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TITLE PAGE

- Problem Statement ID – 1605
- Problem Statement Title- Women Safety Analytics – Protecting
- Women from safety threats
- Theme- Miscellaneous
- PS Category- Software+Hardware
- Team ID- MU/ISIH/24/113
- Team Name- Team Raksh

Team Raksh

IDEA TITLE

RAKSH

A Wearable Safety Ring

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Proposed solution:-

Raksh is an innovative wearable safety solution designed to empower women and provide them with a discreet, yet effective way to stay protected.
By combining-

- Advanced sensors
- GPS tracking
- Emergency alert capabilities
- Bluetooth connectivity

Raksh offers a comprehensive approach to personal security.

Addressing the problem:-

Raksh is particularly helpful when a women is confronted with harassment or going for a nighttime stroll alone.
Raksh provides a quick and simple means for users to transmit an SOS in an emergency, thereby addressing the problem of women's safety directly.
Though they are unable to openly utilize typical protection items like pepper spray or take out a phone.
Raksh is covert because it's made to look like an ordinary ring.
Help can be on its way even when the user is unable to ask for it directly because they can broadcast their live location to trusted contacts with just three taps on the ring.

What makes Raksh truly innovative and unique:-

1. Its wearable design—Raksh is a sleek ring that doesn't raise suspicion.
2. The triple-tap system is unique because it prevents accidental alerts.
3. Packed with modern technology—Connects to your phone via Bluetooth, uses GPS tracking, and has real-time alert notifications.
4. Easily accessible in panic situations.

This balance of discretion, ease of use, and advanced features makes it stand out from traditional safety tools and apps.

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TECHNICAL APPROACH

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Technologies to be used:-

- Programming Language:

1. C/C++ for embedded systems (programming microcontroller).
2. Python or JavaScript for the smartphone app.

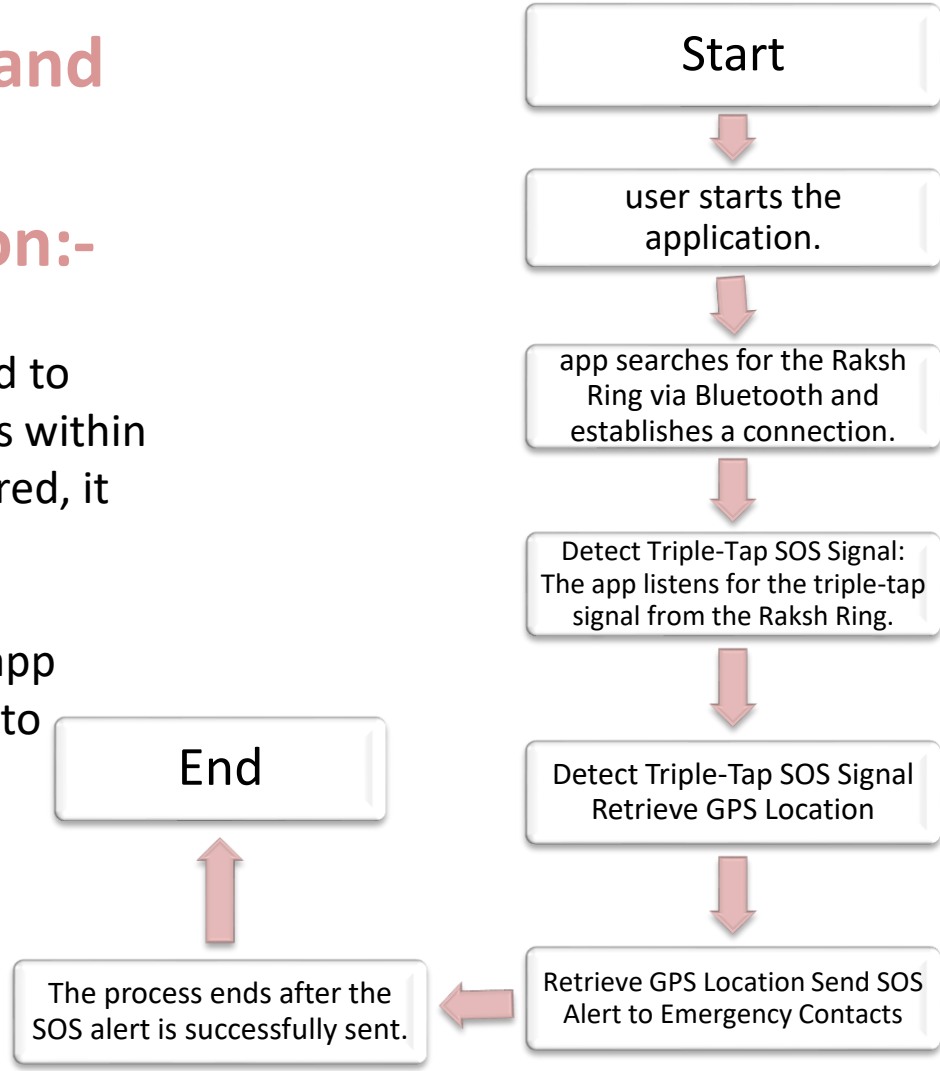
- Hardware:

1. Microcontroller: ATtiny85 or ESP8285 (for compact size).
2. Bluetooth Module: HM-11 (BLE for low power).
3. GPS Module: ATGM336H (for real-time location tracking).
4. Battery: LIR2032 Coin Cell (rechargeable).
5. Tactile Button: For emergency alert activation.

