TAMILNADU STATE COUNCIL FOR SCIENCE AND TECHNOLOGY

Women safety Ring

STUDENT PROJECT PROPOSAL

Submitted by

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Introduction:

Women's safety is a critical and pervasive issue that transcends geographical boundaries, cultures, and socioeconomic backgrounds. It encompasses a range of concerns and challenges that women face in their daily lives, from harassment and violence to discrimination and unequal opportunities.
Many women feel unsafe in public spaces due to poorly lit areas, inadequate security measures, and the absence of gender-sensitive urban planning. This limits their mobility and access to education, employment, and social activities. Public transportation systems often pose safety challenges for women. Crowded buses and subways can be hotspots for harassment and assault.

Objective:

Its main objective is to enhance women's safety and empowerment by providing them with a **Ring** equipped with innovative features, real-time connectivity, and user-friendly design, aimed at reducing the risk of harassment, violence, and improving overall well-being.
Enhancing Women's Safety and Empowerment through the Safety Ring involves Enhanced Safety and Security, Reducing the Risk of Harassment and Violence, Immediate Response and Assistance, Innovative design.

Methodology:

We have proposed solution in two phases one is in software and other one is hardware.
In hardware section of the solution, we have designed a product which comprises of SOS alarm, and Wi-Fi connectivity that is been powered by solar sheet that is thinner than hair and been developed by IIT Madras and a lithium battery cell for emergency purposes.
The basic concept is like the ring is connected to a network 24/7 during emergency when he/she is in danger the ring is broken (hitting wall) by that person who is wearing the ring and automatically network connection is broken then a predefined state is triggered through the cloud service. Here 2 possibility occurs one-false alarm, second-true alarm either of this possibility may occur and a warning is sent to the paired device when that person doesn't respond to the warning then emergency state is triggered (which is predetermined) and location of that person is sent to the police.

Stages:

1. Wearable Device (Ring):

-Device equipped with sensors and communication capabilities.

2. 24/7 Network Connection:

- The ring is continuously connected to a network service, typically through a wireless connection like Wi-Fi or cellular data. This allows it to stay in communication with a cloud-based service.

3. Emergency Situation:-

When the person wearing the ring finds themselves in an emergency or a dangerous situation, they can trigger an alert. This physical action serves as a manual trigger for emergencies.

4. Predefined State Triggered:

- After the network connection is broken, the ring sends a signal or message to a cloud-based service.

5. Two Possibilities:

- **False Alarm:** If it turns out to be a false alarm (the wearer accidentally broke the ring without being in real danger), the system can still send a warning message to paired devices or contacts. This ensures that any misunderstandings are quickly resolved.
- **True Alarm:** If it's a real emergency, and the wearer is indeed in danger, the system proceeds to the next step.

6. Warning Sent to Paired Device:

- In the case of a true alarm, a warning message is sent to a paired device, such as a smartphone or another wearable device. This message informs the designated contacts or authorities about the emergency situation.

7. Location Sent to Police:

- In the emergency state, the system can automatically send the location of the person in distress to the appropriate authorities, such as the police. This allows for a rapid response to the emergency.

Work plan:

Development of Proof of Concept(PoC):
By creating a basic proof-of-concept to test the core functionality of the device.

Coding and Programming:
Programming the microcontroller to perform specified operation such as such as detecting impacts, initiating network disconnection, and sending signals to a cloud services. C,C++ is used in programming micro controller and for Software application we use Android studio code with google cloud services.

Building a Physical Prototype:
First a circuit design is made with the components and in first prototype model the base functionality is been implemented with the preceeding prototype models all the finctionality has been implemented and tested .

Test and Iterate:
Test the Design and product in various scenarios to check for false alarms and to verify that the emergency trigger works correctly.

Connect to Cloud Services:
Integrating the Cloud Services Such as like Google Cloud, or other cloud service providers.

User Interface:
An User interface is designed in a user friendly manner for easy understanding .This is Done in android studio code.

Document the Prototype:
Creating a detailed documentation for the prototype, including schematics, wiring diagrams, code documentation, and a user manual.

Applicability:

- Women's Safety Initiatives
- Travel and Tourism
- Personal Safety and Security
- Elderly Care
- Campus Safety
- Healthcare
- Remote or Outdoor Activities
- Security Personnel

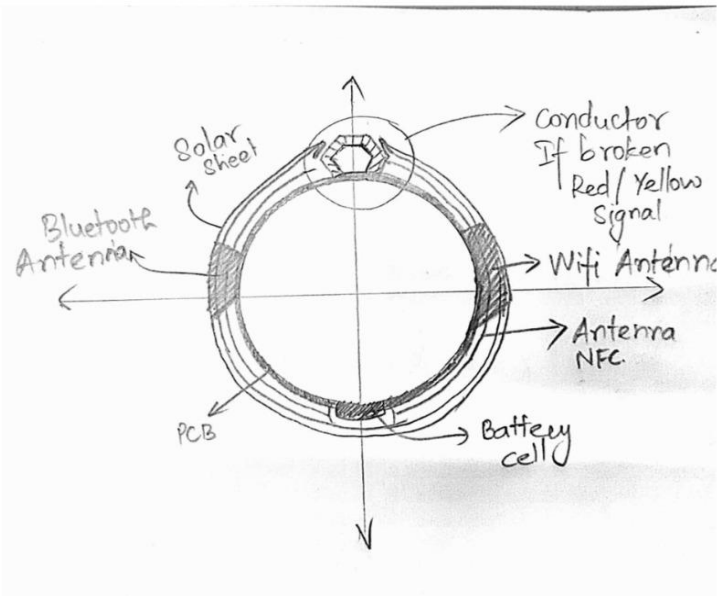
Budget amount:

