Smart Ring for Women Safety

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Abstract : Every day, every woman, young girls, mothers and women from all walks of life are struggling to be safe and protect themselves from the roving gaze of the horribly insensitive men who molest, assault and violate the dignity of women on a daily basis. The streets, public transport, public places have become the dominion of the hunters. Due to these atrocities that women are subjected to in the present scenario, a smart security wearable device for women based on Internet of Things is proposed. It is implemented in the form of a smart ring and comprises of Arduino Pro Mini, HC-05 Bluetooth Module, Push Button to activate the services and various other parts. This device is extremely portable and can be activated by the victim on being assaulted just by the click of a button that will send an alert to the users registered in the app. The message will be sent to predefined emergency contact numbers or police via smart phone of the victim thus preventing the use of additional hardware devices/modules and making the device compact.

IndexTerms – Women safety, safety ring, arduino.

I. INTRODUCTION

The status of ladies in India has been liable to numerous extraordinary changes in the course of the last couple of centuries. In current India, Women are dealt with on parallel grounds with men. They have turned out to be Independent and are keeping pace with the evolving patterns. Be that as it may, in a few sections ladies still keep on facing separation and other social difficulties and are regularly casualties of mishandle and vicious violations. Because of these reasons it has turned out to be vital for females to remain alarm and handle every single such circumstance proficiently when they are distant from everyone else. Ample opportunity has already past that we furnish ourselves to manage such overwhelming circumstances. Neither ladies nor their families need to stress over the time or places when they go out. All they require is a gadget that can be conveyed effortlessly and worn at whatever point the lady feels risky. Here we present a wearable ring which ordinarily fills in as a common watch. It additionally fuses a electronic unit that will help the casualty to speak with their family or police at the main indication of inconvenience. It additionally actuates an alert from the mobile which is associated by means of bluetooth. This empowers to pick up consideration of others to the situation. These requests the need of extra equipment which brings about expanded size and weight. Every one of these imperfections can be amended by utilizing the innovation so the capacities like following, informing and ready caution can be performed with the assistance of an advanced cell on accepting the charge. The caution will get enacted and ready message with area will be sent to a predefined number.

II. LITERATURE SURVEY

Authors of [5] have worked on the use of Internet of Things (IoT) that leads to the Smart Security technology. They have highlighted the development of a safety device called the Smart Band that communicates with a Smart Phone that has access to the Internet, thereby, alerting the victim's family, friends and police about the incident, aided by GPS tracking and message services [5]. Also, authors of [6] have proposed a smart intelligent security system for women and have shown their concern regarding various issues faced by women. Their proposed system uses two objects, a wrist band and spectacles, where the band incorporates a switch to activate a screaming alarm and tear gas mechanism for self-defending purpose and also sends alert messages and location to emergency contacts. The system also incorporates a mechanism to figure out the attacker using a live streaming video [6].

Authors of [7] have developed a smart security device based on IoT concept. Throwing light on societal challenges faced by women, a device called "watch me" has been proposed that includes a sensor to detect the heart beat rate of a person that will become high when the woman is in danger, generating an alarm sound to grab the attention of nearby people. The device also automatically makes a call to registered contacts and supports GPS tracking to track the victim's location [7]. Authors of [8] have described the deployment of Internet of Things in the physical world across many sectors. The paper presents a novel approach to collect data from the devices using sensors and many case studies in which it can be applied, through a sample demonstration of smart home based on this principle [8].

Suraksha: The device is based on Blood pressure sensors and sends a help message to registered numbers and location tracking [9].

Child Safety wearable device: This device enables to track the daily activity of children and also locate the child using Wi-Fi and Bluetooth services present on the device [10].

HearMe: An application that includes lock screen access and instant siren on the receiver device and can be accessed through hardware buttons to facilitate quick access to the woman [11].

Femme: It consists of a device and a smart phone that are synchronized using Bluetooth, which triggers the instant location to the registered contacts and includes audio recordings [12].

Abhaya app: It is an android app which was mainly developed for women safety that provides instant location to the registered contacts by pressing a single power button in the phone [13].

