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A Review Paper on Women's Safety: A Web Application

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Abstract: *The safety of women remains a persistent matter of concern, which needs to be addressed through legal, social, and technological interventions on priority. The current study examines three exemplary cases: Nirbhaya (2012), Bhanwari Devi (1992), and Ayesha Meera (2007)—all of them being point cases that impacted legal reforms, media coverage, and policy action. Other than this, this review takes into account existing women's safety applications (bSafe, Safetipin, VithU), identifies overall vulnerabilities in safety apps, and introduces an innovative AI-based application, Suraksha, to further ensure women's security. Through the combined endeavours of leveraging technological advancements, legislative changes, and social cooperation, an effective mechanism can be developed for enabling women's security.*

I. INTRODUCTION

Women's safety is a basic human right that is crucial for the attainment of gender equality and social progress. Despite progress, issues like sexual harassment, discrimination in the workplace, and gender-based violence continue to exist. This paper discusses:

- 1) Major legal case studies that shaped India's legal framework.
- 2) Emerging technological trends, specifically mobile apps and AI-driven security solutions.
- 3) Suggested solutions, such as the creation of a next-gen safety app with AI-driven predictions, offline SOS, and wearable integration.

II. LANDMARK CASES IN WOMEN'S SAFETY

1) Nirbhaya Case (2012)

- a) Incident: A 23-year-old student was brutally gang-raped in Delhi, sparking protests across the country.
- b) Legal Impact: Resulted in the Criminal Law (Amendment) Act, 2013, which brought stricter punishments and fast-track courts for sexual crimes.
- c) Technological Relevance: Sparked the innovation of safety apps with SOS alarms, GPS monitoring, and public surveillance systems.

2) Bhanwari Devi Case (1992):

- a) Incident: A social worker was attacked while campaigning against child marriage.
- b) Legal Impact: Resulted in the Vishaka Guidelines (1997) and subsequently the Sexual Harassment of Women at Workplace Act, 2013.
- c) Technological Relevance: Forced anonymous reporting websites and workplace safety software.

3) Ayesha Meera Case (2007)

- a) Incident: A pharmacy student was raped and killed in her hostel, pointing to forensic investigation lapses.
- b) Legal Impact: Triggered discussions on hostel security and forensic investigation enhancement.
- c) Technological Relevance: Demanded AI-based predictive safety notifications in schools.

4) Comparative Analysis

a) Legal Frameworks

- Nirbhaya Case: Thorough legal amendment on sexual violence.
- Bhanwari Devi Case: Established workplace harassment laws.
- Ayesha Meera Case: Brought attention to the lack of forensic investigation.

b) *Social Impact*

- Nirbhaya Case: The unified protest of the people raised massive awareness and activism.
- Bhanwari Devi Case: Made rural women and grassroots workers more empowered.
- Ayesha Meera Case: Raised questions on institutional accountability and the safety of students.

III. EXISTING APPLICATIONS ANALYSIS

A few women's safety apps offer emergency assistance and live tracking. This essay compares bSafe, Safetipin, and VithU based on features, benefits, and limitations.

A. *bSafe*

- 1) Features: Recording videos, SOS, simulation calls, live tracking.
- 2) Limitations: Internet required, battery drains quickly.
- 3) Recommended Improvement: Offline SOS triggering and risk detection using AI.

B. *Safetipin*

- 1) Features: Location-based safety scores, community audits, and night tracking.
- 2) Limitations: Limited global coverage, requires manual input.
- 3) Suggested Improvement: Automatic AI-based safety audits and real-time incident reporting.

C. *VithU*

- 1) Features: One-tap emergency message, 2-minute location updates.
- 2) Limitations: No real-time tracking, no sophisticated safety features.
- 3) Recommended Improvement: GPS-based tracking with live updates.



