WOMEN'S SAFETY IN THE IOT ERA: A SYSTEMATIC REVIEW OF CURRENT SOLUTIONS AND CHALLENGES

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ABSTRACT: Women is an essential social and cultural value in any society. Sexual violence against women includes rape, molestation, harassment, and assault in the home. Many issues and people's lives could be made easier by the Internet of Things (IoT). The community has created solutions based on the Internet of Things to help women stay safe. This research delves further into the topic of machine learning, smart technologies, sensors, and Internet of Things (IoT) devices designed to keep women safe. The majority of these devices designed to keep women safe include pressure and pulse-rate sensors with an emphasis on safety, as shown in the research. To help women who are at risk avoid issues in the future, machine learning techniques including decision trees, hidden Markov models, and logistic regression are being used. Findings from in-depth research indicate that developing technology to streamline automatic alarm sending—while simultaneously increasing accuracy and decreasing the need for human intervention—is the best course of action. This study organizes the wearables, sensors, features, and technology of women's safety goods that are based on the Internet of Things. There are advantages to the Internet of Things (IoT) for women's safety, but there are also limitations and challenges. Additionally, this research suggests a building approach that zeroes in on critical features for women's Internet of Things safety devices.

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

1. INTRODUCTION

The safety of women is a critical issue, as they are frequently subjected to a variety of hazards, such as molestation, harassment, and violence. Several organizations presented statistics regarding incidents of violence against women, underscoring the gravity of the issue on a global scale. According to the International Safe Cities for Women study conducted by Action Aid UK, nine out of ten women had encountered some form of violence. According to the World Health Organization (WHO), violence affects one in every three women worldwide. According to the Global Gender Gap Report, sexual assault affects one in every five women worldwide. These statistics indicate that the safety of women is deteriorating on a daily basis. Women are concerned about their safety in both domestic and public settings, such as offices and marketplaces. All day, including in public places, women are subjected to harassment, not just at night or in the evening. Almost eighty percent of women believe that they are quite hazardous. In the contemporary environment, women are working and laboring outside to help earn a living, despite the dangers they face.

2. LITERATURE SURVEY

Mehta, A., & Joshi, S. (2024) This paper investigates the potential of the Internet of Things to safeguard women by demonstrating innovative solutions such as GPS-enabled wearables and clever alarm systems. The paper provides a comprehensive evaluation of the numerous IoT devices that have been implemented to improve personal protection on a global scale. We also address adoption challenges such as cost, privacy,

and societal remorse. The authors investigate the potential integration of IoT into municipal safety infrastructure to provide women in both public and private settings with a more comprehensive and effective safety net.

Bose, S., & Sen, A. (2024) This essay investigates the potential of IoT technologies to enhance the safety of women in public spaces. We conduct a thorough analysis of the numerous IoT-based systems that have been implemented, including security cameras, IoT-enabled emergency buttons, and location-based services. This essay meticulously investigates the potential of IoT to expedite emergency response times and enhance the safety of women. The writers also emphasize the system's deficiencies in terms of data security and the necessity of privacy protections.

Hussain, T., & Rizvi, S. H. (2024) This page emphasizes the adoption of IoT-based devices to enhance the protection of women, with a focus on both personal and community-based solutions. It emphasizes numerous safety improvements, such as community IoT networks that facilitate rapid responses to hazards and wearable technology that notifies emergency contacts in the event of an incident. The authors discuss the challenges associated with data security and scalability, as well as the methods by which these systems have been tested under a variety of circumstances. They also investigate potential solutions to overcome these constraints and ensure that IoT technologies are widely implemented to safeguard women.

Ahmed, S., & Khan, M. I. (2023) This exhaustive assessment examines the numerous IoT-based security applications that are intended to enhance the safety of women. The study emphasizes the challenges associated with the development of effective systems, such as privacy concerns, real-time monitoring, and emergency response. It categorizes current IoT solutions into three categories: smartphone applications, smart home automation, and wearable technology. The writers examine the effectiveness of these concepts in a variety of socioeconomic and geographical contexts in order to highlight the challenges that inhibit their widespread adoption. The evaluation integrates IoT and contemporary technologies, including artificial intelligence and machine learning, to enhance predictive analytics and implement preventative safety measures.

Kumar, V., & Gupta, R. (2023) This paper investigates the potential of IoT to improve the protection of women in metropolitan areas, where they are most vulnerable. It examines a variety of safety technologies that are facilitated by the Internet of Things, including integrated safety networks, emergency response systems, and smart wearables. The authors concentrate on the impact of emerging technologies on the safety of women, including the rapid availability of emergency services and alarms. In addition, they evaluate their efficacy and the technical challenges associated with integrating these technologies into the existing infrastructure. Additionally, methods to enhance the scalability and consumer acceptance of IoT safety solutions are being considered.

