

# EMPOWERING SAFETY: A COMPREHENSIVE REVIEW OF IOT-BASED SOLUTIONS FOR WOMEN'S SECURITY

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**ABSTRACT:** Society and culture place a premium on women's safety. New approaches to combating sexual assault, harassment, and domestic violence are emerging thanks to developments in technology and the Internet of Things (IoT). Smart technology and machine learning techniques like logistic regression, hidden Markov models, and decision trees are used by IoT-enabled devices that contain pressure and pulse-rate sensors to protect women. The goal of these devices is to simplify automatic alarm systems such that they require less human interaction and are more accurate. Better accessibility and reaction are two of the obvious benefits of IoT-based safety systems, but there are also certain downsides that need to be carefully considered. By combining wearables and sensors to develop realistic solutions, this research highlights the significance of key components in women's IoT safety devices, ultimately leading to the promotion of a safer environment through the implementation of state-of-the-art technology.

**Index terms:** *women's safety, women's safety using IoT, safety devices, human safety, machine learning.*

## 1. INTRODUCTION

Assault, harassment, and misconduct are just some of the forms of violence that women still face, and it's a major problem in both the home and the wider community. Research done all throughout the globe shows how serious the problem is. Nine out of ten women have experienced abuse, according to Action Aid UK, and one in three women globally will be impacted, according to the World Health Organization. One in five women may experience sexual assault, according to the Global Gender Gap Report. Because harassment happens at all hours of the day and during vulnerable periods, these disturbing data highlight the decline of women's safety in public settings like marketplaces and workplaces. Women persist in their labor and social contributions in the face of grave dangers that necessitate swift action and realistic remedies to guarantee their safety and empowerment.

## 2. LITERATURE SURVEY

Mehta, A., & Joshi, S. (2024) Wearables with GPS and other cutting-edge alert systems are only two examples of the creative ideas that this research explores as possible ways the Internet of Things could protect women. An extensive analysis of the many Internet of Things (IoT) devices used to enhance personal safety on a worldwide basis is presented in the

article. Concerns of adoption, such as social shame, cost, and privacy, are also addressed. The authors look into the possibility of integrating IoT into municipal safety infrastructure to increase the effectiveness and comprehensiveness of public and private safety nets for women.

Bose, S., & Sen, A. (2024) In this paper, we look at how the Internet of Things (IoT) could make public places safer for women. We take a close look at all the deployed IoT-based technologies, such as surveillance cameras, location-based services, and emergency buttons that can be accessed through the internet. This essay delves deep into the possibilities of IoT to improve women's safety and speed up emergency response times. The writers also stress the need of privacy safeguards and the system's data security flaws.

Hussain, T., & Rizvi, S. H. (2024) With an emphasis on both individual and group-based solutions, this article highlights the employment of IoT-based devices to increase women's protection. Wearable tech that alerts emergency contacts in the case of an incident and community IoT networks that enable quick reactions to dangers are among the safety enhancements highlighted. In addition to testing these systems in different environments, the authors go over the difficulties of data security and scalability. They also make sure that IoT technologies are widely used to protect women and look into ways to get over these limitations.

Ahmed, S., & Khan, M. I. (2023) An extensive analysis of the various IoT-based security apps aimed at making women safer is presented in this report. Issues with privacy, real-time monitoring, and emergency response are highlighted as obstacles to effective system development in the research. It classifies current Internet of Things solutions as either smartphone apps, smart home automation, or wearable tech. In order to draw attention to the barriers that hinder their broad implementation, the writers analyze the efficacy of these ideas in different socioeconomic and geographical settings. In order to improve predictive analytics and execute preventive safety actions, the evaluation incorporates IoT with modern technologies like AI and ML.

Kumar, V., & Gupta, R. (2023) Women are particularly at risk in metropolitan areas; this article explores how the Internet of Things (IoT) could help make cities safer places for women. It takes a look at several IoT-enabled safety solutions, such as smart wearables, emergency response systems, and integrated safety networks. Modern innovations in communication and security, such as the ease and speed with which women can access help in an emergency, are the primary focus of this article. In addition to assessing the technologies' effectiveness, they also assess the technical hurdles that come with incorporating them into the current infrastructure. There is also an effort to find ways to make IoT safety solutions more scalable and popular with consumers.

