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An Iot Based Automated Security Solution For Women Safety

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Abstract: *In today's era of women empowerment most of the articles in the newspaper covers the achievements of women but we owe the responsibility to introspect that equal or more than the same number of news are the ones of rape, sexual abuse, sexual harassment etc. Where is our society heading towards? A society which strives for empowerment of women and suppresses its safety or the one which strives for both? In every developed country the maneuver for women safety arised much before women empowerment. This paper focuses on mainly three phases. The most important part of the system is the collection of data which is analysed on firebase to provide an alert message regarding the safety of a particular location before visiting the same location. The system also consist of a prototype of an IoT device which a women can trigger by pressing a button which will automate the application through Bluetooth. Various security features is provided to the victim through the application. The system takes proper care to see all possible measures taken to provide help to the victim in a distressed situation.*

I. Introduction

Women in India are touching various pinacles of success but even then they are exposed to various crimes in the society like domestic violence, Sexual harassment, rape, molestation etc. This idea makes an attempt to contribute a solution for this problem. Average court cases of crimes against women registered is approx 38947 and the number is only on rise. [1]. According to a report, number of rape cases per lakh population was 243 (approx) in 2018. During such incidents the victim needs immediate help from all possible means. Taking this into consideration the system is divided into three main parts. Whenever a woman feels she is in a distressed situation, she just have to press a button in her wearable device which would activate the device. The device contains a GSM/GPS module which would immediately track the location and send it to her family or friends at the same time it will get connected to the application through Bluetooth. The application requires the user to register herselfand also set a few emergency contacts. After getting triggered by thewearable device the application throws a popup notification confirming whether the situation is abusive to avoid panic. It then gives live location status to the emergency contacts through sms every 10 mins. Emergency call is made to one of the emergency contacts. The camera on the phone then gets activated to capture the images of the situation which can serve as a proof later. Hereafter an alarm is triggered to alert the nearby people and disorient the attacker. The data of all the past incidents are stored in firebase which will analyse the data using the proposed algorithm and whenever the location of any user of this application is around the radius of the any location present in the database, it will send a notification to the user that she is about to enter in an unsafe location and the same security features are provided if she is in danger.

II. Material And Methods

LITERATURE SURVEY

Advanced women security system based on IoT. (IJRITCC 2017): The idea behind this system is a hardware that has a switching alarm in case of emergency. An application tracks the location of the victim during emergency and lists the nearest police station around, sends alert message and a voice recording of the situation to the guardians. Data analysis is done using K- nearest neighbouring (KNN) algorithm to find the nearest person who is the subscriber of the application. KNN works in a manner such that the location of all the subscriber in the database. Whenever a person is in trouble, her current position will be compared to other location and the nearest neighbour will be informed. Data analysis is done using Glassfish server. Thus immediate help is provided.[10]

Mobile Application for Women's Safety: WoSApp App(IEEE 2015): This paper focuses on creating a mobile application for women safety where the user has to first register herself by filling a simple form which contains her name, number and the names and numbers of her emergency contacts. In a critical situation she could either shake her phone 40 times or simply click a panic button in the user interface by doing so a message will be sent to the nearest police station which will contain the location coordinates of the user in the form of a URL and all her emergency contacts. The police station has a Google Maps interface which pinpoints each location where an emergency is taking place at that point of time. This allows the authorities to take swift action and dispatch policemen from thepolicestation nearest to the location of the user. Immediately

after the message is sent a call is placed to the provided helpline number and the necessary action is taken. The PhoneGap API from Cordova was used for plug-ins to implement the existence of the application as a background service Red-Folder, to enable shake detection Gibson, to send the emergency message to the police Apache Cordova, and to place the emergency call. [11]

Smart Foot Device for Women Safety (IEEE 2017): In this paper a smart foot device is build such that if one foot if tapped behind another four times the system gets activated and triggers the application to send location message to emergency contacts. The device contains a Bluetooth module to connect to the smartphone, an accelerometer to detect tap and microcontroller. In order to test the system Naïve Bayes classifier is used. The system is low cost not noticeable easily. The system is accurate, specific, sensitive and effortless.[12]

