threshold, threshold can be adjusted[4]. If there is no vibrations so the output will be low, when there is vibration then the output will be high[5]. This component is very useful to detect the vibrations. The operating voltage for this component is 3v-5v and the operating current is 15mA. LEDs in this component indicates the output and power. It uses the wide voltage LM393 comparator. When the vibrations occur it gives command to Arduino nano for next procedure.
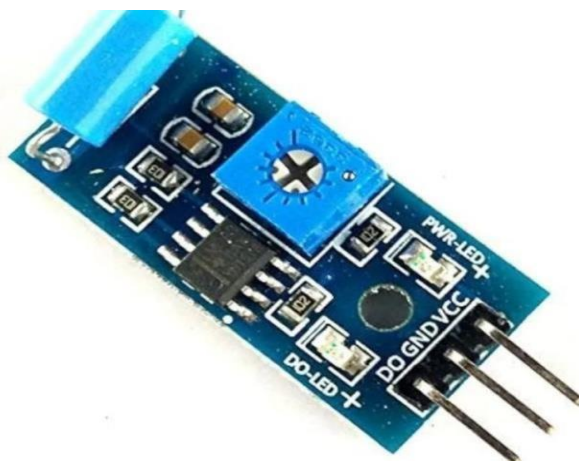

FIG 5. VIBRATION SENSOR

Working.

Firstly we will connect two batteries of 3.7v to the sim800a device. Then the network indication led will give status about the range. Then after receiving proper network this project will be ready to use. When the crash occurs the vibrations sensor sends the signal to the Arduino nano gets the location coordinates from gps module and it will be included in sms and then the sim device will send the sms to mentioned emergency number. After receiving sms we can simply take the coordinates and search them on google. After doing this it will us the exact location of the crash.

Application.

- Very helpful to bike vehicles for the well-being purpose of the biker.
- The security system of the helmet can also be used in the four wheeler.
- It is used for crash detection and obtaining location.
- Two wheeler rider can get medical emergency due to accurate location in short time.

ADVANTAGES.

- Crash detection can be effortlessly discovered and by obtaining location, medical treatment can be supplied in short duration.
- Live accident location can be obtained with the assist of GPS device for emergency service.

EXPERIMENTAL RESULT.

When crash is detected then sim device will send the sms to the mentioned emergency number and gps location will be also included in the sms.
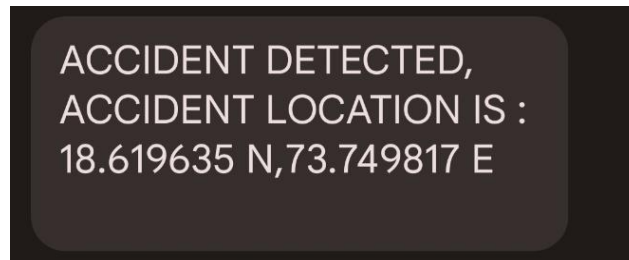

FIG 6. MOBILE SMS.

CONCLUSION.

Hence if the accident happen then firstly smart helmet sends SMS notification to the emergency number to get the accurate GPS location to get emergency medical service on the time for the vehicle rider.
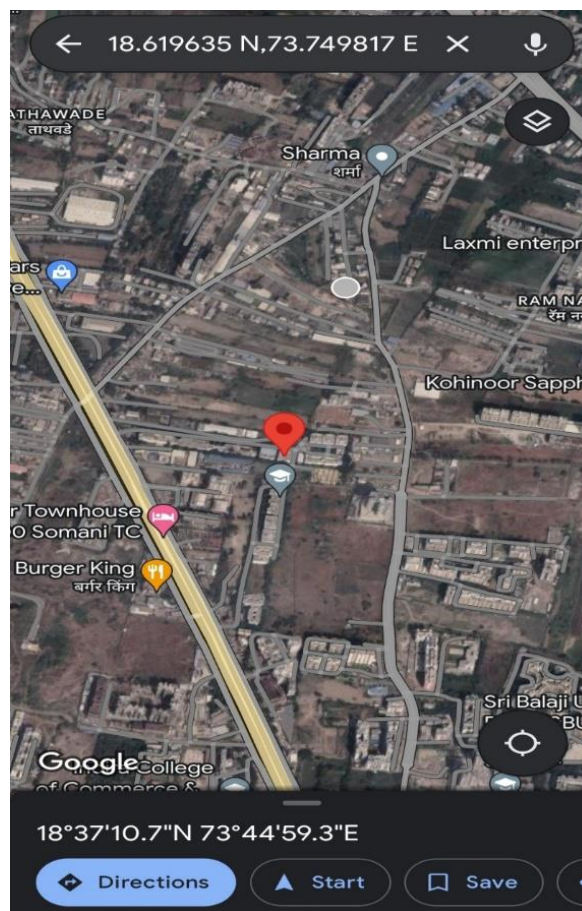

FIG 7. MAP LOCATION

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