IV. COMMON CHALLENGES IN SAFETY APPS

- 1) Connectivity Problems: Internet dependence restricts access.
- 2) Battery Drain: GPS monitoring uses a lot of power.
- 3) Few Features: Most apps have minimal SOS alerting features.
- 4) User Participation: Some apps need manual initiation, which lowers effectiveness during emergencies.

V. PROPOSED SOLUTION: SURAKSHA

To overcome these limitations, this paper proposes Suraksha, a next-generation safety app with:

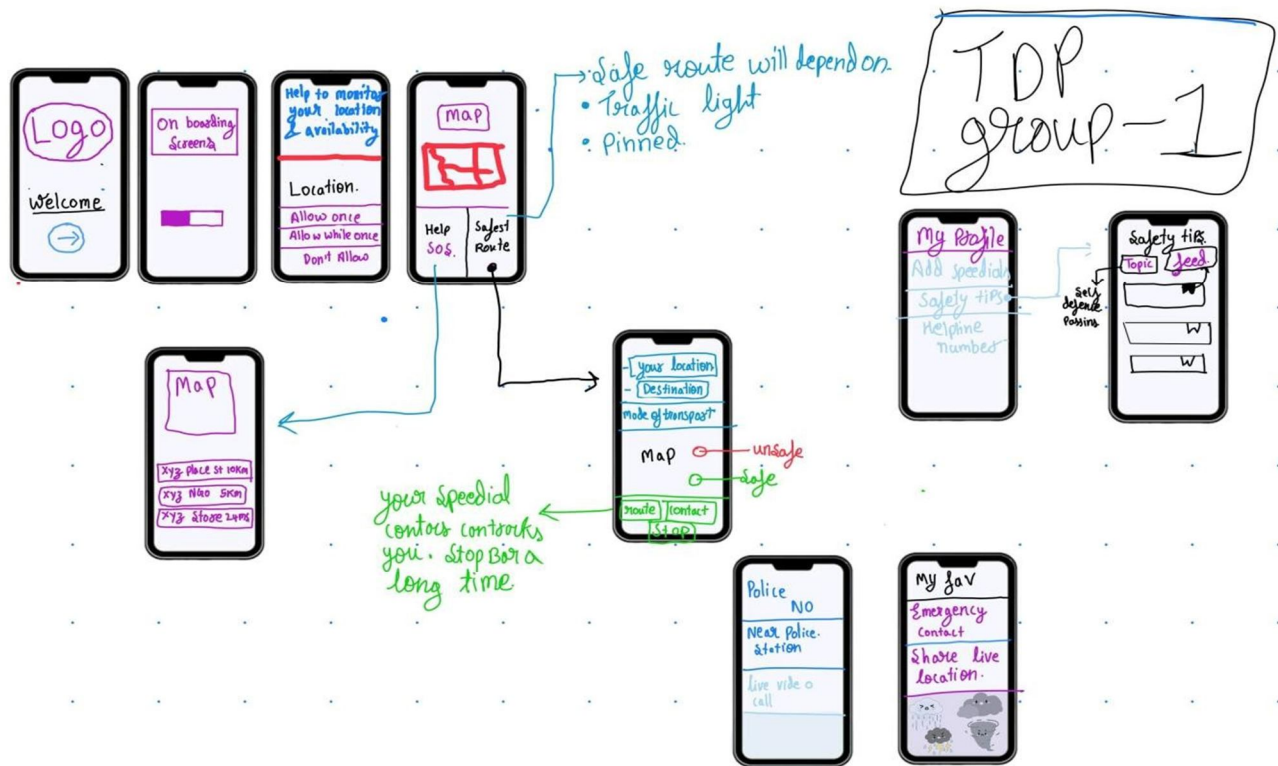
- 1) Offline SOS Activation – Internet-free emergency alerts via SMS.
- 2) AI-Based Safety Predictions – Identifies risk zones from past accidents.
- 3) Wearable Integration – Enables easy distress calls via smartwatches.
- 4) Voice & Gesture-Based Emergency Triggers – Enables hands-free SOS calling.



