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Multipurpose security and emergency application for elderly people, children, women and physically challenged based on AIML and IOT

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***Abstract* — Security for women, children, elders and physically challenged has become a major issue as the number of crimes over them are increasing day-by-day. This paper describes about safety and their security by using electronic device to both detect the problem & alert authorities. This paper suggests a new perspective to use technology to protect women, children, elders and physically challenged. we use an android based smart phone with an integrated feature that alert and provide location based Information. This Document describe GPS and GSM based "Security System "that provides the combination of GPS devices as- well-as provide alerts and message with an emergency button Trigger. Whenever somebody is in trouble, they have to shake the mobile, message alert is sent to Register Contact list and a voice announcement to the Number registered first and give a message "THE PERSON IS IN PROBLEM NEED HELP". Now a day safety of them is becoming very poor with the help of this Application The project was development in Android Which Graphical User Interface it provides the level of reliability, availability and compatibility. All these make Android an appropriate language for this project because Android language is based on JAVA language.**

Keywords - Smartphone, Registered contacts, GPS (Global Positioning System), GSM (Global System for Mobile)

I. INTRODUCTION

This project presents an alert system for problem detection using common commercially available electronic devices to both detect the problem and alert authorities. We use an Android based smart phone with an integrated tri-axial accelerometer. Data from the accelerometer is evaluated with several threshold values and position data to determine a problem. The threshold is adaptive based on user provided parameters such as: height, weight, and level of activity, the application adapts to unique movements that a phone experiences as opposed to similar systems which require users to mount accelerometers to their chest or trunk. If a problem is suspected a notification is raised requiring the user response. If the user does not respond, the system alerts pre-specified social contacts with an informational message via SMS. If a contact responds the system commits an audible notification, automatically connects, and enables the speakerphone, if a social contact confirms a problem, an appropriate emergency service is alerted. Our proposed system provides a realizable, cost-effective solution to problem detection using a simple graphical interface while not overwhelming the user with uncomfortable sensors. I problem is a very powerful software especially developed for the safety of women, physically challenged and elderly people whenever somebody is in trouble they don't have to sit and find contacts or find ways to send SMS, or msg the near ones. They might not have so much time, all that they have to do is shake the smart phone above the threshold value, vigorously, immediately message alert is sent to the persons mom, dad and whoever they wish to, if their guardians also have a Smartphone. Even though if it is in silent mode. When a message called alert is received it automatically changes its profile to general, and gives a voice notification as "The person is in problem please help" until they listen and stop it. If they want to find where their ward is all that they have to send is loc as an SMS to their smart phone, it will respond with the current location of their ward. If parents want to track their ward, they have to send track message as a SMS to their wards Smartphone, it will respond with the location every 5 minute once, which is stored and gets connected with the google maps using GPRS and plot the route in live. We come across many issues regarding the safety and security in day-to-day life. Arak shak dal, what we call as police force which is only meant for the protection, security, and safety of citizens. If the unsafe situation like this type is known to police like force, then only they can give protection to needy women. Unfortunately, nowadays the scenario is quite different, after the incident happens, such forces come to know as such, cases are increasing day by day; what a woman can do in such kind of situation? Making phone calls to her well-wishers for help. Constraint is distance of her well-wisher from her place. If the place is unknown, the identity of place is also the constraint. Moreover, in trouble (unsafe situation), it is difficult to call anybody for help, even a woman may be unaware of the place where she is and cannot give place identity.

Existing System

Existing Systems as a part of literature survey, we investigated some applications that offer the same or similar services for android and other platforms. The aim is to see how these applications work and to see how they can be improved. Today the cases of atrocities on women are growing. In these types of cases, a smart phone plays an important role for safety

of women. Now android is budding on some apps for women security purpose. These apps are as follows –