Methodology and Process of Implementation:-

Working Principle:

The ring is programmed to detect 3 button presses within 5 seconds. Once triggered, it sends an SOS signal via Bluetooth to a paired smartphone app. The app sends a real-time alert to predefined emergency contacts, including the user's GPS location.



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FEASIBILITY AND VIABILITY

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Analysis of feasibility of idea:-

- Technical Feasibility:

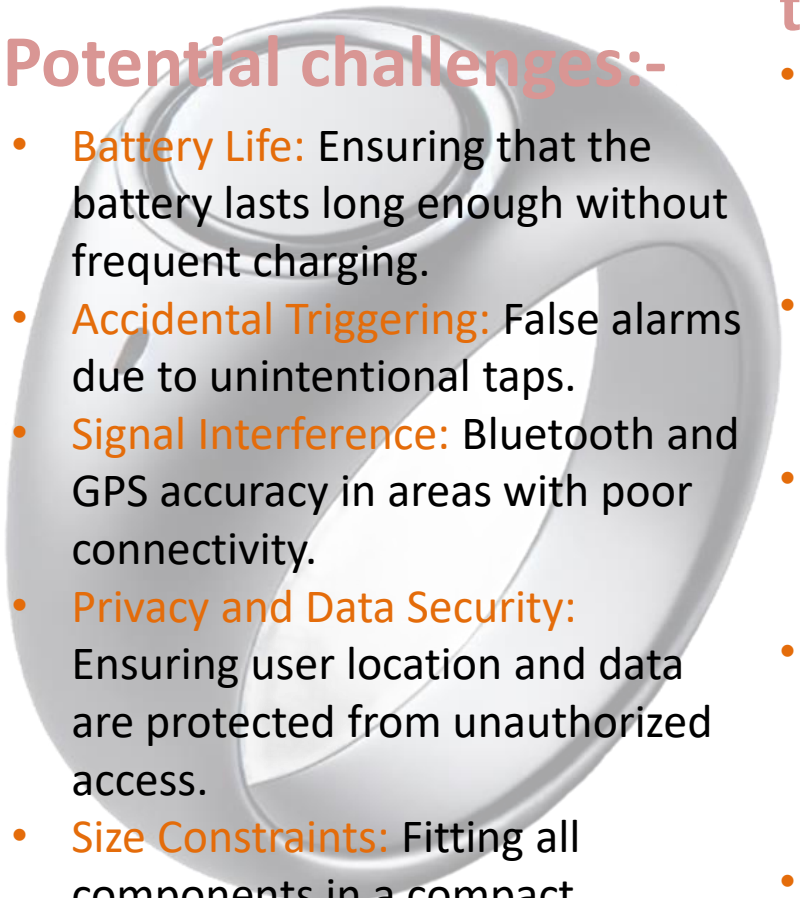
The use of compact components (ATtiny85, HM-11, and ATGM336H) ensures the ring remains lightweight and comfortable. Power optimization through BLE and sleep modes make it energy-efficient.

- Economic Feasibility:

With component costs kept low (₹800 – ₹1300 per device), the production cost is manageable. If scaled, the price can be reduced further, making the device affordable for a wide audience.

- Market Feasibility:

Given rising concerns around personal safety, especially for women, there is a clear demand for discreet safety tools like Raksh.



Potential challenges:-

- Battery Life: Ensuring that the battery lasts long enough without frequent charging.
- Accidental Triggering: False alarms due to unintentional taps.
- Signal Interference: Bluetooth and GPS accuracy in areas with poor connectivity.
- Privacy and Data Security: Ensuring user location and data are protected from unauthorized access.
- Size Constraints: Fitting all components in a compact, comfortable ring design.

Strategies for overcoming these challenges:-

- Battery Life: Use sleep modes in the microcontroller to save power when the ring is idle. Consider integrating wireless charging for user convenience.
- Accidental Triggering: Implement debounce logic and a triple-tap system to minimize false alarms.
- Signal Interference: Add Wi-Fi fallback in the smartphone app when Bluetooth is weak or GPS fails.
- Privacy: Use end-to-end encryption for all data communication between the ring, app, and server to ensure user safety and privacy.
- Size Constraints: Work with flexible PCBs and miniaturized components to optimize space.

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IMPACT AND BENEFITS

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Potential Impact on Target Audience:-

- Primary Audience:

Women, especially those who are concerned about personal safety in public spaces.

- Impact:

By providing an invisible, wearable safety solution, Raksh gives women more confidence and peace of mind. This could reduce fear and increase independence in daily activities, especially at night or in unsafe areas.

Benefits of the solution:-

- Social Benefits: Increases personal safety and security, especially for women. Empowers vulnerable groups like children, the elderly, and individuals with disabilities.
- Economic Benefits: Affordable technology means wider adoption, which could reduce crime and the societal costs associated with personal safety concerns. As the technology scales, job opportunities in tech and manufacturing could rise.
- Environmental Benefits: The device is small and uses low power, which reduces its environmental footprint.

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RESEARCH AND REFERENCES

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Details / Links of the reference and research work:-

- Hackaday:-

Hackaday | Fresh Hacks Every Day

- Wikipedia:-

Wikipedia

- arXiv:-

arXiv.org e-Print archive

- YouTube:-

YouTube

- Reddit:-

Reddit - Dive into anything