

# Accident Detection Application using Arduino and Sensors

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**Abstract** - Accidents are a commonplace occurrence in the roads. Often these accidents are severe and the time taken to inform the hospitals causes a lot of damage to the injured. Also, traffic jam at the accident location causes inconvenience to the authorities that bring aid to the injured. In order to solve this shortcoming, we come up with the idea of an application that installs sensors to dynamically detect impact and inform the nearest vehicles as well as the hospital of a possible accident.

**Key Words:** Accidents, Traffic Jam, Sensors, Dynamically Detect Impact.

## 1. INTRODUCTION

The increase in the number of vehicles has led to an increase in the number of accidents. The causes of accidents are numerous: bad roads, unpredictable weather conditions, unknown accident spots to name a few. The idea we put forth tries to warn the driver of the accident locations in his path and alert nearby vehicles in the case of an accident. The application uses a sensor, an arduino board, the arduino application that is connected to our proposed application to perform this task. The sensor is used to detect accident impact and the application uses the arduino board's transmitter that is fitted in the automobile to communicate distress signals to other vehicles and nearby hospitals. The same apparatus fitted in other vehicles receive distress signals and alert the drivers of those automobiles about the accident.

## 2. EXISTING SYSTEMS

### Accident Detection Using Android Smart Phone

This application detects accident uses the heart beat sensor to measure the heartbeat of the user. When it gets the signal from the sensor the application filters the background data and only the pulse sound is taken to consideration. To get the pulse rate the microphone should be held near the heart or where the sound produced by movement of blood can be detected using audio signal processing. If the heartbeat rate shows variation from the normal heart beat range which is 60 to 100 beats per minute then the application assumes

that an accident has occurred. Now, the application waits for the user or the driver to respond to confirm the accident. If there is no accident and the user is safe, he has to respond to the application by touch or voice so that no alert is sent to his emergency contacts. In case, the user has met with an accident and could not respond to the application, an alert message along with the location of the user will be sent to the emergency contacts of the user [1].

### SOSmart car crash notification

SOSmart application is designed to detect car accidents and will send alert messages to the pre-configured emergency contacts in the phone.

**Panic button:** When an accident has occurred the user should press the panic button in the application, this action makes the application to alert the emergency contacts of the user by sending them the current location of the car.

**Hospitals list:** Through the application the user can also get the list of hospitals near to the current location. Whenever required the application provides the route to the list of nearest hospitals. And whenever the app is opened it shows the approximate address [2].

## 3. PROPOSED SYSTEM

The application opens up with a map that highlights the current location of the user as well as the accident locations within a distance of 200m. In addition to that, the application allows the user to connect to a sensor that is fitted in the automobile. This sensor has the ability to detect the impact the car undergoes if it has a collision. The sensor transmits this information to the application through arduino board. The arduino board sends this information to the software or application that must be installed so that information can be sent and received which sends the received signal to the application developed by us. The application assesses the information received and interprets whether the information was received from the sensor fitted into its own automobile. If it is so, the application sends information to transmit distress signals to all vehicles within a distance of 500m and the nearest hospital. Else, the application knows

that some other car has had an accident. It interprets this as an alert and warns the user. For this to work, the automobile must be fixed with the specified sensor and must also have the application. Thus, all vehicles with the sensors within the specified distance receive this distress signal. This information is displayed on the application that allows the user to change his/her course and avoid a potential traffic jam. It will also alert the nearest hospital and thus, it will aid the hospitals to come quickly to help.

The components of the application are:

(I). Sensor:

Minisense 100 is a vibration sensor that is of cantilever type released by Measurement Specialties. It is economical and offers sensitivity even at low frequency. It can even detect a tap from the user. A small AC and large voltage (up to +/- 90V) is created when the film moves back and forth. A simple resistor is sufficient to get the voltage down to ADC levels [3].

Features:

- a. Flexible PVDF Piezo Polymer Film
- b. Breadboard friendly leads

(II). Arduino board:

The input of the arduino board is from the sensor and the method of communication is a wire interface. It sends the signal received using a Bluetooth module once in every 500ms.

The application checks every 500 ms if there is any data available from the serial port. If data is present it is read and displayed on the screen [4].

*Materials and tools required to connect arduino board to the application:*

- Two USB cables named A and B , OTG cable , An Arduino, An Android device with a minimum of Android 4.0
- "ArduinoCommander" application from Google Play store.

*Steps to connect arduino board to application:*

- Plug the USB-A to USB-B cable into the USB of the Host cable.
- Then plug the USB-B plug into the Arduino and the Micro USB into the Android device.

- We use "ArduinoCommander" application to allow us to work with Android in the Host mode. Install the app and launch from playstore. (This app is for working with the Arduino on an Android device, it is simple to handle the pin arrangement. The application is easy to understand, even if the controls are unusual. It finds the Arduino automatically and doesn't crash.)
- When the app is started, the home screen offers 4 options for connection with the board. Since, USB is being applied the user should choose USB device.
- In order to direct the Android device to search or scan for arduino boards, the user should choose the AutoDetect option provided. The devices searched are shown on the screen.
- The user should select the arduino board of his choice and the application will display it as a drawn animation. The user has the freedom to alter their mode.

*Connecting sensor to arduino board:*

1. Installation of DHT11 library:

- The user can download the library which is available as a zipped file. Then the file should be unzipped in the libraries directory of the Arduino IDE folder.
- The directory should have the following two files: dht.h and dht.cpp

2. Program:

- Load the program dht11.ino after you save it onto your computer and open it in Arduino IDE

(III). Running the program:

- Compile the program in the IDE
- Run the program and open the Serial port (shown below).

<Path to Arduino IDE>\libraries\DHT  
Should have the following two files: dht.h and dht.cpp

3. Application:

The application receives the signals transmitted from the arduino board and interprets it. It differentiates between the distress signals received from its own automobile and signals received from other automobiles. If the signals are received from other automobiles it displays an alert on the screen that tells the driver that an accident has occurred within a range of 500m. Thus, the driver can exercise caution

as well as try to help. The driver is also at the liberty to inform the hospitals. If the signals are received from its own automobile, the app directs the arduino board to transmit distress signals to all vehicles within the range of 500m. The right type of frequency is selected and signals are sent. The application also attempts to find a hospital in the same range. If found, the hospital is also notified. Else, there is a hope that other vehicles that have received the distress signal will notify nearby hospitals.

### 3. CONCLUSIONS

Through the above given report, we have made an honest effort to highlight the design of the proposed android application. Our application, attempts to give complete user satisfaction regarding safety on roads. By using this application the user is alert and can use the application to alert other drivers about the accidents occurring.

### REFERENCES

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