

A Location Aware Safety Companion

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Abstract - The ever increasing rate of crime on women and elderly has been a cause for alarming concern among citizens all around the world. According to a recent survey conducted, molestation cases have seen a whopping rise of 47% between 2001-2015 in Mumbai alone. Also, according to the information provided by the RTI, crime against senior citizens has witnessed a rise of 53% in the last 5 years. Under such circumstances having a companion with you has a severe impact on the feeling of security. Our main motivation for this project has been the above stated fact and the drive to contribute towards Digital India by helping enhance citizen security which is a primal need of the hour. The proposed system is a wearable device that is location aware and stays connected to the users phone via a Low Energy Bluetooth(BLE) signal and by press of a button can send a SOS message in the form of an MMS, which will capture the current location of the victim and send it to the emergency contacts, an SOS to a group of contacts on a social networking platform such as WhatsApp. The system will also consist of an Android App which will be used to obtain important information from the user such as emergency contacts and will be used to send the SOS. Also, incorporating features like sending an SOS over by using the carrier services along with the data services, we aim at increasing the chances of being saved in times of distress by approximately 40%.The proposed work shows a flexible and interoperable combination of a device and application that will accessorize and empower the citizens and serve as a multifunctional device.

Keywords — BLE, Mobile Computing, Safety Devices, Wearable Devices, Android.

I. INTRODUCTION

It is believed that every person deserves to feel safe, wherever they are, whatever they're doing. The proposed system is designed such that when the person is in distress, they can alert their chosen personal network by sending an SOS by using carrier and data services. The system is simple to use in times of high distress when a user feels threatened; a moment that often results in making irrational decisions.

The world in today's time is becoming increasingly unsafe, especially for women. According to National Crime Records Bureaus annual Crime in India

publication, "24,923 rape cases in 2012, 45,351 cases of molestation and 9,173 cases of verbal harassment of women" have been recorded. According to a survey conducted by WHO, Almost 35% of the woman, regardless of where they live experience sexual assault. Crimes against the elderly have seen an 8-11% spurt. Citizens at every walk of life are harassed these days, in public spaces, irrespective of gender and age. Some victims of such circumstances stand up to the accused while others choose to live their life in silence. Every day there seems to be an unspoken war on streets. While some use books to shield themselves, others wear full-covered attire to protect their dignities, and avoid the delirious gaze. The corresponding diagram will give a brief overview of how women are harassed.

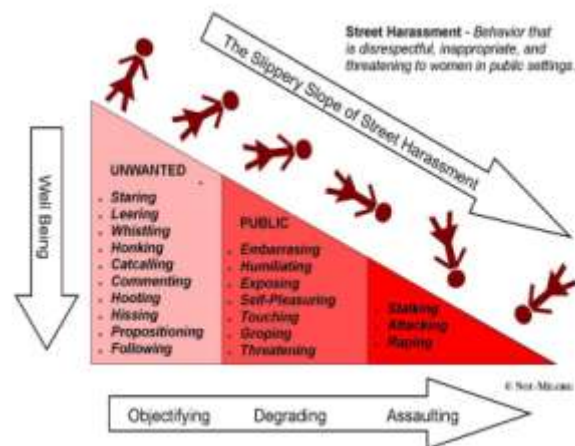


Figure 1: Woman Harassment

Our purpose is to develop a system with which an SOS can be sent in times of distress to improve safety of women, children and elderly. The system will consist of a wearable device and an Android application.

The proposed system consists of two classes :

- Sender : The person who is currently in distress can press a button on the wearable device which will allow the wearable device to signal the smartphone to immediately send SOS in various forms.
- Receiver : The SOS message sent through the smartphone will be received by the contacts present in the emergency list of the users mobile application .

II. PROPOSED SYSTEM

As mentioned our system will consist of two main components:

- A wearable device
- An Android application

The wearable device will be a wristband of very light weight. It will consist of further of two components :

- Buttons
- BLE module

A single press on the button will activate the android application on the smartphone . A double press on the button further on signals the Android device to send the SOS to its recipients. The button will be Micro-Switch-Push button . The BLE module is connected to the button .As soon as the button is pressed the first time, the BLE module signals the Android smartphone to start the particular application. A simple architecture of this system is shown in the corresponding diagram.

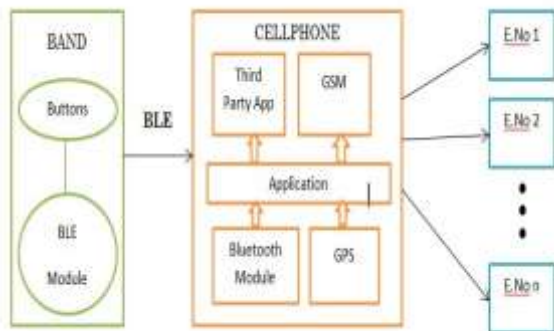


Figure 2: Proposed system architectural diagram

In this diagram E.No 1,E.No 2,E.No n are the emergency contact numbers saved in the database by the user in the users smartphone. SQLite is the most widely deployed database engine in the world. SQLite will be used to store the information obtained from the user such as the emergency contacts current/last location etc.

The working of the proposed system can be understood by the following diagram.