1. FIGHTBACK: This app is developed by Mahindra faction. In earlier days, this app was not complimentary, customer have to compensate for this app. But after Delhi gang rape incident, this app is on hand at no cost. This app sends a message to your friend or contacts that "user is in trouble" through E-mail, SMS and GPRS. This app works on those mobiles that support Android Java Programming.
2. SECUREME BETA: This app is developed by Think MPI Consulting Private Limited. It helps us to raise alert and we can get help in case of life threaten emergencies. After installing the app, initially we have to give a pin number for security purpose and then after emergency contacts must be registered in the app. By pressing a tap on secure button, it notifies the contacts with location co-ordinates.
3. VANITHA ALERT: This app is developed by ABC Mobile Learning Communication click on " HELP" button on our mobile's home screen in an emergency situation can deliver a distress text message to the registered mobile number, E-mail id, face book id seeking help and indicating the user's location.
4. RAKSHA – WOMEN SAFETY ALERT: This app is launched by BJP on May 15, 2014. By clicking on this app, it sends location of the user to the contacts registered and the user can also get the details of the location of the contacts. A distress signal just by pressing a single key sends out a loud buzzer to our near and dear ones. We can add multiple contacts to this app and when there is no data connection, this app alerts the contacts by sending SMS.
5. GLYMPSE – SHARE GPS LOCATION: This is the recent application developed on January 28, 2015. This app is a fast, free and a simple way to share our location using GPS tracking in real time with friends and family. This app does not need any sign up and do not need any contacts to manage.

Proposed System

The proposed system is especially for the women, children, elderly people and physically challenged safety and overcomes the disadvantages of existing system: - This proposed system is 'GSM & GPS Based Security System'. It consists of GPS device i.e. Any Android Phone and an emergency button. GPS device must to be placed inside the device (Android Phone). The device will provide the position information such as latitude, longitude of person in trouble. An emergency button is fixed on the device at a particular position. Whenever women in any kind of trouble she will press the emergency button and an alert will be immediately sent to the nearest police station. Then it is the responsibility of police squad to handle the situation.

Features: 1) This project presents an alert system for Women, Children, physically challenged, elderly people safety detection. 2) The system provides a realizable and efficient. 3) The application is easier to use all the people. 4) The application is normal budget. 5) For user there is no need of external hardware or software to use this application. 6) This application is free for user, which does not affect user's cost. 7) User only need a Smartphone or tablet which has Android OS to the work.

II. REQUIREMENT SPECIFICATIONS

Software Requirements:

1. Android SDK 4.0 or more
2. Eclipse 3.7 or more
3. Java 1.6 or more
4. Arduino IDE
5. Blynk

Android SDK:

Every time Google releases a new version, the corresponding SDK is also released. In order to work with Android, the developers must download and install each version's SDK for the particular device. The Android SDK (Software Development Kit) is a set of development tools that are used to develop applications for the Android platform. This SDK provides a selection of tools that are required to build Android applications and ensures the process goes as smoothly as possible. Whether you create an application using Java, Kotlin or *C#*, you need the SDK to get it to run on any Android device. You can also use an emulator in order to test the applications that you have built. Nowadays, the Android SDK also comes bundled with Android Studio, the integrated development environment where the work gets done and many of the tools are now best accessed or managed. Discover how to create mobile apps that look and feel great on any platform with comprehensive Flutter Training.

Eclipse:

Eclipse is an integrated development environment (IDE) used in computer programming. It contains a base workspace and a extensible plug-in system for customizing the environment. It is the second-most-popular IDE for Java development, and, until 2016, was the most popular. Eclipse is written mostly in Java and its primary use is for developing Java applications, but it may also be used to develop applications in other programming languages via plug-ins.

Including Ada, ABAP, C, C++, C#, Clojure, COBOL, D, Erlang, Fortran, Groovy, Haskell, JavaScript, Julia,[8] Lasso, Lua, NATURAL, Perl, PHP, Prolog, Python, R, Ruby (including Ruby on Rails framework), Rust, Scala, and Scheme. It can also be used to develop documents with LaTeX and packages for the software Mathematica. Development environments include the Eclipse Java development tools (JDT) for Java and Scala, Eclipse CDT for C/C++, and Eclipse PDT for PHP, among others.

Arduino IDE:

Arduino first and foremost is an open-source computer hardware and software company. The Arduino Community refers to the project and user community that designs and utilizes microcontroller-based development boards. These development boards are known as Arduino Modules, which are open-source prototyping platforms. The simplified microcontroller board comes in a variety of development board packages.

The most common programming approach is to use the Arduino IDE, which utilizes the C programming language. This gives you access to an enormous Arduino Library that is constantly growing thanks to open-source community.

Download Arduino Integrated Design Environment (IDE) here (Most recent version: 1.6.5):

https://www.arduino.cc/en/Main/Software This is the Arduino IDE once it's been opened. It opens into a blank sketch where you can start programming immediately. First, we should configure the board and port settings to allow us to upload code. Connect your Arduino board to the PC via the USB cable and make board setup and COM port setup.