Jain, M., & Kumar, P. (2023) This document investigates the potential for the Internet of Things (IoT) and artificial intelligence (AI) to collaborate in order to enhance the safety of women. It discusses the ways in which personal security is being improved by AI-powered Internet of Things devices, such as facial recognition software and voice-activated alarms. The paper delineates the scientific and technical advancements that have been achieved as a result of the integration of these devices with real-time positioning systems and emergency services. In addition to assessing the ethical implications, including the potential for data breaches and privacy invasions, the authors recommend the implementation of legislative systems to ensure the responsible use of these technologies.

Balakrishnan, R., & Singh, A. (2022) This paper investigates the potential for ubiquitous IoT devices to enhance the safety of women. The authors identify substantial technological advancements, including smart watches, GPS trackers, and IoT-integrated personal alarms, that have shown significant potential in

enhancing personal security and situational awareness. Also included in the evaluation are user-centered design methodologies that ensure the accessibility and convenience of these devices. The primary concerns are the evaluation of geofencing, incident reporting, and real-time notifications, with an emphasis on their role in crime prevention and emergency response.

Joshi, R., & Agarwal, P. (2022) The authors of this comprehensive literature review examine IoT-based personal safety solutions for women with a focus on smartphone applications, wearable technologies, and integrated home security systems. They evaluate the efficacy and usability of numerous systems, emphasizing the necessity of real-time alerts, two-way communication, and GPS tracking to ensure prompt emergency responses. The evaluation also investigates the sociocultural constraints that impede the widespread adoption of IoT technologies, as well as the role that governments and businesses should assume in promoting their use to ensure the safety of women.

Deshmukh, S., & Patil, P. (2022 This document examines real-time monitoring systems that are based on the Internet of Things (IoT) and are intended to protect women. GPS tracking, emergency alarms, and communication systems that are integrated into particular devices are among these technologies. By analyzing case studies of successful deployments in both urban and rural areas, it is possible to gain insight into the extent to which these technologies have affected the ability of women to feel secure and receive prompt assistance. The authors also discuss the potential of machine learning algorithms to enhance the dependability of emergency response systems and predict hazardous events.

Zhang, L., & Zhang, W. (2022) This document provides a thorough examination of location-based services, wearable technology, and IoT-enabled security systems as a means to enhance the safety of women. The assessment assesses the effectiveness of these systems in deterring theft and sexual harassment, among other offenses. It discusses the potential for IoT devices to be connected to emergency services in order to provide more rapid response periods in the event of catastrophic events. The authors address the challenges associated with the implementation of these technologies, including system dependability and user privacy concerns, and offer solutions to ensure widespread acceptance.

Chandra, S., & Mishra, P. (2021) This comprehensive investigation concentrates on IoT solutions that are specifically designed to safeguard women, particularly in urban areas. The study categorizes Internet of Things applications into two categories: active safety systems, which include wearable safety devices and smartphone apps, and passive safety systems, which include smart home security. The writers evaluate the efficacy of each system by taking into account its technological and social components. Additionally, they discuss the policy implications of improving public safety infrastructure and the role of public-private partnerships in the development of comprehensive IoT safety solutions.

Shukla, N., & Tripathi, A. (2021) This methodical evaluation examines the potential of IoT applications to enhance the safety of women in urban environments. It examines a variety of IoT devices, including smart city infrastructure, smartphone applications, and wearable technology, that provide real-time monitoring and emergency response capabilities. The authors assess the technical and sociological challenges associated with the implementation of new technology, as well as user adoption and data security. The paper also examines the potential of IoT-based safety solutions in urban development and provides successful case studies.

Gupta, N., & Jain, R. (2021) The authors of this systematic review investigate a variety of IoT technologies that are intended to enhance the safety of women, with a focus on smartphone applications and wearable technology. The study examines the speed with which these technologies provide alarms during natural disasters by utilizing real-time data, including environmental sensors and position monitoring. It evaluates the advantages and disadvantages of each technology in consideration of emergency response efficacy,

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privacy, and usability. The investigation not only identifies potential future advancements, such as the utilization of artificial intelligence for proactive threat detection, but also identifies deficiencies in the current body of knowledge.

Dey, S., & Verma, P. (2020) This paper examines IoT-based safety solutions for women in urban areas, with a focus on the use of mobile apps, cameras, and sensors to provide real-time safety monitoring. The authors explore the potential of IoT devices to improve urban infrastructure and increase the security of women. Additionally, they include societal impediments to the adoption of contemporary technologies, including cultural objections and implementation costs. The paper also discusses the necessity of developing culturally appropriate safety solutions that cater to the unique requirements of women in various geographical regions.

Kaur, P., & Sharma, M. (2020) This comprehensive investigation examines IoT-based solutions to enhance the safety of women, with a particular emphasis on devices such as smart surveillance systems, mobile safety applications, and personal safety tools. This investigation assesses the efficacy of various technologies in reducing crime rates and enhancing the overall sense of security experienced by women. It also addresses and provides solutions to privacy and security concerns that are associated with Internet of Things devices. The authors provide a critical evaluation of the current state of safety device design and suggest potential areas for future research.

