# SMART INDIA HACKATHON 2024

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- **Problem Statement ID – SIH1527**
- **Problem Statement Title-** STUDENT INNOVATION
- **Theme-** Disaster Management
- **PS Category-** Hardware
- **Team ID- 42165**
- **Team Name- 1SHEild**

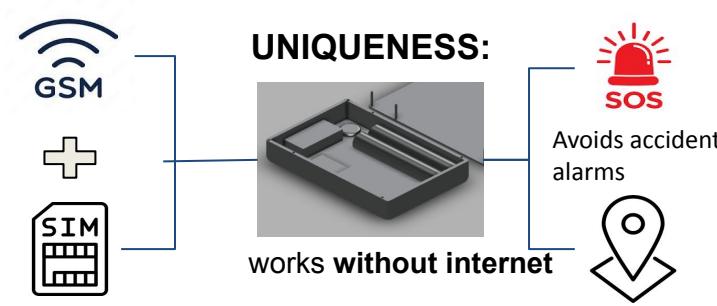
# SHEild: A Handheld, Internet-Free Safety Device

## PROBLEM IDENTIFIED:

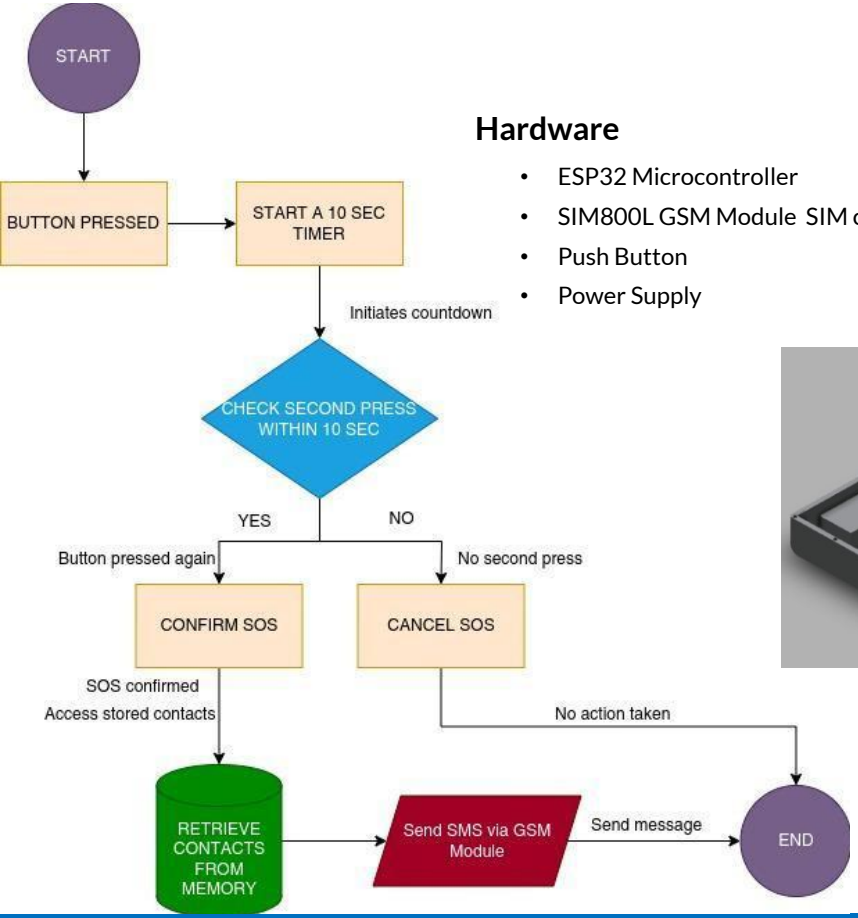
1. **NCRB 2024:** The crime rate in India is 445.9 per 100,000 people.
2. **UNICEF India:** Natural disaster rate : 90%
3. **85% times the victims in both the cases are women, children and senior citizen.**