III. PROBLEM STATEMENT

To design and develop a Smart Ring which has the following features:

1. The ring is Bluetooth enabled.
2. It connects to Bluetooth of user's mobile for sending alerts.
3. It has a push button which when pressed sends alert signal to phone.
4. On receiving alert from ring the phone send message to predefined emergency numbers.

3.1 Flowchart

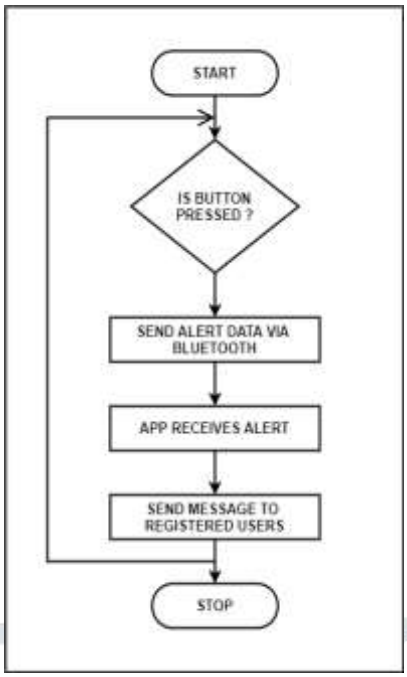

Figure 1: Flowchart for Smart Ring for Women Safety

3.2 System Architecture and Block Diagram

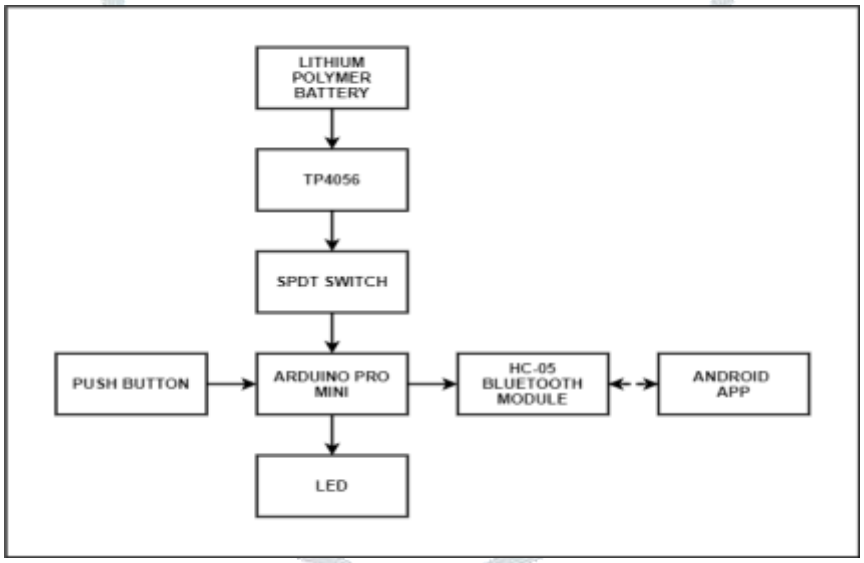

Figure 2: Block diagram for Smart Ring for Women Safety

3.3 Hardware Used:

1. Arduino Pro Mini (Microcontroller-Atmega328p – 8 BIT AVR controller)
2. HC – 05 Bluetooth Module
3. Push button
4. TP4056 (Battery charging module)
5. Li – polymer battery
6. LED
7. SPDT slider switch
8. PCB, wires, USB cables for connections.

