

Women Safety Ring

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Abstract - As the women harassment cases are increasing day by day, it is necessary to ensure the safety and security of women in India. According to a survey conducted by National Crime Research Bureau, as the number of wrongdoings incidents against women has increased consistently. The prime focus of this project is developing a Women Safety Ring which will help to increase the safety of the women. This IoT based Women Safety Ring consists of a pressure sensor, Camera module and a programmable Microcontroller to control and synchronize with the other components in the ring. The ring is equipped with Bluetooth to interface with the Mobile device. Upon detecting a signal from the pressure sensor, the Microcontroller will initiate the Camera module and will send a first signal to the Client Application which is deployed on the mobile phone. Then the Client App will detect the device location using GPS and send an alert message to the pre-defined contacts and to the Police station. The Client App is programmed to update the device location at a regular interval to the Centralized Server and also collect the pictures from the camera on the ring and post it on to the server.

Key Words: IoT, Bluetooth, Microcontroller, GPS, Server.

1. INTRODUCTION

IoT based technology provides good services that will completely change the way people lead their daily lives. IoT is a technology through which we can create many applications on Internet. In an IoT network, all the devices are connected to the Internet and is used to transmit data over a network. Hence, it provides automatic control without involving any human interactions.

IoT has an immense scope as it provides unique opportunity for looking into data insights. Various factors that leads to growth of IoT are enhanced sensors, peripheral connections, mobility, and evolution of lifestyle. IoT includes applications like wireless networks, home automation, building automation, security systems, health care etc.

According to a survey conducted by National Crime Research Bureau, the total crime incidents against women has increased consistently. The number of victims is increasing day by day wherein the victim cannot use her mobile phone to dialup to police or her family members in emergency situation. Sometimes, it becomes difficult to get the position of the victim in case of emergency and due to this it may even cost her, her life. Hence, it is necessary to ensure the safety of women. The main focus of this project is developing a Women Safety Ring which will help to increase the safety of the woman by providing them an easier way through which they can connect to emergency contacts.

Section II presents the study of the existing systems, their working and limitations. Section III includes the architecture of the proposed system and the various scenarios in which it will function.

2. EXISTING SYSTEM

Women are excelling in every field in the industry. But they still have to struggle against the hardships in the society. Because of all these odds it is necessary that women feel safe in the surrounding. In major critical situations the women will either dial up to the police, scream for help, try protecting themselves through self-defense etc. But even after doing all these it does not guarantee the safety of women.

This section provides information about currently existing technologies which ensures women safety, some of which are as follows:

3.1 Women safety Device with GPS Tracking & Alerts

This device has a system that ensures dual alerts in case a woman is facing some critical situation. This device uses a finger print sensor which is connected to the microcontroller. It also consists a GPS module along with a GSM modem and a LCD display.

The authenticated woman can switch on the device well in advance by the using fingerprint scan when she is walking in an unknown area. This device requires woman to regularly scan her finger after every 1 minute. If she fails to do so, the system will share her

location to the emergency contacts by sending a SMS alert as a security measure and furthermore sounds a signal constantly so that close by individuals may understand the circumstance. Thus, ensuring the safety of the woman[4].

Advantages:

- This system does not require a panic button which is helpful in cases where the event is spontaneous

Disadvantages:

- This system requires to perform repeated fingerprint scanning which may cause problem as the time limit is very less, making it difficult for one to do other tasks.
- Its usability is limited by its own size, as it is a hand held device of a considerable size making it noticeable to other people.

3.2 Smart Band for Women Security Based on Internet of Things (IoT)

This wearable smart Band is used to provide safety to women. It consists of a micro-controller, temperature sensor, BLE Module and Pulse Sensor.

The Microcontroller monitors pressure and temperature continuously after every 10 seconds on activation. The BLE module connects the smart band to her mobile phone which has to be in 10m range. It has a women security application programmed with standard pulse rate and temperature values according to various age groups which are compared constantly after 10 secs. This system avoids woman interaction at a time of critical situation. It sends an emergency alert to her close relatives and to the nearby police station[5].

Advantages:

- Band is not noticeable as a safety device, as it is similar to wrist watch band which is quiet normal in day to day life.