| System Name | How They Work | Uniqueness and Difference with SHEild |
|---|---|---|
| Emergency Signal Sending Device (Your Project) | Uses a physical button to trigger SOS via GSM, sending GPS location without internet | Works offline, suitable for both disaster and personal safety scenarios, unlike SHEild which mainly focuses on women's safety. |
| Garmin inReach / Spot X | Satellite-based communication to send SOS messages | Reliable in remote areas but expensive and primarily targets outdoor adventurers, whereas SHEild focuses on simple, cost-effective solutions. |
| Integrated Public Alert & Warning System (IPAWS) | Broadcast alerts via radio, TV, and cell networks during disasters | Used for mass alerting; SHEild is focused on individual, personalized alerts. IPAWS is not suited for personal emergency situations. |
| National Disaster Response System (India) | Government-coordinated system for alerting and deploying resources during national disasters | Government-run, focused on large-scale response; SHEild provides personalized safety assistance during emergencies. |
| Safelet / Revolar | Wearable button press that sends alerts via paired phone | Requires smartphone pairing and has limited functionality for disaster use, unlike SHEild which works independently and is more versatile. |
| Shake2Safety | Activates alert by shaking the phone, works with mobile signal | Limited by mobile signal, whereas SHEild uses a dedicated GSM module to ensure alerts are sent even without strong mobile service. |

**Comparison Table: Safety Solutions vs. SHEild**



# TECHNICAL APPROACH

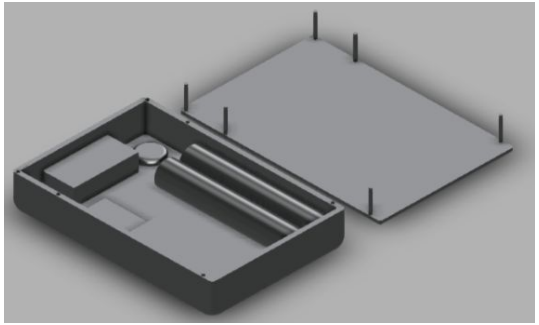



## Hardware

- ESP32 Microcontroller
- SIM800L GSM Module  SIM card
- Push Button
- Power Supply

## TechStack

- Android Studios
- Kotlin
- SQLite
- Arduino IDE



Prototype Designing made in Fusion 360

# WORKING

**User Onboarding and Application Setup**

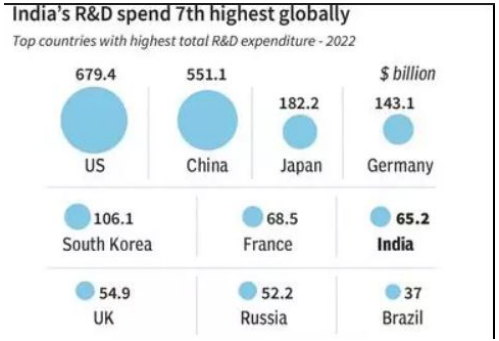
- The user installs the SHEild app
- Using Wi-Fi, the user adds phone numbers of emergency contacts and contacts of the officials into the app.
- The app syncs these contacts with the device via Bluetooth, transferring them to the ESP32 microcontroller.

**Device Structure and Setup**

- The ESP32 is programmed to handle all logic, written in C++ via Arduino IDE.
- The GSM module is connected to the microcontroller to enable communication,
- The push button is used to trigger events.

**User Activation Process / Sending SOS**

- Press Button once to initiate a 10-second timer.
- If pressed again within 10 sec then it sos is sent and if not then
- The microcontroller retrieves the stored contact list and activates the SIM800L GSM Module.
- Offline Functionality: The device **doesn't require internet**; it communicates using the GSM module, making it **suitable for remote locations.**




Since India Focuses on the Research and Development more, if we were to sell our product, we can get good funding ! [1]

# FEASIBILITY AND IMPACT

**Feasibility Analysis:**

- Cost-effective: ₹950-1000 per device.
- Quick assembly: 4-5 days.
- Scalable: Suitable for mass production.
- Easily available components.

**Challenges & Risks:**

- Multiple button presses in panic situations.
- Accidental activation despite delay.
- SOS may fail in no-signal areas.
- High power consumption.

**Strategies to Overcome the Challenges:**

- Debouncing: Ensure single input from multiple presses.
- Retry SOS: Resend if the first attempt fails.
- Deep Sleep: ESP32 conserves power when idle.

**Impact / Benefits:**

- Increased Safety: Quick SOS access, faster response times.
- Empowerment: People in distress can be incharge of thor own safety.
- Reliable: efficient across all areas.
- User-Friendly

**Multiple uses of pur product:**

1. In disaster management (Individual)
2. Women Safety
3. Safety for the general public

**Target**

**Audience**

**People of all ages**

# RESEARCH AND REFERENCES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