3.4 Software Used

1. Arduino IDE
2. Fritzing
3. MIT App Inventor 2

3.5 Circuit Diagram

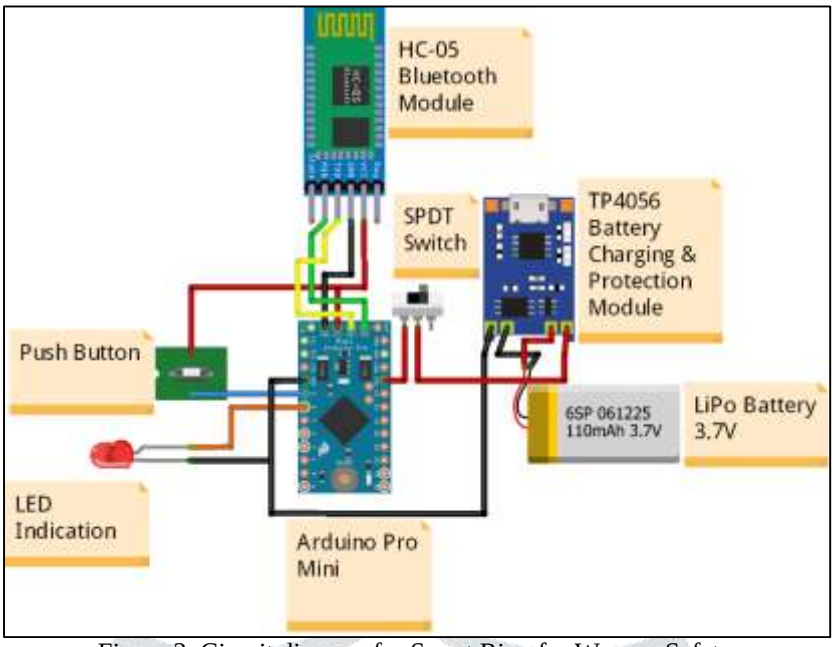

Figure 3: Circuit diagram for Smart Ring for Women Safety

3.6 Working

1. The project uses Arduino Pro Mini as the microcontroller.
2. A push button is connected to the digital pin of Arduino Pro Mini.
3. When the push button is pressed it sends an alert signal to the user's mobile.
4. HC-05 Bluetooth Module is used for this purpose.
5. The HC-05 Module connects with the user's phone over Bluetooth protocol.
6. The mobile application is developed using MIT App Inventor 2.
7. Emergency contact numbers are saved by the user in the mobile app.
8. When an alert is sent from the ring the app receives the signal and sends a message to all the emergency contacts that are predefined in the app.
9. The device has a led for indication of alert signal sent, a SPDT switch for on/off.
10. The device is powered using LiPo battery and a charging and protection module TP4056 is also used.

3.7 Implemented Circuit

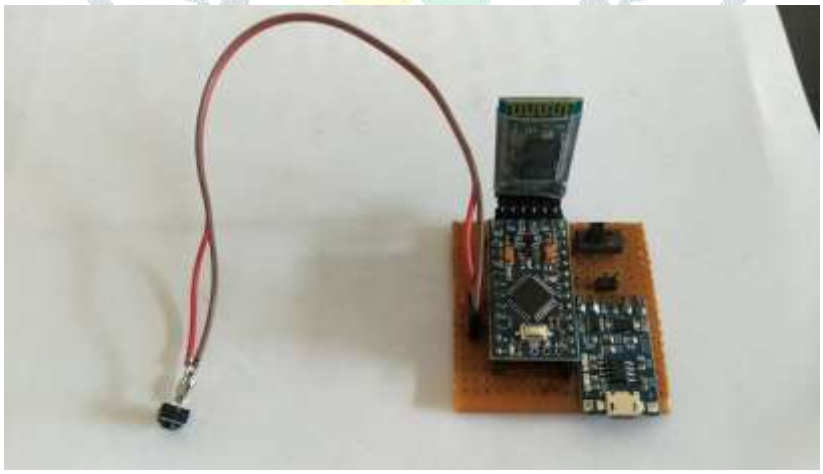

Figure 4: Implemented Circuit for Smart Ring for Women Safety

IV. Advantages, Disadvantages & Applications

4.1 Advantages

1. Easy to use.
2. Convenient to carry.
3. Requires less power consumption.
4. Sends message instantaneously.

4.2 Disadvantages

1. Device is bit bulky.
2. Requires a mobile phone for sending alert messages.

4.3 Applications

This device is suitable not only for women's safety but can also be used by anyone. As it acts as a safety device for women it can be also used as a safety device for kids.

V. Conclusions & Future Scope

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. Before actual 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 colour 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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