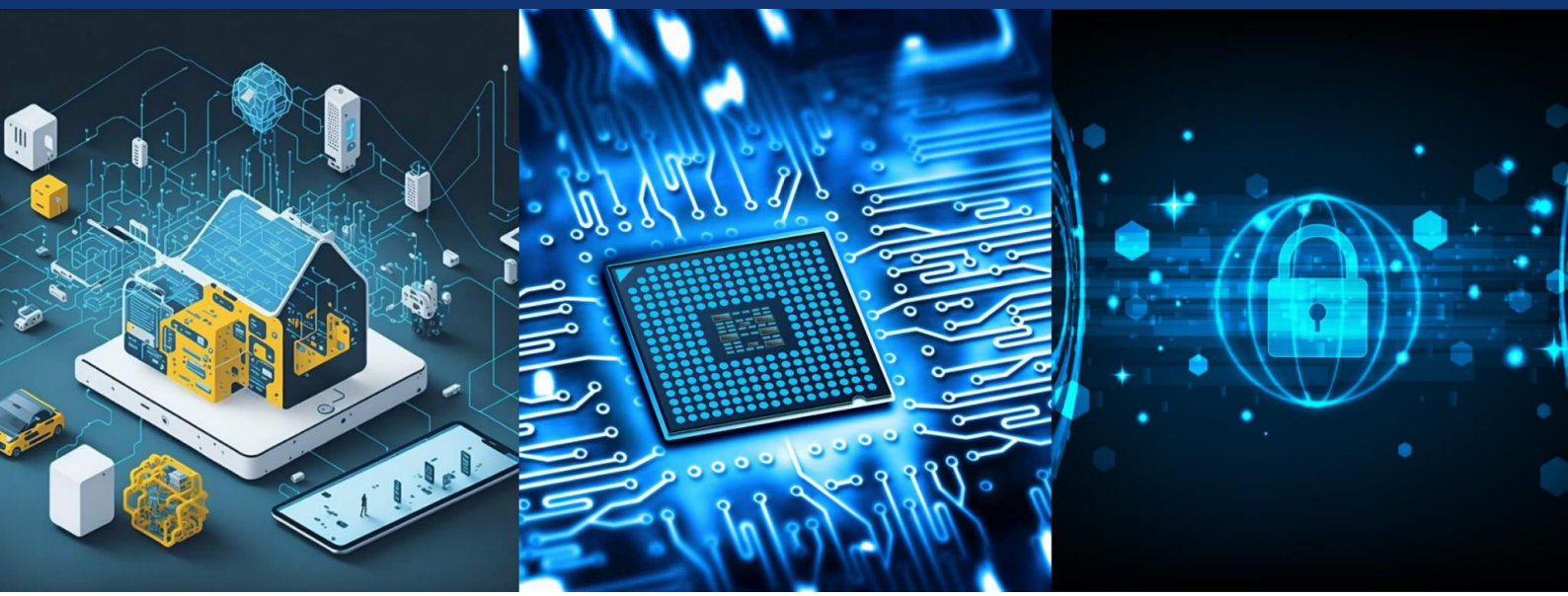
IJIRCCE

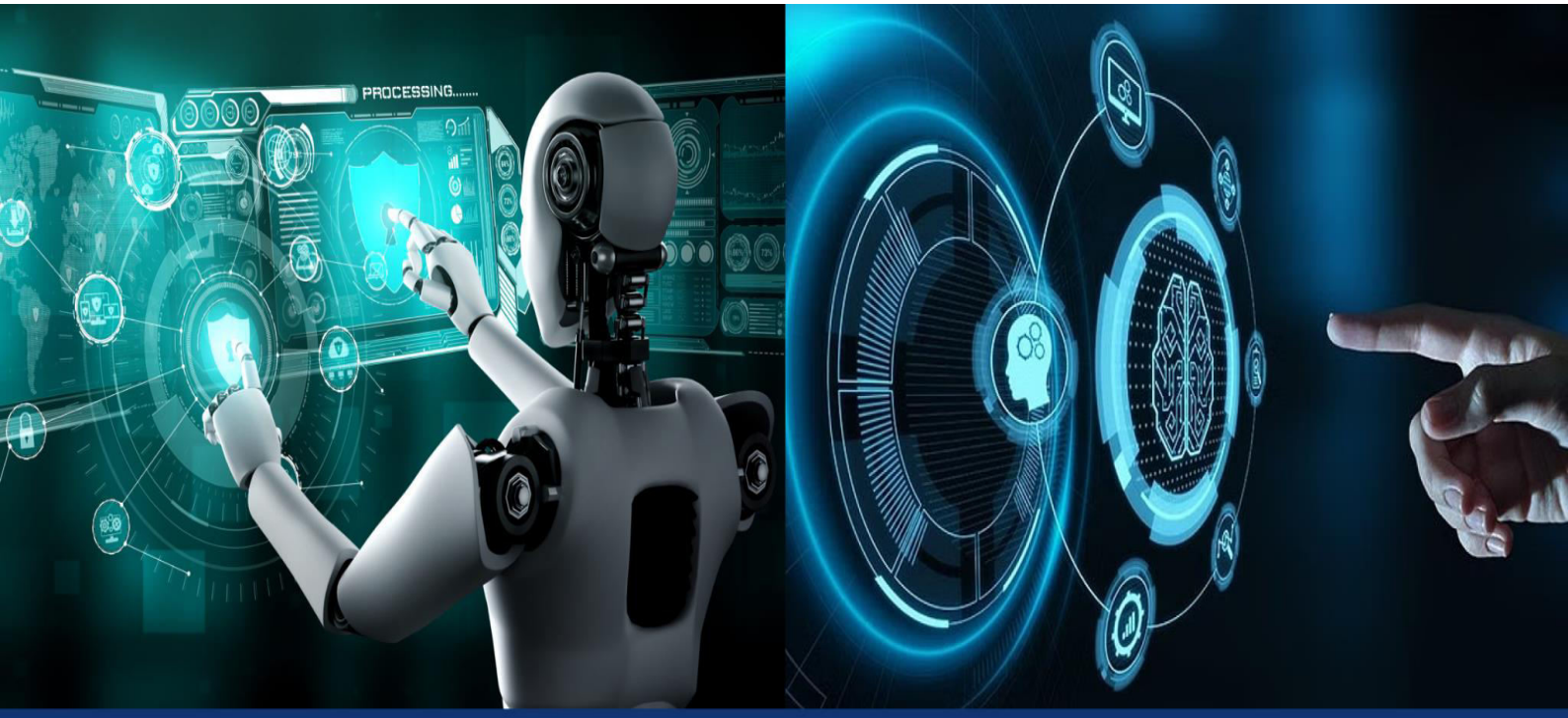
ISSN(O): 2320-9801

ISSN(P): 2320-9798



International Journal of Innovative Research in Computer and Communication Engineering

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.771

Volume 13, Issue 5, May 2025

© 2025 IJIRCCE | Volume 13, Issue 5, May 2025| DOI:10.15680/IJIRCCE.2025.1305118

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Safety First: Evaluating the Awareness and Usage of Safety Apps among Women

Gnaneshwari R, Piyush Gattani, Likitha S, Krithika, Hari Priya, M.R Padmapriya

PG Students, MCA Department, Jain Deemed to be University, Bangalore, India

Assistant Professor, School of CS & IT, Jain Deemed to be University, Bangalore, India

ABSTRACT: With increasing interest from across the world in women's safety, mobile safety apps have come into the limelight as digital resources claimed to enhance one's safety and provide immediate assistance in times of need. Throughout this paper, the whole market of safety apps dedicated to women will be analyzed based on their core features, their added-value benefits that might be provided, and drivers to use and stick with them. It highlights how, by functionalities like real-time sharing of locations, emergency notifications, and direct connect with the authorities, these apps can be strong facilitators in asserting the independence and self-esteem of women in navigating public spaces. Although available, however, numerous obstacles like low awareness, privacy concerns, and technology limitations habitually remain opposed to their widespread adoption. The report focuses on the imperative of accessible design, secure data protection, and collaborative cooperation between developers, policymakers, and civil society to bring these digital safety technologies within reach, effective, and efficient. In this process, safety applications can become a useful utility in empowering women and making the world a better and safer place.