Blynk:

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things.

There are three major components in the platform:

- Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide.

- Blynk Server - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.
- Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.

Now imagine: every time you press a Button in the Blynk app, the message travels to the Blynk Cloud, where it magically finds its way to your hardware. It works the same in the opposite direction and everything happens in a blynk of an eye.

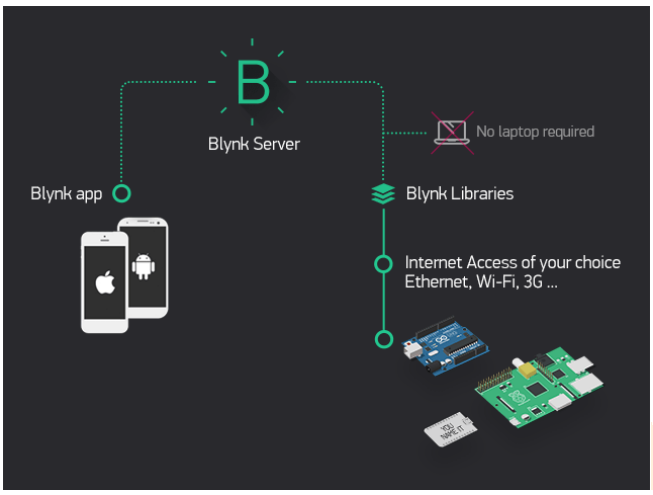

Fig.1. Blynk operation process

Hardware Requirements:

1. Node MCU (ESP8266)
2. Tactile Switch
3. Battery
4. Wi-Fi Camera

Node MCU (ESP8266):

The ESP8266 is the name of a micro controller designed by Espressif Systems. The ESP8266 itself is a self-contained Wi-Fi networking solution offering as a bridge from existing micro controller to Wi-Fi and is also capable of running self-contained applications. This module comes with a built in USB connector and a rich assortment of pin-outs. With a micro USB cable, you can connect Node MCU devkit to your laptop and flash it without any trouble, just like Arduino. It is also immediately breadboard friendly.

Specification:

- Voltage:3.3V.
- Wi-Fi Direct (P2P), soft-AP.
- Current consumption: 10uA~170mA.
- Flash memory attachable: 16MB max (512K normal).
- Integrated TCP/IP protocol stack.
- Processor: Tensilica L106 32-bit.
- Processor speed: 80~160MHz.
- RAM: 32K + 80K.
- +19.5dBm output power in 802.11b mode
- 802.11 support: b/g/n.
- Maximum concurrent TCP connections: 5.

ESP8266 NodeMCU WiFi Devkit

Fig.2. ESP8266 Node MCU

Tactile Switch:

These small sized switches are placed on PCBs and are used to close an electrical circuit when the button is pressed by a person.

When the button is pressed, the switches turn ON and when the button is released, the switches turn OFF.A tactile switch is a switch whose operation is perceptible by touch.

Click Response: The click response of the button lets the user feel the response of the operation from the switch.

High Durability: The contact dome, which also acts as a moving contact, has specific materials, surface processing and shape properties to maintain a stable contact over a long period of use.

Fig.3. Tactile Switch

Battery:

In order to use solar panels with the ESP8266, we need a constant voltage of 3.3V. Here we could just use a linear voltage regulator between the solar cell and the ESP. However, this has the disadvantage that the power connection breaks off as soon as the sun is no longer shining.

For this reason, a battery must be interposed. If the solar panel generates enough electricity, the ESP should be supplied from it and the battery should be charged at the same time. During the night, the battery should then transfer its energy to the ESP8266. This ensures a constant power supply. There are special charging modules for this, we used HW battery for charging purpose.

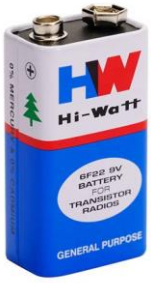

Fig.4. HW Battery

Wi-Fi Camera:

Basically, to construct a Wi-Fi live webcam, we needed a Wi-Fi server interfaced with a camera. This kind of server is nothing more than a Wi-Fi server built around an ESP8266. Constructing an ESP8266 Wi-Fi server is not difficult. Just like in the NTP clock design, we also used the Arduino IDE (integrated development environment) for compiling the Wi-Fi server code we wrote and fused it into the ESP8266. Once the phone is connected to the Wi-Fi camera server, it's also connected to the Wi-Fi network. Third, the Wi-Fi webserver built with the ESP8266 is also connected to the same local Wi-Fi network, using the same SSID and password.