3. SYSTEM DESIGN

EXISTING SYSTEM

When leaders in India assert that women may feel safe in urban areas, many take to social media to express their disapproval. Online communities provide a safe space for people to express themselves freely; for example, victims of sexual assault or harassment can talk about their experiences and possible responses on these platforms. Tweets on women's safety and personal accounts of standing up to abuse and harassment motivate other women on the same social media site, like Twitter. As a result of these tweets and messages being published by other women, five or even ten more people are motivated to speak out against the men and women responsible for the unsafe urban environments that women face in India. Facebook and other social media sites have attracted a huge user base in recent years. To obtain insights from openly accessible social network data, data extraction, analysis, and interpretation methods are frequently employed. You can find out how accurate Twitter analysis and predictions are by studying social network behavior.

Disadvantages

- The vast majority of Indian internet users share their thoughts and feelings about Indian cities and culture on social media platforms like Instagram and Twitter.
- There are various ways to sentiment analysis, such as hybrids of machine learning and lexicon-based learning.
- Additional categories also exist. Janta illustrated several methods of statistical, knowledge-based, and age-related distinction.

PROPOSED SYSTEM

Women have the freedom to go to school or any other location they choose since they have the right to live in the city. But on their way to work, these women feel unsafe in areas like malls and shopping centers due to the numerous anonymous eyes that harass and shame them. Either a lack of safety measures or an absence of tangible outcomes for women is the root cause of harassment towards girls. On the way to school, some girls experienced dread due to a lack of security or were harassed by their neighbors. Consequently, the girls endure lifelong pain due to a single incident in which they were coerced into doing something against their

will or were subjected to harassment by either their neighbors or an unidentified individual. Women should be able to freely participate in civic affairs without fear of harassment or violence in the safest cities. It is time for society to stop putting limitations on women and start prioritizing their safety. Girls and women should be able to feel as protected in urban areas as males.
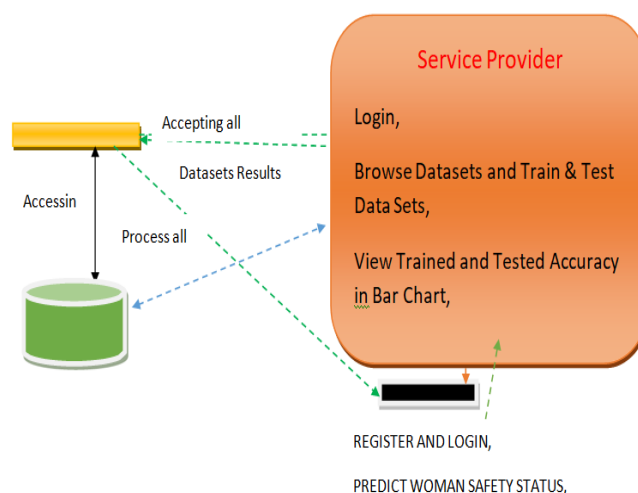
SYSTEM ARCHITECTURE

Figure 1 System Architecture

MODULES

Two modules make up this proposed system. They are:

1. Service Provider
2. Remote User

SERVICE PROVIDER

The following objectives will be fulfilled by this module:

1.You can access training and testing datasets
2. when you log in.
3. Check the taught and tested accuracy with the bar chart.
4. Look at the test and training accuracy results.
5. Check out the Future of Women's Safety Status Report.

Sixth, verify the percentage of women's safety.

Get datasets with predictions. 7.

8. Check out the Women's Safety Status ratio's findings.
9. View all users who are remote.
10. Sign out.

REMOTE USER

The following objectives will be fulfilled by this module:

1.sign up and log in
2.find out how safe ladies are.
3.see your profile.
4. Sign out.

4. RESULTS

EXECUTION PROCEDURE

- Here is the rundown of how it all works: • All of the data used in this study is floating-point and has specific observable properties. Additionally, a decision class or class variable is included. The Kaggle machine learning database was the source of this data.

- The data utilized to train the model accounts for 70% of the total, whereas 30% is used for testing in this study.

- We utilize logistic regression as our classifier.

- Because of the categorization report, we could deduce the anticipated result.

- A number of research variables dictate the final result of this examination. However, the algorithms that yield the best results in terms of true positives, false positives, true negatives, and false negatives are the ones that stand out in this examination.

Figure 2 Enter Values for Prediction

Figure 3 Prediction Result

5. CONCLUSION

A thorough analysis of the literature on protective measures for women against violence, sexual assault, harassment, and molestation that utilize the Internet of Things (IOT). One hundred thirty-four research articles from reputable journals were reviewed for this investigation. Review articles on Internet of Things (IoT) gadgets designed to keep women safe are sourced using a variety of keywords and synonyms. Even if precise keywords are utilized to search the pertinent literature, it is possible that some research incorporated synonyms and alternative phrases into their work, which could impact the ultimate outcomes.

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