I. INTRODUCTION

In the past couple of years, the global increase in cases of gender-based violence, public harassment, and overall concerns of women's safety has re-opened the issue of the need to implement effective means to guarantee their safety. Beginning from city capitals to rural towns, women face threats that evolve from verbal insults and stalking to physical violence and abductions. These problems not just affect their individual well-being but also restrict their liberty to travel, find jobs, and take part in society.

Governments and institutions all over the world have responded in response to legislation change, campaigns, and improvements in urban infrastructure such as increased street lighting, CCTV systems, and women's transport. As significant as such efforts are, they are inclined to be weak regarding providing prompt, personalized feedback in moments of necessity.

Amidst growing unease, digital technology has emerged a force to be countenanced when it comes to personal safety. Widespread use of the smartphone and access to internet through mobile have enabled the development of mobile safety apps—specifically designed to address the safety needs of women. These apps are designed to provide instant support, bridging the gap between emergency responders or contacts of confidence and the user at the press of a button.

The majority of these applications feature such functionalities as real-time GPS location tracking, direct SOS alerts that may notify family members, friends, or local police, and emergency hotline calling at a single tap. Other applications have also added emergency audio/video recording, spoof calling functions that one can use to distract or scare away an assailant, and discussion forums wherein community members are allowed to share safe zones or warnings. Newer applications combine AI and automation further to improve their capacity for detecting potential threats and acting first.

Why the apps are relevant now is because of their on-demand nature: they allow consumers to be masters of their safety without relying entirely on other systems. In a situation where a second matters, mobile safety applications can facilitate timely response and hopefully prevent escalation.

But their full potential remains unrealized. Among the factors that account for this, are low awareness, uneven performance of apps, and privacy and data security issues, which all of these reinforce to prevent wide adoption. Nevertheless, as part of a multilayered safety ecosystem, mobile safety apps hold the promise to redefine how women perceive and move about public and private spaces.

© 2025 IJIRCCE | Volume 13, Issue 5, May 2025| DOI:10.15680/IJIRCCE.2025.1305118

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

II. REVIEW OF LITERATURE

The Smith & Johnson (2019) After conducting cognitive walkthroughs with 87 women across five countries, this research established three essential usability thresholds: panic mode reliability (100% alert transmission), icon recognizability (>80%), and activation time (<2.5 seconds). Utilizing applications to mimic harassing situations, the study's pioneering "stress testing" approach discovered that 62% of failures were due to "fumble factors" when under pressure. Material Design guidelines for safety apps, particularly the one suggesting large, highly contrasted emergency buttons, were based directly on these results. But the laboratory conditions of the study may not be representative of emergency situations in the real world, where environmental factors such as low lighting and physical impairments make use even harder.

Thompson et al (2020) This study, which examined data from 14,326 app users in 6 cities, found a strong association ($r=.57$, $p<.001$) between regular app use and less harassment reports. The spatial analysis identified "safety deserts"—regions where cellular dead zones caused app efficacy to fall below 20%. Most remarkably, the study found that habitual app users increased their use of public transportation by 40%, indicating that these tools could boost women's mobility. However, our proposed research will fill these gaps through mixed-method verification. The study's urban focus makes rural applicability dubious, and its dependence on self-reported data presents potential response bias.

Rahman & Singh (2018) - This ethnographic research of 92 neighbourhoods in Delhi, which criticized techno-solutionism, found that 68% of attackers just targeted non-users when safety applications became popular, displacing rather than reducing violence. The way that apps interact with physical infrastructure is illustrated by the researchers' "safety ecosystem" concept (for example, apps were three times more effective close to police booths). According to their long-term data (2014–2017), apps originally decreased harassment reports by 22%; however, as offenders adjusted, this effect vanished. This emphasizes how important it is that our research look at app adoption rates as well as how effective they are changing in light of shifting social dynamics.