Disadvantages:

- This system may classify abnormal readings as critical situations for example like running increases heartbeat which surpasses the threshold and classify this scenario as a Critical situation.
- Lower stand-by time due to constant scanning. As the band is constantly scans for the pulse and temperature consuming thus much needed battery power.

3.3 SMARISA: A Raspberry Pi Based Smart Ring for Women Safety Using IoT

This wearable smart Ring is used to provide safety to women. Ring consists of a push button, alarm, raspberry pi microcontroller and a raspberry pi camera. It also consist of Wi-Fi module which connects the smart ring to the internet.

Once the push button is pressed it triggers raspberry pi and activates high frequency alarm. The pi camera captures the image and uploads it to the server. The victim's current GPS location, image link and message notification is sent to the emergency contacts mobile phone [3].

Advantages:

- This system does not necessarily require that the victim should have a mobile phone. One can just take the ring alone.

Disadvantages:

- Needs Wi-Fi connectivity to function which is not available at every place. Even if there is a Wi-Fi network available one cannot just connect to it due to security issues.
- Incase if the connection is lost, re-association and re-establishment with network takes time.

3.4 NIMB: Smart Ring with a Panic Button

NIMB is a smart ring which is used for the safety of anyone who wears it. It contains Bluetooth which is used to provide connectivity, push button that is used to send an alert, rechargeable Lithium Polymer Battery which lasts for up to two weeks, LED to give the current status of the ring and vibration motor which is used to indicate the button press.

When one is in danger, he/she needs to just press the button on the ring for 3 seconds. This button will trigger an alert to the mobile application via Bluetooth. The mobile application will get the location from mobile GPS and send it to the predefined contacts. It will also send a message to the nearest police station[6].

Advantages:

- Does not need a Wi-Fi connection, it uses mobile data to track the location

Disadvantages:

- The ring has to be within the coverage of mobile phone. If the ring is out of range with the phone it is not possible to send the alert.

- No way to track the last location if the ring goes out of network. The location can only be tracked if the button is pressed.
- There is no way to get any details of the vicinity due to the fact that mobile phones are not always in one's hands and also trying to capture and send images via mobile phone may even cost her, her life.

4. SYSTEM DESIGN

To design and develop a Women safety ring for the safety and security of women in emergency situations. The ring will provide women with constant assistance in all their difficult times by just the push of a button. It will also help women to feel more secure as her location information will be timely monitored and saved, and in times of critical situations, she will be able to capture the details about her vicinity, which will be saved and shared. With the help of this system, women can feel safe to move about independently on their own and at the same time be cautious.

3.5 Architecture of the system

3.1.1 Detailed Block Diagram

The figure depicts that the ring is paired with the client application via Bluetooth. The ring initially sends the input signal to the app after pressing the push button on it followed by sending the captured images. The client application in turn sends the location information and the images to the server and the pre-defined contacts. These shared information via client app will be updated periodically to the server.

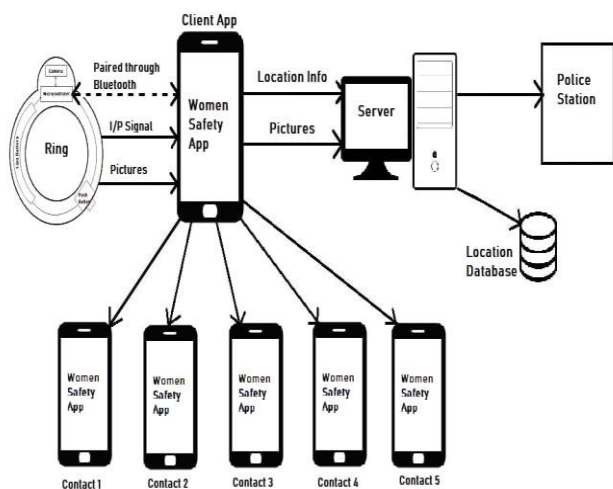


Fig -1: Detailed Block Diagram of System

3.1.2 Schematic Diagram of the Ring

The schematic diagram of the ring depicts the positions of the various components used in the developing the safety ring. The camera is placed at the top bulging portion of the ring facing outwards in order to capture images. The microcontroller is placed below the camera chip to control and synchronize all the other components in the ring. The ring is powered by the Li-Po Battery which is placed on its side. The push button is placed below at certain angle for easy access to press.