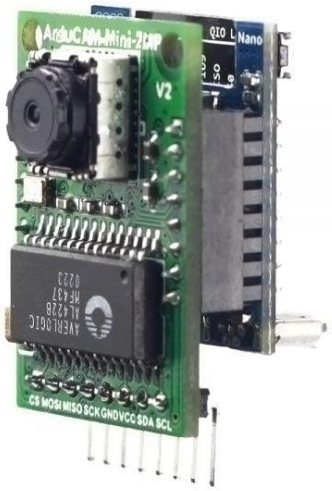

Fig.5. Wi-Fi Camera

III. IMPLEMENTATION

Work flow of application:

The flowchart below shows the flow of our application in cellular phone. Firstly the application will be in the sleep mode that is the accelerometer will be running in the background. The accelerometer reading is taken periodically and is compared with the threshold values which are set by the user. If the accelerometer value crosses the threshold then the fall is detected and the application is started. If the value does not cross the threshold then the fall is not detected and the application goes back to the idle state. If the fall is detected then the application starts and alerts the user. The user has to respond to the application within the stipulated time. If the user respond to the alert within the time then the application goes back to the idle state else the message is sent to the social contacts and it waits for the reply from the contact. The message contains the key word, the GPS coordinates where the fall is detected. If the contact replies to the message the application checks the replied message for the key. If the message contains key then the call is made to that contact and it also enables the speaker so that bidirectional communication take place between the victim of the fall and the social contact.

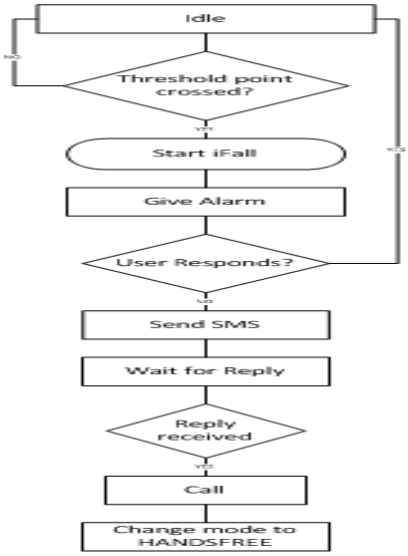

Fig.6. Flow chart of the application

Working:

Data from the accelerometer is evaluated with several threshold values and position data to determine a problem. The threshold is adaptive based on user provided parameters such as: height, weight, and level of activity. The application adapts to unique movements that a phone experiences as opposed to similar systems which require users to mount accelerometers to their chest or trunk. If a problem is suspected a notification is raised requiring the user's response. If the user does not respond, the system alerts pre-specified social contacts with an informational message via SMS. If a contact responds the system commits an audible notification, automatically connects, and enables the speakerphone. If a social contact confirms a problem, an appropriate emergency service is alerted. If they want to find where their ward is all that they have to send is TRACK as an SMS to their smart phone, it will respond with the current location of their ward. If they want to track their ward. They have to send enable message as an SMS to their smart phone, it will respond with the location every 5 minute once, which is stored and gets connected with the google map using GPRS and plot the route in live.

IV. CONCLUSION

There are many severe problems that arise all of a sudden, that really cause threat to life. There should be some means to both detect and alert the authorities. Developing such an Android application which is an alert system for problem detection, was a great experience. The person, who is in trouble-victim, can make use of our application to seek the help from his/her trust worthy people-guardian. The functionality that we provide in our application makes it very simple and easy to use. Whenever a person is in trouble all that he/she got to do is, to just give shake to their cell that has our application deployed in it. Once the shake is given a message seeking for help will be sent. There will not be any necessary to search the contact details, to create message and then send it. All that needed is an Android cell with our application deployed in it. When the guardian responds with a TRACK message, the current location of victim is found. Therefore our application will be more efficient and productive in problem detecting and alerting.

Sometimes the culprits are not punished just because of the lack of evidences. But using our application one can even

register the complaint to police against the culprit. Preventive measures can be taken before some crime is committed.

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