Mehta & Desai (2022) -This study compared 1 in 200 Indian women in 8 states to create the Digital Safety Divide Index (DSDI), which measures the additional obstacles faced by rural women: 82% mistrusted app permissions, 58% couldn't afford data plans, and 73% didn't have smartphones that work with their phones. The significance of community-based onboarding was underscored by the study's creative "train-the-trainer" intervention, which increased rural adoption rates from 12% to 39% over a 6-month period. The study did, however, also reveal cultural barriers: 67% of rural families disapproved of women using safety applications because they believed it would "invite trouble." Due to these results, familial impact must be included as a significant adoption variable in our study.

Silva et al. (2021) - Brazilian Trust Barriers* Focus groups with 147 residents of favelas revealed paradoxical patterns of distrust: women distrusted police responders (76%) and app developers (81%) at the same time, creating adoption catch-22s. The study introduced the concept of the "security precariat"—marginalized groups that do not trust commercial alternatives or state protection—noting that community-modified apps (such as those that allow neighbourhood watch alerts) saw 53% higher retention than commercial versions.

This suggests that safety apps must incorporate local knowledge systems, a finding our study will test through comparative analysis of customized vs off-the-shelf apps in various cultural contexts Chen et al. (2022) The "privacy paradox" in safety applications was measured in this mixed-methods study (N=2,143 survey responses + 47 in-depth interviews), where 72% of women voluntarily supplied data when apps showed obvious usefulness, despite 89% of them expressing concern about location tracking. Using a Privacy Calculus Model, the researchers found that users consent to tracking if it offers real protection benefits ($\beta=.58$, $p<.001$). Only 23% of the 17 well-known apps they analyzed technically implemented end-to-end encryption, while the majority stored location history without encryption. In A/B testing, the study's innovative "Privacy Nutrition Label" prototype raised confidence by 34%. Our study uses stratified sampling to fill this gap, as the research may have underestimated privacy concerns among marginalized groups due to its concentration on educated metropolitan populations.

Khan and Abbas (2023) Data costs (average 12% of monthly income for required plans), device limitations (64% lacked smartphones), and digital literacy (82% needed assistance installing apps) all contribute to adoption barriers, according to the "3D Exclusion Framework" developed by this research through a year-long ethnographic study conducted across 15 low-income communities in Pakistan. By placing shareable tablets with safety apps pre-installed in

© 2025 IJIRCCE | Volume 13, Issue 5, May 2025| DOI:10.15680/IJIRCCE.2025.1305118

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

women's centres, the study's creative "Community Device Libraries" intervention boosted access by 300%. Sustainability, however, proved difficult; upkeep expenses caused 68% of libraries to close within six months. These results significantly influence our research's emphasis on creating low-tech substitutes for resource-constrained situations, such as USSD-based systems.

III. INTERPRETATION

Problem Statement

Even with the existence of many safety apps, they are still yet to be embraced at a relatively low level. Most women are not aware of these tools or do not want to use them for fear of privacy, data security, usability, and credibility. In addition, existing safety apps are not uniform, and the majority of them are incompatible with local emergency services, thus making them less useful when needed.

Objectives of the Study

This paper focuses on:

- Examine the key features of mobile safety apps targeted at women.
- To analyze the benefits these apps, offer in promoting women's security and confidence.
- Identifying the barriers that prevent adoption and regular usage.

Significance of the Study

Through identifying the strengths and weaknesses of existing safety apps, the research provides developers, policymakers, and advocates with important insights. Enhancing these programs offers the possibility of greatly improving women's empowerment to access public and private areas with increased assurance, thus complementing more comprehensive gender equity and public safety initiatives.

IV. METHODOLOGY

This study adopts a qualitative and analytical approach to explore the current landscape of mobile safety applications developed for women. Instead of empirical surveys or direct user testing, the methodology is centered on secondary research, feature analysis, and comparative evaluation of selected safety apps. The aim is to determine fundamental functionalities, assess their impact, and know the determinants of their adoption.

Tools and the techniques used

The research primarily involves:

Literature Review: Academic journals, whitepapers, and research articles on mobile safety applications and digital safety solutions were studied to establish a theoretical foundation.

App Store Analysis: A curated set of widely-used safety apps for women was selected from platforms like Google Play Store and Apple App Store. User reviews, update history, ratings, and descriptions were analyzed.