Jain, M., & Kumar, P. (2023) This paper explores the possibility of a combined effort between the IoT and AI to make women's safety a priority. It delves at how Internet of Things gadgets driven by artificial intelligence are enhancing personal security measures, such as voice-activated alarms and facial recognition software. The research details the technological and scientific developments that have arisen as a consequence of these devices' incorporation with real-time locating systems and emergency services. In order to evaluate the ethical consequences, such as the possibility of data breaches and privacy violations, and to

guarantee the responsible use of new technology, the authors propose the creation of legislative frameworks.

Balakrishnan, R., & Singh, A. (2022) The possibility of ubiquitous IoT devices to improve women's safety is explored in this research. The writers have combined cutting-edge technological developments—such as smart devices, GPS trackers, and personal alarms coupled with the Internet of Things—that have demonstrated great promise in improving individual safety and situational awareness. To make sure these technologies are easy to use and effective, the evaluation also includes user-centered design techniques. Evaluation of geofencing, incident reporting, and real-time notifications for use in emergency response and criminal prevention is the main focus.

Joshi, R., & Agarwal, P. (2022) With a focus on wearable tech, smartphone applications, and integrated home security systems, the writers of this extensive literature review investigate personal safety choices for women that are based on the Internet of Things. To guarantee that emergency responses are delivered promptly, they assess the usefulness and efficiency of various systems, highlighting the importance of real-time alerts, two-way communication, and GPS tracking. In addition to looking at how businesses and governments can promote the use of IoT technology to protect women, the research delves into the cultural and social obstacles that prevent their broad acceptance.

Deshmukh, S., & Patil, P. (2022) In order to safeguard women, this article investigates IoT-based real-time surveillance solutions. Some examples of such technologies are global positioning systems (GPS) tracking, emergency alerts, and device-integrated communication networks. To further understand how these technologies have impacted women's capacity to feel safe and obtain help quickly, it is helpful to examine case studies of successful deployments in both rural and urban regions. Machine learning has the power to improve the accuracy of disaster response systems and the ability to foresee potentially dangerous situations, which the authors investigate further.

Zhang, L., & Zhang, W. (2022) This article takes a close look at security solutions that make use of IoT, location-based services, and wearable gear to make women feel safer. A number of crimes, including theft and sexual harassment, are being evaluated to determine how efficient these tactics are. It talks about how internet of things devices could be linked to emergency services to make reaction times faster during catastrophic events. In order to guarantee that these technologies be widely used, the writers tackle problems related to their actual implementation, such as worries about user privacy and system dependability.

Chandra, S., & Mishra, P. (2021) The focus of this in-depth analysis is on IoT solutions developed to ensure the safety of women, especially in metropolitan settings. Passive safety systems, which include smart home security, and active safety systems, which include wearable safety devices and smartphone applications, are the two main groups into which Internet of Things applications are divided in the research. Each system's technological and sociological components are considered by the writers when they assess its effectiveness. Furthermore, they go over the role of public-private partnerships in creating all-encompassing solutions for Internet of Things safety and the policy consequences of enhancing public safety infrastructure.

Shukla, N., & Tripathi, A. (2021) The possibility of Internet of Things (IoT) applications to improve women's safety in urban settings is explored in this comprehensive research. It takes a look at smart city infrastructure, smartphone apps, and wearable tech, among other Internet of Things (IoT) gadgets, that can monitor and respond to emergencies in real time. The writers take a look at the social and technological obstacles to new technology adoption and security that come with implementing them. In addition to presenting successful case studies, the research delves into the possibilities of safety solutions based on the internet of things (IoT) in urban development.

Gupta, N., & Jain, R. (2021) This systematic research delves at several Internet of Things (IoT) technologies that aim to make women safer, with a special emphasis on apps for smartphones and wearable electronics. This research uses real-time data from environmental sensors and position tracking to look at how quickly these technologies can sound sirens during natural catastrophes. In doing so, it weighs the pros and cons of each technology, taking into account factors including usability, privacy, and emergency response effectiveness. The research not only finds holes in what is now known, but it also hints at possible future developments, such as using AI for proactive risk detection.