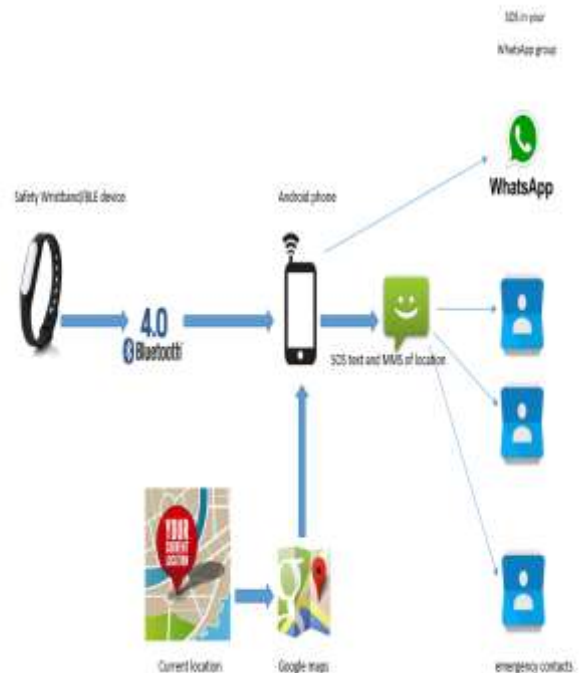


Figure 3: Working of the Proposed System

The system will consist of two main components:

- A wearable device
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The wearable device will be a wristband of very light weight. It will consist of further of two components:

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A single press on the button will activate the android application on the smartphone. A double press on the button further on signals the Android device to send the SOS to its recipients. The button will be Micro-Switch-Push button. The BLE module is connected to the button. The BLE module such as ibeacon have battery life of up to 1-2 years, therefore there is no need of a battery to power the wearable device

System feature 1:

- Add contacts to your emergency list.
- Select the WhatsApp group.

System feature 2:

On press of a button on the wearable device sense the signal and start the application automatically and do the following task:

- SendSOS_sms(): A simple text message will be sent to the contacts using carrier service.
- SendSOS_mms(): Use of GPS to capture a screenshot of the current location shown in the map and send it as MMS using carrier service as well as

send location information using data service using google maps.

- SendSOS_social(): User can choose WhatsApp as one of the third-party applications to send the SOS in one of his/her WhatsApp groups.

A sequential working of this proposed system can be shown easily with the help of an activity diagram in the corresponding figure.

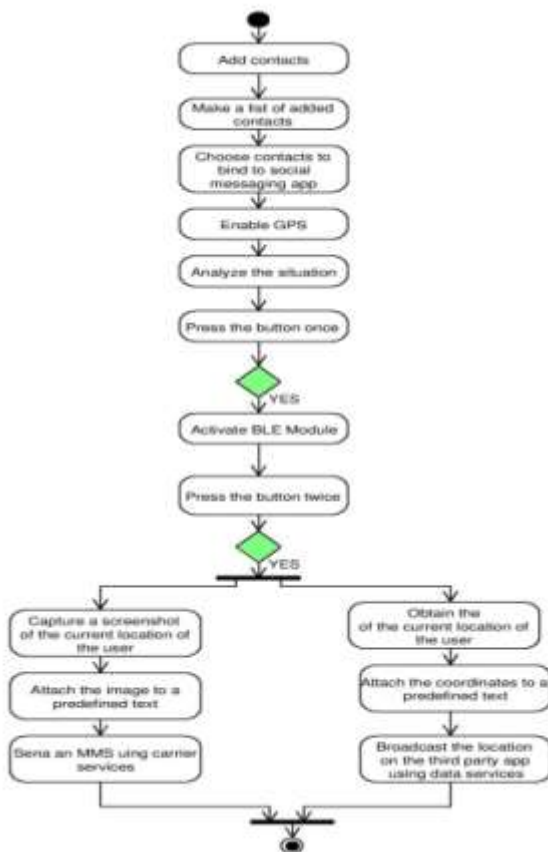


Figure 4 : Activity diagram of proposed system

From the diagram we can see ,the first step is the user must enter contacts into the database via the android application. Also the user must enable the GPS for the system to function properly. Once the button is pressed for the first time, it activates the BLE module and signals the android smartphone to start the particular application . After the button is pressed twice it sends the location of the user as well as an SOS via the carrier services and data services.

III.CONCLUSION

The proposed work aims at enhancing citizen security by ensuring that the SOS gets delivered in multiple formats increasing reliability and flexibility. This project consists of two major components a wearable device and an App which together work as a single component and are used to send the SOS. The wearable device is capable of sending a BLE signal to

the users smart phone which is then responded to efficiently by the internal working system of the App .This is done by capturing a screenshot of the users current location and simultaneously obtaining coordinates of the location to be sent as an MMS and broadcasted via a third party messaging App respectively. In this project, some challenges are, to make sure that the connection between the band and the users smartphone is stable. It is essential that we include a few techniques in order to manage stability of the connection and reliability of the system. As the network infrastructure in our country is not extremely reliable , we intend to use multiple platforms to send the SOS ensuring increased chances of rescue and help in the time of distress, and as we make use of cost efficient components for development of the device , it makes the band more affordable making it accessible to the masses. We have surveyed and studied various papers and web references to help us understand and identify the various components in our project along with algorithms and methods that can be used in developing and building the system. We have also studied different techniques that can be implemented to make the system more reliable and efficient.

IV.FUTURE SCOPE

A small microphone can be incorporated into the wearable device which will start recording as soon as button is pressed to send SOS. This will help in collecting evidence which can be used in court proceedings. An alarm may also be incorporated into the device so that it alerts anyone passing by, but this will require a rechargeable battery to power the alarm.

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