V. IMPLEMENTATION STUDY

Comparative Analysis of Women Safety Applications and Their Underlying Technologies

In order to see the real deployment of women safety apps, an in-depth comparison of popular available solutions was carried out. In this analysis not only their key functionalities but also the underlying technologies are examined to try and deliver insights into available trends and points of improvement. The research largely includes applications such as Raksha, bSafe, Safetipin, Smart24x7, Shake2Safety, and CitizenCop—all of which have been made with the objective of improving the personal safety of women.

Raksha – Women Safety Alert, The Women Safety Alert app, Raksha, emphasizes prompt communication in case of an emergency. Users only need to click a button to send their location via SMS. Its primary benefit is that it can function without internet access, which makes it appropriate for low-network and rural areas. The application is simple to create but has limited functionality because it depends on essential Android components like the Location Services

© 2025 IJIRCCE | Volume 13, Issue 5, May 2025| DOI:10.15680/IJIRCCE.2025.1305118

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

and SMS Manager API. It lacks audio/video recording and live tracking, both of which are essential for emergency responses in real time.

bSafe offers a comprehensive suite of safety features including real-time tracking, live video/audio streaming, automatic call recording, and even a fake call system that can simulate a phone call to help users exit uncomfortable situations. It also allows guardians to follow the user's location and receive alerts instantly. From a technical standpoint, bSafe utilizes cloud platforms for data management, push notification services, and advanced permissions to handle camera and microphone access. While it's one of the most feature-rich apps available, it depends heavily on stable internet connectivity and offers most advanced features under a subscription model, limiting accessibility for some users.

Safetipin takes a different route by emphasizing community-driven data. Instead of focusing solely on emergency situations, it helps users avoid unsafe areas by using crowd-sourced ratings. The app collects data on lighting, visibility, presence of people, and police availability to generate a safety score for different locations. Technologies like Google Maps API, data analytics frameworks, and mobile sensors are used to create and display safety maps. However, the absence of a direct SOS function limits its usefulness during actual emergencies.

Smart24x7 bridges the gap between personal safety and law enforcement by directly connecting users with police departments in some cities. It allows users to send alerts, record emergency calls, and share their live location with authorities. The app is developed using both Android and iOS SDKs, and incorporates cloud synchronization, location tracking APIs, and in some cases, integration with police databases. The major limitation here is its dependency on collaboration with local law enforcement, making the app's effectiveness inconsistent across regions.

Shake2Safety proposes a subtle and easy-to-use feature in which an emergency message can be conveyed by shaking the phone or quick pressing of the power button a few times. It works even when internet or GPS is unavailable, using motion sensors and SMS APIs. The simplicity of this app makes it accessible, especially in critical situations where there's no time to unlock the phone. However, it lacks features like live video/audio streaming or contact with official services.

CitizenCop combines safety with civic engagement. Besides enabling emergency alerts, it lets users anonymously report crimes or suspicious activities to the authorities. It's designed with a focus on building safer communities and uses technologies like secure cloud storage, GPS mapping, and encrypted databases. The downside is that it's less focused on real-time emergency responses and more on incident reporting, which might not be effective in time-sensitive situations.From a technological perspective, the backbone of these apps includes real-time GPS tracking, SMS and push notifications, cloud storage, and in advanced cases, AI-based anomaly detection. Many apps use Firebase for real-time data updates, while map integration relies heavily on Google Maps APIs. For apps with offline capability, native SMS services are used to send location-based alerts without internet. Some newer apps also explore the integration of machine learning to predict risk patterns based on user behavior or environmental data. Security and privacy are essential in such applications, yet several apps still lack proper encryption mechanisms, making user data vulnerable. Battery optimization is another technical challenge, especially in apps that use continuous location tracking and background services.

© 2025 IJIRCCE | Volume 13, Issue 5, May 2025| DOI:10.15680/IJIRCCE.2025.1305118

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

VI. RESULTS AND DISCUSSION

Presentation of Findings

The detailed analysis of a curated collection of safety apps for women found that there were several overlapping core features essential to their function. Most of the top-rated applications include features such as live GPS location tracking, allowing users to share their location with trusted friends or family members; SOS messages, which send instant alerts to selected contacts or authorities; one-touch call to emergency contacts, and location broadcasting in emergency cases.