ABHAYA: AN ANDROID APP FOR THE SAFETY OF WOMEN (IEEE 2015): This paper focuses on developing an application on which a single click is required as an initial action. As soon as you click the start button an emergency call is placed to one of the contacts and location is sent in the form of SMS. A unique feature of this application is that location is sent every five minutes because there is a possibility that the victim might try to escape and for that she is moving from one location to another. The application is physically dependent and speed is slow. But it provides continuity.[13]

Existing systems:

There are many different wearable devices, applications and systems designed for women security. The wearable devices like smart watch, invisa wear, safelet, nimb, revolar etc.

Invisa wear: It is weared around the neck which works on cell battery, has a double click function which sends sos message to her contacts in emergency.[3]

Revolar: Being a small device it can be attached to the key ring or clips directly on clothes. It works on a panic button which sends the location to her contacts in emergency situation.[4]

The applications like Vithu, abhaya, Nirbhayaetc were also designed.

Vithu : It sends the alert messages to the registered contacts once power button is pressed every 2 minutes.[5]

Nirbhaya: It sends SMS alert or call after a single touch in emergency.[6]

Procedure methodology

Block Diagram

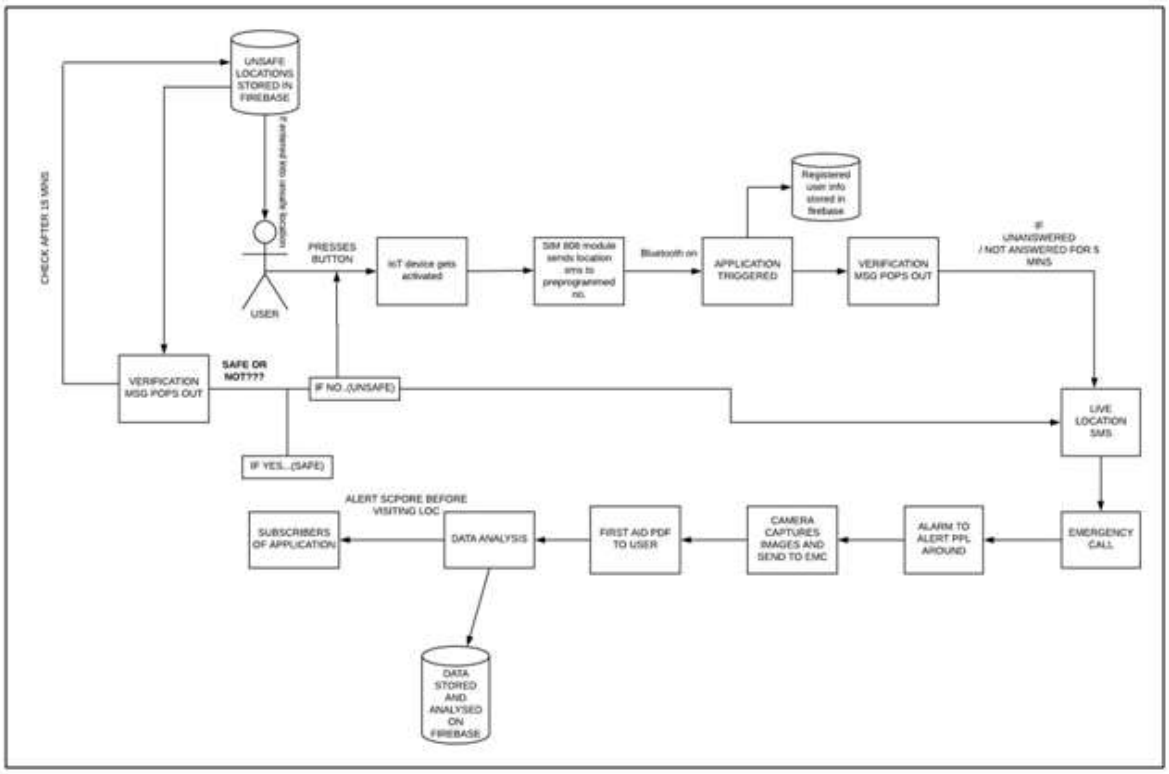

Fig a. Block Diagram of proposed system

ALGORITHM

1. Input from Naive users:
Parameters: Frequency (f), User Type, Mode etc

```
While(true)         // Forever
{
In every f minutes
{
data= getBasicData() // like location co-ordinates, time and date
safety_level marked = getSafetyLevel()  // User entered level (Fuzzy Logic could be used to translate into numbers)
sendData() // Send all data to the server
}
}
```

2. Output for Naive users:
Event : In case of Danger

```
{
Type= getCommunicationPreference() // Set by the user eg.. call or message etc
Id = getCommunicationId() // Set by user the immediate contact
//Collect other details in case non call communtaioneg..location
SendCommunicationReuest() // Make call incase call is the default option
}
```

3. Scheduling

```
Event : In case of Scheduler Job is active
{
Select the new location details not entered into master table
Calculate the new safety attribute for the updated entities (Fuzzy  logic)
Update the Master Table using newly calculated values
Send reports to the administrator
}
```

4. Suspicious User Monitoring

```
Event : Triggered by Admin
{
Update/Revoke permissions of the user
Inform the admin accordingly
}
```

DATABASE AND DATA ANALYSIS

Firebase

Firebase is a platform that provides you various tools to develop high quality application by making use of many features like Authentication, Storage, Analytics, Cloud Storage etc. It is economical and lucid. It supports various platforms like Android, ios, web etc.

Advantages of using a firebase:

1] It stores the data in JSON format and also provides real time syncing for it.
2] There is no need of server to built any application.
3] When your users go offline, the Realtime Database SDKs use local cache onthe device to serve and store changes. When the device comes online, the local data is automatically synchronized. Thereby optimized for offline purpose.
4] The database is integrated with authentication to provide security to the data.

Following data is stored by the firebase in the system

1] Details and credentials of the user.
2] Access rights of users
3] Whenever a user visits a particular location she can give reviews about that place the reviews will be analysed and then updated and stored.
4] Location coordinates of the past incidents.

HARDWARE

1] Arduino UNO
Arduino: It is an open source electronics platform which is used to build hardware and software project.
Arduino Board : It senses the environment by receiving inputs from many sensors, and affects its surroundings by controlling lights, motors, and other actuators.
Arduino IDE: Instructions can be given to Arduino by coding in the Arduino programming language in the Arduino Environment.

2] SIM 808 module: The wearable IoT device uses a SIM 808 module. It is a GPS/GSM two in one function module.GPS acts as a transmitter and sends the location cordinates to the GSM antenna which acts as a receiver. It sends a preprogrammed SMS to the contact numbers.

SOFTWARE

OPERATING SYSTEM:
Arduino IDE
Android Studio

Future Scope

Women security has become a major concern today. Although there has been many devices and applications which pose a solution for this problem. But the major drawback with most of the devices and application is that it requires the smartphone to be held in hand which is not possible in most of the cases. In future, the Iot device can be embedded into a small button so that the attacker does not find it suspicious. Future enhancement includes embedding the device into a small button so that it is invisible to the attacker. This system can also take various feedback from users for multiple places and update the database. If used on a high scale itcan actually store data of all incidents, thereby reducing many dangerous crimes like Human Trafficking, etc

III. Conclusion

In the present day scenario, even in a country like India where women are considered as goddesses, women safety is one of the major concerns. To help resolve this problem, we have developed a proposed device which when triggered, sends the emergency call and messages to the registered contacts. Also, our MyAngel Application is developed for safety purposes. It also provides the safety score of the particular area and an alert message to the user using data analysis. Further improvements if required can be done after practical application and experiences. As engineering graduates, we have used our knowledge and skills and played our role in withdrawing one of the major concerns to the best possibleextent from the society

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