VI. IMPLEMENTATION PLAN

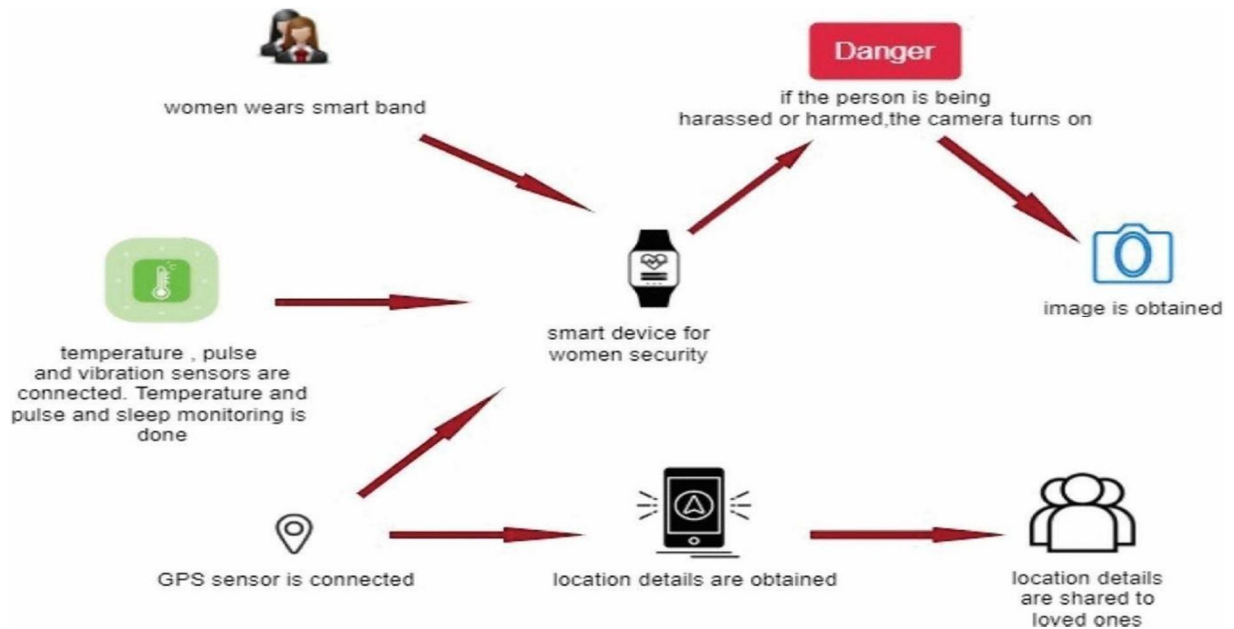
The development of Suraksha is a process that is structured:

- 1) Phase 1: Research & Analysis – Determine safety concerns and app limitations.
- 2) Phase 2: UI/UX Design & Wireframing – Offer ease of navigation and user-friendliness.
- 3) Phase 3: Technology Stack Selection – Use Flutter/React Native for frontend, Node.js/Django for backend.
- 4) Phase 4: Development & Integration – Run AI safety predictions, offline functionality, and wearable integration.
- 5) Phase 5: Testing & Security – Run data encryption and battery performance optimization.
- 6) Phase 6: Deployment & User Feedback – Roll out beta release, get feedback, and mould features.



VII. TECHNOLOGICAL ADVANCES

- 1) Safety apps that include real-time tracking.
- 2) Enhanced monitoring in workplaces and public areas.
- 3) Forensic tools with advanced capabilities for crime solving.



A. Non-AI Technical Tools

- 1) Safety Alarms: Handheld systems producing loud noises to discourage attackers and grab attention.
- 2) GPS Trackers: Systems that allow real-time location sharing with trusted acquaintances or authorities.
- 3) Panic Buttons: Used in public areas and cars, so that emergency services can be contacted instantly.