Aside from these fundamental features, there are a few more advanced apps that have also integrated cutting-edge features such as AI-powered threat prediction, which can detect unusual patterns of activity and initiate warnings, and fake call simulations, which can activate to enable the user to get out of possibly harmful scenarios. Another main trend is crowd-sourced safety mapping, where users can mark.

Our detailed analysis of a range of safety apps developed specifically for women has revealed some of the most important features that are crucial for their proper functioning. The majority of top-rated apps have features like real-time GPS tracking, allowing users to broadcast their location to trusted contacts; SOS emergency alerts that can instantly notify selected individuals or authorities; one-touch dialing of emergency numbers; and broadcasting of location in the event of life-threatening situations.

Apart from these basic features, a few sophisticated apps have started incorporating innovative technologies. For example, AI-based threat prediction can detect suspicious behavior patterns and alert accordingly, while simulated fake calls can offer users an option to break away from threatening situations. Community-based safety mapping, where users can mark dangerous zones and post current alerts, is another notable trend, which encourages collective effort towards safety.

Yet feedback on most platforms has underlined a divide between experience. While some users like the usefulness and convenience these apps offer when circumstances are dire, there are real concerns over technical issues. Common grumbles mention app crashes, sluggish response, faulty GPS tracking, and aggressive permission requests. These issues tend to move users to seek alternative choices or doubt the app's trustworthiness in the first place. unsafe zones and exchange live warnings, creating an open-source approach to safety.

Yet, an analysis of user reviews across platforms indicated a split in user experience. While several users complimented the utility and ease of use of the apps, describing them as helpful during times of crisis, there were significant issues regarding technical inadequacies. Some of the common complaints were app crashes, sluggish response, incorrect GPS location tracking, and obtrusive permission requests. These disadvantages were frequently mentioned as reasons for abandoning the app or losing faith in the application itself.

Analysis of Results

When assessing the chosen apps, we considered five important criteria to determine their usability and practicality:

1. Ease of Use: The majority of apps had friendly interfaces with big buttons and easy navigation that made them easy to use even in stressful conditions. Some apps were not good, though, with complex onboarding processes and cluttered layouts that could easily bewilder novice users.
2. Reliability: A distinguishing criterion between the more popular apps and the less popular ones was their stable and timely performance. Good apps provided quick responses to users' actions, dispatched alerts on time, and maintained a consistent connection even under poor network conditions. On the other hand, some had issues with performance, especially during updates.
3. Feature Richness: The diversity of features between the apps was quite distinct. While standard versions generally included alerts and GPS sharing, advanced ones integrated multimedia recording, voice command functionality, and live streaming, essentially providing a full toolkit for safety.
4. User Privacy: Data privacy emerged as a major concern among users. Many were hesitant about the volume of personal information requested, which included continuous location tracking and access to contacts and microphones. Furthermore, many privacy policies were ambiguous or hard to decipher, leaving users feeling uneasy about trusting the apps.

© 2025 IJIRCCE | Volume 13, Issue 5, May 2025| DOI:10.15680/IJIRCCE.2025.1305118

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

5. Compatibility with Local Emergency Services: This was also a sector in which most of the apps fell short. Very few could directly alert or interface with local police or emergency services, which greatly reduced their value in real crisis scenarios. This gap highlights the need for closer cooperation with institutional emergency services.
Comparison with Existing Systems Although conventional public safety strategies such as CCTV, security guards, panic buttons, and helplines give a good safety profile, they tend to lack the customized and instant response that mobile safety apps are capable of offering. These applications make the user empowered by giving him the freedom, flexibility, and authority he seeks over his own safety.

Yet, mobile safety applications oftentimes face issues with the amount of institutional support and legal recognition enjoyed by conventional systems. Without such official endorsement by law enforcement and public policy, their potential may even be constrained, despite possessing technologically more sophisticated attributes.
Performance Evaluation Apps from well-known organizations or sponsored by government and global funding generally represent higher reliability. They are advantaged by frequent updates, responsive support, and good performance across various network infrastructures. In contrast, regional or less known applications commonly see irregular updates, restricted language support, old features, and poor performance statistics, resulting in consumer frustration and reduced long-term interaction.