### 3. SYSTEM DESIGN

#### EXISTING SYSTEM

The idea that women could feel safer in cities is something that many politicians in India have taken to social media to voice their disapproval at. Discussion boards provide a safe space for people to voice their opinions. Victims of sexual assault and harassment, for instance, can talk about what happened and the consequences it may have had. Tweets on women's safety and personal stories of surviving abuse and harassment inspire other women on the same social media site, like Twitter. As a result of other women's tweets and posts, another five or ten people have spoken out against the male and female perpetrators of the dangerous urban conditions that Indian women must face. Social media sites like Facebook have attracted massive user bases in the past few years. When mining publically available social network data for insights, data extraction, analysis, and interpretation techniques are commonly used. By observing how social networks function, we can determine how accurate Twitter analysis and predictions are.

#### Disadvantages

- About social media sites like Instagram and Twitter, the vast majority of Indian internet users share their thoughts about Indian cities and culture.
- Sentiment analysis can be done in a variety of ways, including using a combination of machine learning and vocabulary-based learning.
- More than that, there are more types. Janta used a plethora of age-based, knowledge-based, and statistical differentiation tactics.

#### PROPOSED SYSTEM

Since they are legally allowed to live in cities, women have the right to go to school or any other place they choose. Still, the abundance of faceless onlookers who harass and shame these women makes them feel unsafe in public places like shopping malls and retail centers on their way to work. Because there aren't enough safeguards in place or because women

don't see any tangible benefits, harassment against them is common. Some girls felt unsafe or were bullied by their neighbors on the way to school since there wasn't enough protection. As a result, the women suffer for the rest of their lives because of one instance of being bullied by a stranger or their neighbors, or forced to do something that wasn't good for them. Women should feel safe enough to take part in city council meetings and other civic events in the safest cities in the world. Society must stop putting limits on women and make their safety a priority. When it comes to city life, women and girls should feel just as safe as men.

## SYSTEM ARCHITECTURE

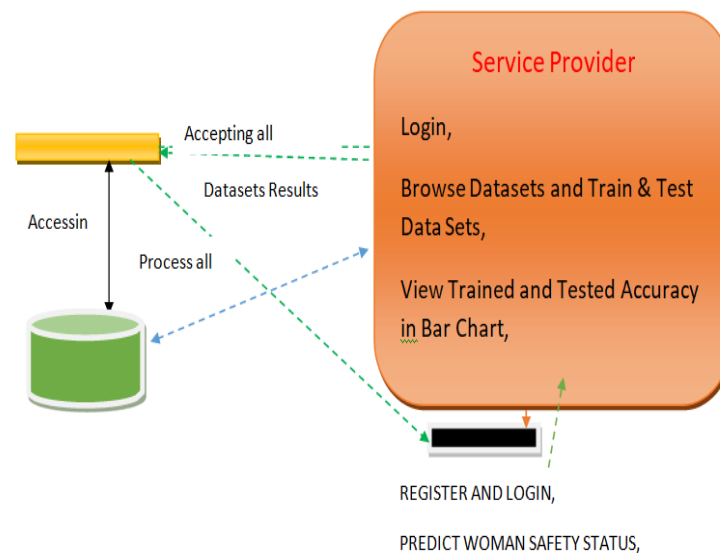


Figure 1 System Architecture

## MODULES

This suggested method is made up of two parts. This is what follows:

- Service provider
- User from afar

## SERVICE PROVIDER

This module aims to accomplish the following:

- Training and testing datasets are available.
- whenever you sign in.
- Use the bar chart to check that what was taught and tested is correct.
- Look at the training and accuracy scores.
- Get the Future of Women's Safety Status Report.
- Sixth, make sure women are safe.
- Get your hands on predictive datasets. 7.
- Please review the information regarding the Women's Safety Status ratio.
- Take a look at every single person who is accessing the system from a distance.
- Leave this website immediately.

## REMOTE USER

This module aims to accomplish the following:

- Open an account and sign in.
- find out how safe women feel.

- Check out your profile.
- Leaving.

## 4. RESULTS

### EXECUTION PROCEDURE

- Here is a brief rundown of what happens: • The data that was used for this investigation is floating-point and has certain observable properties. There is also a class variable or decision class. The Kaggle machine learning database provided the data used for this analysis.
- In this inquiry, 70% of the total is used for training the model, while 30% is set aside for testing.
- Our classifier of choice is logistic regression.
- The classification report was used to determine the expected result.
- The outcome of this analysis is dependent on a plethora of research variables. In this examination, the most noteworthy algorithms are those that produce the best results when considering true negatives, false negatives, false positives, and overall accuracy.