B. Mobile Applications

AI-based mobile applications are another major support pillar of women's safety. These applications can be driven by sophisticated algorithms that can offer features like predictive threat analysis, voice commands, and geofencing.

- 1) base: Live GPS tracking, auto SOS messages, and audio/video recording capabilities during crises.
 - 2) Safaitic: Application based on artificial intelligence that assigns scores to locations based on lighting, safety, and crowd levels.
- Mobile applications with AI also provide women with the ability to report crimes in a discreet way, which creates actionable information for law enforcement.



C. Surveillance Systems

Artificial intelligence-fortified surveillance systems are used for monitoring public spaces and detecting suspicious behaviour. Such systems, with the help of computer vision, detect unusual behaviour, follow the individuals, and identify potential threats.

Facial Recognition Technology: AI will identify a known convicted offender or a designated threat and alert the authorities proactively.

Crowd Behaviour Analysis: AI algorithms can monitor crowd movements to identify aggression or distress signs.

D. Chatbots and Virtual Assistants

Chatbots and virtual assistants based on AI can immediately offer informational and emotional support to women in distress. They are NLP-driven chatbots that can initiate a conversation to provide immediate relief

They can connect users with helplines, counselling services, or legal aid.

The AI system may also collect incident data anonymously to analyse statistical and policy-making purposes.

E. Predictive Analytics

AI algorithms will look at the historical data and real-time input to predict high-risk zones and times for crimes against women

- 1) Crime Mapping Tools: Law enforcement agencies can use predictive models to identify criminal hotspots and allow focused patrolling.
- 2) Policy Formulation: Governments as well as NGOs can utilize predictive analytics to implement interventions that lower risks.

F. Grassroots Safety Initiatives

Delhi Police's "Himmat" App

- 1) Features: A cell phone application that includes a panic button with connection to the police helpline, GPS-based tracking of location, and audio recording in case of emergencies.
- 2) Success Metrics: Enhanced usage resulted in quicker response and high rates of successful interventions.
- 3) Impact: Fostered trust among women and law enforcement authorities, enabling women to report situations confidently.



G. Non-AI Safety Devices

SAFER Smart Jeweller

- 1) Features: Wearable safety devices with GPS tracking and an emergency alert system.
- 2) Real-World Impact: Cases where women employed the use of the device to alert the authorities in case of emergencies, and they were rescued on time.
- 3) Limitations: Excessive costs and dependency on internet connectivity made it out of reach for low-income groups.

H. Community Watch Programs

Neighbourhood Patrols:

- 1) Female Community Patrol: within a section that is known to experience harassment,
- 2) Community Implementation: public spaces are monitored with patrols as they work directly with local law enforcement for surveillance.
- 3) Results: the activity decreased markedly as there is enhanced security of female patrol members in public areas.

I. Proposed Solutions

1) Legal Recommendations

- Implementation: Effective implementation of current laws.
- Judicial Efficiency: More fast-track courts to quickly dispose of cases.
- Victim Protection: Thorough victim and witness protection schemes.

2) Social Recommendations

- Awareness Programmer: Conduct gender sensitivity programs in schools and workplaces.
- Community Involvement: Encourage bystander intervention and neighbourhood watch programs
- Educational Programmer: Integrate women's safety lessons in school education.

3) Technological Innovations

- AI-Based Surveillance: Use facial recognition and behaviour analytics for threat detection.
- Safety Wearables: Create wearables with GPS and panic buttons.
- Forensic Advancements: Develop portable DNA testing kits and blockchain for safe evidence storage.

VIII. CONCLUSION

Women's security requires an effort from multiple sectors to combine technological advances, the legal system, and civil society. Suraksha App is an AI-based, offline-enabled, and wearable-friendly solution to enhance safety. In addition, case law landmarks like Nirbhaya, Bhanwari Devi, and Ayesha Meera highlight the need for legal changes, enhanced security, and active public involvement. With the power of technology, more effective law enforcement, and awareness campaigns, we can move toward a secure and equitable society for women.

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