This inconsistency between platforms is a barrier of trust among users, which is a major obstacle to wider acceptance of these tools.

VII. CONCLUSION

The increased need for women to be safe at public and private places has resulted in mobile safety apps as empowering and protective tools. These technology-based tools provide features such as GPS tracking, SOS calling, emergency numbers, and more recently danger anticipation using AI and safety mapping. By examining a summary review of a few of the most popular applications such as Raksha, bSafe, Safetipin, Smart24x7, Shake2Safety, and CitizenCop, the research shows that although every app has useful elements, none on its own is able to manage the broad set of safety demands. In addition, technical discrepancies, inability to connect with indigenous emergency services, privacy issues, and usability matters—particularly within rural or lower-income environments—are adversely affecting take-up and usability.

User experiences paint a complex portrait; some find the apps useful during emergencies, while others lament round-the-clock crashing, app crashes, and invasion of privacy undermining trust. More detailed analysis reveals that data privacy, usability, institutional support, and locational flexibility are all key drivers of the app's utility and acceptability. In addition, differences in adoption between rural and urban societies point to the digital divide and the need for inclusive, community-based designs that address socio-economic and cultural contexts.

In general, mobile safety apps are full of promise as facilitators of women's security and empowerment, but their ultimate value hinges on comprehensive development. Future innovations must focus on solid design, offline capability, cooperation with law enforcement, and secure privacy infrastructure. Maybe as essential is the role of educating people, promoting digital literacy, and overcoming socio-cultural obstacles so these technologies become not only accessible but usable and powerful for all women—regardless of geography or background. Addressing such complex problems, future generations of safety apps can then be an important part of an integrated, safer world.

REFERENCES

[1]. Chen, L., Zhang, Y., & Wang, H. (2022). Privacy vs. protection: Women's dilemmas in using safety apps. Journal of Cybersecurity, 8(2), 45-67.
[2]. Dubois, E., Fernandez, M., & Carter, N. (2020). Prevention through preparation: How training modules improve safety app efficacy. Computers in Human Behaviour, 104, 106189.
[3]. Garcia, M., & Lopez, T. (2022). Battery anxiety and abandonment: Barriers to women's safety app retention. Journal of Urban Safety, 15(3), 201-218.
[4]. Khan, S., & Abbas, R. (2023). Digital exclusion and safety app accessibility among low-income women. Technology in Society, 74, 102301.

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.771| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

[5]. Mehta, P., & Desai, N. (2022). Urban vs. rural disparities in women's safety app usage: Evidence from India. International Journal of Comparative Sociology, 63(1-2), 88-105.
[6]. Olsen, R., & Mathews, S. (2023). Queering safety tech: LGBTQ+ women's unmet needs in protective applications. Feminist Media Studies, 23(2), 1-19.
[7]. Patel, R., & Kumar, S. (2021). Psychological impacts of safety apps on women's mobility. Women & Health, 61(5), 678-695.
[8]. Rahman, A., & Singh, M. (2018). Beyond apps: Structural solutions for women's safety. Feminist Criminology, 13(3), 345-367.
[9]. Silva, M., Costa, A., & Ribeiro, J. (2021). Trust barriers in women's safety technology: A Brazilian case study. Latin American Perspectives, 48(4), 203-220.
[10]. Smith, A., & Johnson, B. (2019). Safety apps and women's empowerment: A usability study. Journal of Gender-Based Violence, 3(2), 145-162.
[11]. Thompson, E., Harris, K., & Martin, L. (2020). Do safety apps make women feel safer? A quantitative analysis. Violence Against Women, 26(10), 1234-1255.
[12]. Gopichand Vemulapalli, Padmaja Pulivarthy, “Integrating Green Infrastructure With AI-Driven Dynamic Workload Optimization: Focus on Network and Chip Design,” in Integrating Blue-Green Infrastructure Into Urban Development, IGI Global, USA, pp. 397-422, 2025.
[13]. Warr, P. (1978). A study of psychological well-being. British Journal of Psychology, 69(1), 111-121.
[14]. Wong, K., Li, T., & Park, J. (2021). Analysing user expectations in women's safety apps through big data. Health Informatics Journal, 27(4), 556-573.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details