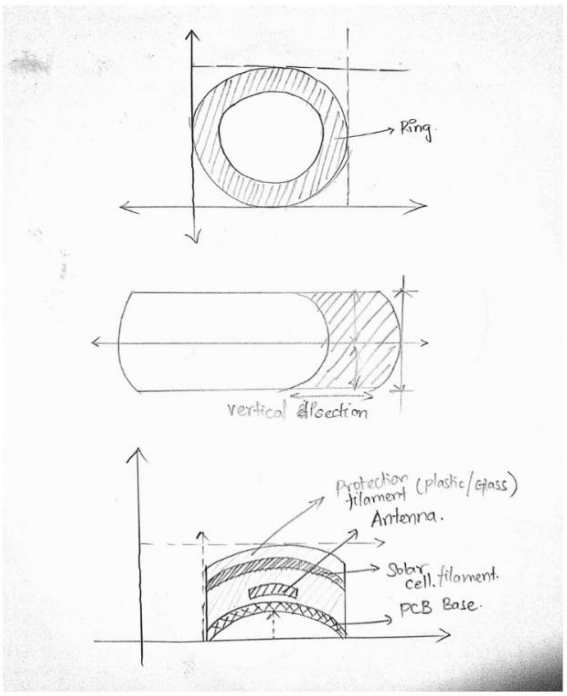
Component	Description	Quantity	Amount in Rs
GigaDevice (GD25LE32D)	32 bit NAND flash memory for code storage	2	100
NRF51822QFABR7	Microprocessor with Bluetooth Low Energy	2	600
MAX4995BAUT+T	Power Load Switch High Side Active 1 Output 5.5 V 600 mA 0.13 ohm SOT-23-6	1	900
NRF52832-QFAA-G-R7	IC RF TxRx + MCU Bluetooth Bluetooth v5.3 2.4GHz 48-VFQFN Exposed Pad	2	1000
PCB design and Ordering	After designing the circuit diagram we would reach out some PCB manufacturer.	10	1000
3D printing the prototype	For prototype design is initially printed using 3D printer.	2	1000
Battery Cell	5v	3	50

Total : ₹ 4650

Extra Details:

Design of Product:





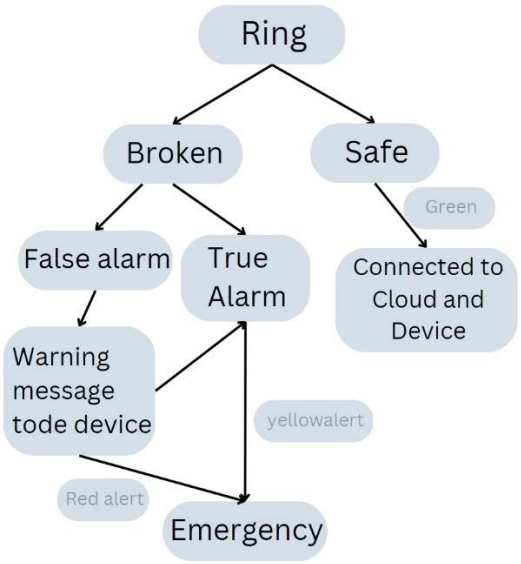


Fig 2 : Flow Diagram

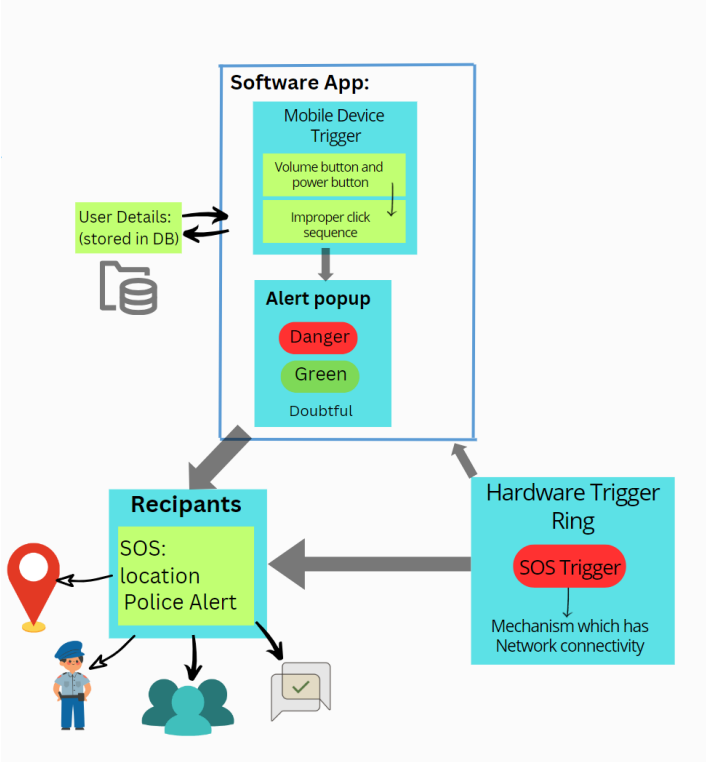


Fig 3 : System Diagram