TrustNet: An SOS App for Women and Child Safety

Startup Name: Allegiant

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1. INTRODUCTION

1.1 About the System

TrustNet is a mobile safety solution designed to protect vulnerable individuals, with a special focus on **women and children**. It enables rapid emergency communication through a **multi-stage alert system**, live location tracking, and proximity-based notifications. The app allows trusted contacts to respond quickly to potential threats, with escalation options to ensure help reaches the user in time. Discrete recording features provide additional evidence for law enforcement.

The system is built to be intuitive, discrete, and effective in both everyday safety monitoring and high-risk situations, ensuring that women, children, and other at-risk users have a reliable digital safeguard.

1.2 Need for the System

The Women and Men in India 2023 report shows a rise from 359,849 cases in 2017 to over 445,000 in 2022, averaging **1,220 cases daily** and **51 First Information Report (FIRs) per hour for crimes against women (Kidnapping, Rapes, crimes against women's modesty, etc.)**
Despite tougher laws, **rape conviction rates have remained low**, fluctuating between 27%-28% from 2018 to 2022. Mumbai saw crimes against women rise 15% in early 2025.

Crimes against children in Karnataka have risen sharply, with about **10 POCSO (Protection of Children from Sexual Offences Act, 2012) cases filed daily in the first two months of 2025**. In 2024, there were 8,233 cases against children, up from 7,854 in 2023. Of these, 4,003 were POCSO cases, a 38.89% increase since 2021 (2,882 cases). However, **convictions remain low, with only 353 secured out of 13,990 cases recorded between 2021 and 2024.**
Trustnet - An SOS App for Women and Child Safety is an application to prevent such incidents that pervades not only in India, but every corner of the world.

2. BACKGROUND STUDY

2.1 Existing System & Demerits

With rising public safety concerns, especially for women, many SOS-based mobile apps have emerged. These apps provide real-time location sharing, alerts, and evidence capture. However, many existing systems lack key capabilities:

1. **bSafe** – Limited to chosen contacts, has no feature of public alerting.
2. **Noonlight** – US-only, lacks media capture and discreet activation.
3. **Citizen** – Crowd-focused, not personal emergency-centered.
4. **Raksha** – No audio/video capture.
5. **Shake2Safety** – SMS-based only, lacks real-time tracking.

2.2 Proposed System & Merits

Our SOS app introduces a 3-level threat response model:

🟢 **Green**: Shares live location with trusted contacts for low-risk scenarios. Can be turned off only using a pin or password.

🟡 **Yellow**: Discreetly trigger alerts to trusted contacts if green mode is turned off abnormally, trusted contacts have an option to escalate to Red if they suspect trouble.

🔴 **Red**: Can be triggered directly from the app. Activates a silent SOS which shares live location with users of the app in close proximity, records audio/video discreetly for evidence purposes, alerts emergency contacts.

- **Merits:**
  - Multi-level escalation model.
  - Community-driven alerts to nearby verified users.
  - Real-time location with recording features for use as evidence.
  - Built using Flutter which makes it scalable and cross-platform.

This solution offers enhanced situational control, real time alerts for trusted contacts and community help thereby addressing limitations of current alternatives.

3. SYSTEM DESCRIPTION

3.1 Modules of the System

1. **Multi-Stage Alert System**
   - As mentioned in the section above, there is a multi-stage alert system, namely the green, yellow and red modes, which can be used to indicate different levels of distress.
   - Green is the default monitoring level where trusted contacts can track the live location of a user, yellow alerts said contacts in case a distress situation is suspected, while red indicates a distress signal, alerting nearby users and the trusted contacts that the user needs help, while discretely turning on audio/video recording to be used as evidence.
2. **Live Location Tracking**

- ○ Continuous, secure location sharing in Green and Red Modes.
- ○ Proximity filtering in Red Mode using the **Haversine distance formula** and **GeoFlutterFire** to identify and alert users within a defined radius.

3. **Suspicion-Based Alerts**
   - ○ Automatic detection of abnormal monitoring interruptions during green mode.
   - ○ Prompts the contact circle to assess the situation and take appropriate action.

4. **Proximity-Based Emergency Notifications**
   - ○ During Red Mode, alerts are sent to users nearby who may assist or notify authorities.
   - ○ Geospatial queries ensure alerts reach the relevant responders, those who are close by, as soon as possible.

5. **Discrete Audio and Video recording**
   - ○ During Red mode, users' devices can start recording audio and video clips that can be used later as evidence to aid in the legal process.

3.2 Users of the System

1. **Primary Users** – Individuals prioritizing personal safety, especially women and children who may be more vulnerable to harassment, assault, or abduction.
2. **Trusted Contacts** – Parents, guardians, trusted friends, or family members who can monitor safety, receive alerts, and escalate/de-escalate alert modes.
3. **Users nearby** – App users in geographical proximity during Red Mode, potentially including community volunteers, local residents, and security personnel who can provide immediate assistance.
4. **Emergency Services -** Contact authorities in the event of a Red Mode alert so that they may also quickly respond to potentially dangerous situations immediately.

3.3 Future Scope

1. **Decentralized storage of evidence using IPFS and Blockchain**
   Future app versions can record and upload short audio/video clips from user microphones during red alerts to a blockchain system like IPFS (Interplanetary File System) for censorship-resistant, tamper-proof evidence.

2. **Accidental Trigger Prevention and Confirmation Mechanisms**
   Future updates to the system will minimize false alerts through smart confirmation methods like fingerprint scans or quick cancellation options. Additionally, utilizing sensor fusion (microphone, accelerometer, location) options too, the system can detect unusual behavior.

3. **Offline Alerts**

When the internet is unavailable, SMS can be used to send emergency alerts with GPS coordinates and/or emergency type (Green/Yellow/Red) to trusted contacts.

4. SOFTWARE AND HARDWARE REQUIREMENTS

- **Git and GitHub**

  For version control and collaborative development across team members.

- **Flutter and Dart**

  A cross-platform UI toolkit used to build the mobile app for Android and iOS. Flutter uses the programming language, Dart, to write the app's logic and interface.

- **Firebase tools**

  Firebase is a mobile development platform. Firebase tools like Firestore and Firebase cloud messaging will be used to develop the back-end.

- **Android phone**

  To test/run the application and to use the sensors, GPS and mic.

- **Google Maps API:**

  To display locations on a map interface, and give directions to other users to reach the location of a user in distress.

5. CONCLUSION

The alarming rise in crimes against women and children in recent years highlights the urgent need for effective, accessible safety solutions. While existing SOS applications offer some protection, many lack personalized emergency response features and evidence capture capabilities. TrustNet aims to bridge this gap by leveraging intuitive triggers and robust location-sharing mechanisms, ensuring timely assistance and improved security outcomes. By empowering individuals with proactive and discreet tools for help, TrustNet contributes meaningfully toward safeguarding vulnerable populations and supporting a safer community.