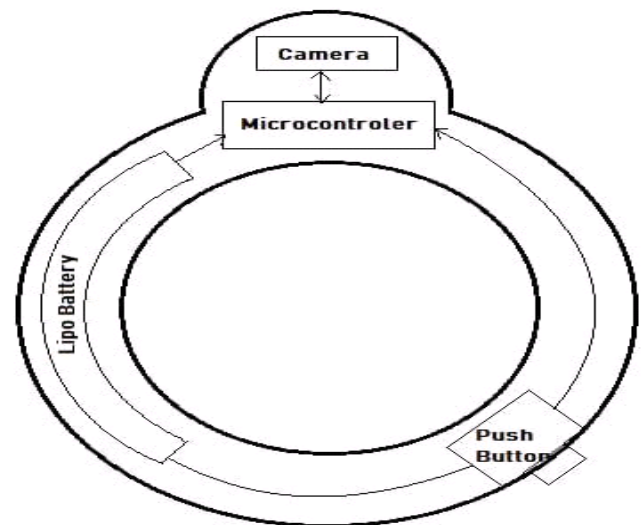


Fig -2 : Schematic Diagram of the Ring

3.6 Flow of control

3.2.1 Sender's side

The figure depicts that the ring is paired with the client application via Bluetooth. The ring initially sends the input signal to the app after pressing the push button on it followed by sending the captured images. The client application in turn sends the location information and the images to the server and the pre-defined contacts. These shared information via client app will be updated periodically to the server.

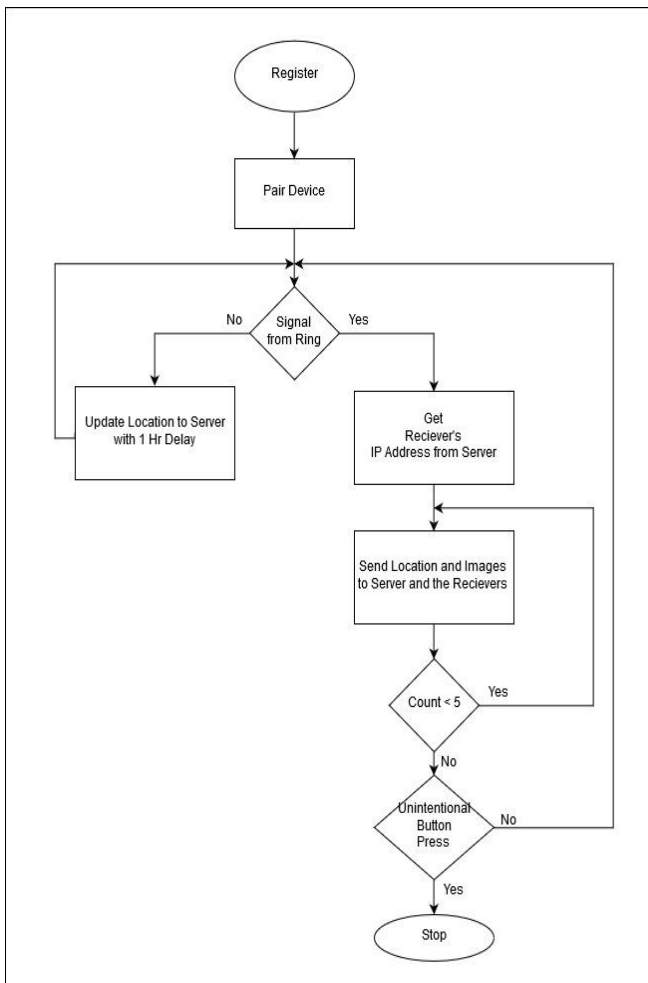


Fig -3 : Sender's side Flow Diagram

3.2.2 Receiver's side

This flow diagram depicts the general flow of control taking place at receiver's (pre-defined contacts) side. Initially, the receiver has to register on the application. Receiver now waits for socket request from the sender in order to establish the connection. Once, the connection is established receiver will get the sender's location and the images with certain delay.