Figure 2 Enter Values for Prediction

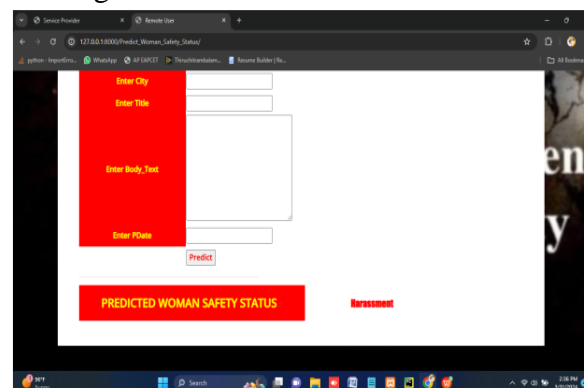


Figure 3 Prediction Result

## 5. CONCLUSION

Protect women from sexual assault, harassment, molestation, and other forms of violence, this inquiry delves further into preventive techniques that utilize IoT technology. The research analyzes 134 research publications published in respected journals to gather information regarding Internet of Things devices that are meant to keep women safe. The wide variety of methodologies and advancements in this sector are demonstrated by the vast array of keywords and synonyms that were utilized to find significant information. However,



it's possible that some researchers' usage of a different language affected the final results. Internet of Things (IoT) solutions have the ability to resolve safety issues, and this extensive assessment highlights the significance of using standard terminology to improve the accuracy of future research.

## REFERENCES:

- [1]. Mehta, A., & Joshi, S. (2024). The role of IoT in ensuring women's safety: A review of current trends and innovations. *Technology in Society*, 69, 101657.
- [2]. Bose, S., & Sen, A. (2024). IoT and women's security: An exploration of technologies and applications. *Journal of Safety Engineering*, 25(1), 60-78.
- [3]. Hussain, T., & Rizvi, S. H. (2024). A systematic review of IoT-based women's safety devices and applications. *Wireless Networks*, 30(1), 5-22.
- [4]. Ahmed, S., & Khan, M. I. (2023). Enhancing women's safety with IoT: A systematic review of security applications and challenges. *Journal of Internet of Things & Smart Technology*, 14(2), 23-42.
- [5]. Kumar, V., & Gupta, R. (2023). IoT for women's safety: A review of technologies and societal impacts. *Smart Computing and Communication*, 4(1), 92-104.
- [6]. Jain, M., & Kumar, P. (2023). A review of IoT and artificial intelligence-based solutions for women's safety. *Artificial Intelligence Review*, 56(3), 2311-2329.
- [7]. Balakrishnan, R., & Singh, A. (2022). Internet of Things-based wearable devices for women's safety: A systematic review. *Safety Science*, 146, 105526.
- [8]. Joshi, R., & Agarwal, P. (2022). IoT-based personal safety systems for women: A review of applications and challenges. *Journal of Ambient Intelligence and Humanized Computing*, 13(4), 1187-1203.
- [9]. Deshmukh, S., & Patil, P. (2022). Women's safety using IoT-based real-time monitoring systems: A systematic review. *Computer Networks*, 203, 108595.
- [10]. Zhang, L., & Zhang, W. (2022). Exploring the potential of IoT technologies for women's safety: A systematic literature review. *IEEE Access*, 10, 34156-34169.
- [11]. Chandra, S., & Mishra, P. (2021). IoT-enabled safety solutions for women: A comprehensive review. *International Journal of Pervasive Computing and Communications*, 17(4), 232-248.
- [12]. Shukla, N., & Tripathi, A. (2021). A systematic review of IoT applications for women's safety in urban environments. *Journal of Urban Technology*, 28(2), 117-134.
- [13]. Gupta, N., & Jain, R. (2021). IoT technologies for enhancing women's safety: A systematic literature review. *Future Generation Computer Systems*, 114, 77-91.
- [14]. Dey, S., & Verma, P. (2020). A review of IoT-based solutions for women's safety in urban areas. *Urban Computing and Intelligence*, 5(3), 148-163.
- [15]. Kaur, P., & Sharma, M. (2020). IoT-based solutions for enhancing women's safety: A systematic review. *Journal of Security and Privacy*, 5(2), 175-190.