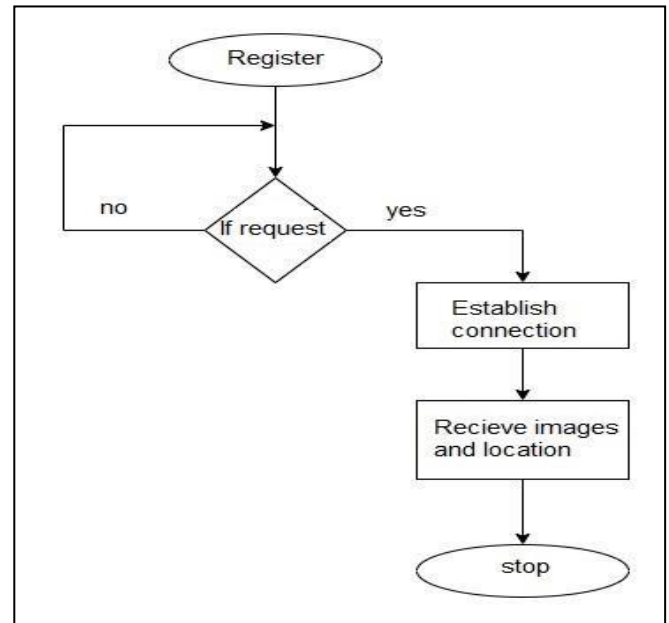


Fig -4 : Receiver's side Flow Diagram

4. CONCLUSIONS

The proposed design of the Women Safety Ring will help women to be safe in any critical situations like rape, harassment, molestation, etc. in the society. The prototype of the system developed is user friendly, cost effective and light weighted. Whenever a woman feels insecure or threatened, this system can be used to provide efficient results just by the push of a button. The system helps the victim to reach to the near and dear ones as soon as possible in case of emergencies. This system also captures images of crime scene, which can be used as a proof to help her get justice in case of serious crimes like acid attack, murders etc. The programmed application stores the captured images as well as updates victim's location periodically. This is very helpful because in case of mobile phone damage we will still be able to get her last location. Before commercial production, by implementing the following features, the design of the developed prototype of the women safety ring can be improved

- By making the ring as per the skin color so that it will camouflage and won't become visible to the assailant.
- Making the ring lighter weight so that it will not become a distraction to the women wearing it.
- Providing an indication of the battery percentage, especially when running low.
- By making the ring independent of the mobile device, so that when the ring goes out of range

with mobile Bluetooth the communication won't be interrupted.

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REFERENCES

- [1] Shubham Sharma, Fasil Ayaz, Rajan Sharma, Divya Jain," IoTBased Women Safety Device using ARM7 " , International Journal of Engineering Science and Computing, Volume : 7, Issue : 5, May 2017,
- [2] Aditya Patil, Prasenjeet Nikam, Shubham More, Saurabh Totewar , R.A.Jain , " Women's safety using IOT" , International Research Journal of Engineering and Technology, Volume: 4 ,Issue: 05 , May-2017 , e-ISSN: 2395 -0056.
- [3] Navya R Sogi, Priya Chatterjee, U Nethra, V Suma "SMARISA: A Raspberry Pi Based Smart Ring for Women Safety Using IoT", 2018 International Conference on Inventive Research in Computing Applications (ICIRCA) , INSPEC Accession Number: 18358063.
- [4] Manish Zadoo, Piyush Kumar Verma, Arpit Sharma, Dhruv Varshney, " Women safety device with gps,gsm and health monitor" , International Research Journal of Engineering and Technology, Volume: 5 ,Issue: 03 , Mar-2018 , e-ISSN: 2395 -0056.
- [5] S. A. More, R. D. Borate, S. T. Dardige, S. S. Salekar, Prof. D. S. Gogawale "Smart Band for Women Security Based on Internet of Things (IOT)", International Journal of Advance Research in Science and Engineering (IJARSE) , Volume: 06, Issue: 11 ,November 2017 ,ISSN: 2319-8354
- [6] <https://nimb.com/>