

EXAMINING THE IMPACT OF IOT ON WOMEN'S SAFETY: A COMPREHENSIVE REVIEW OF LITERATURE

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ABSTRACT

Women's safety has been highlighted as one of the major concerns of any society where several women are dealing with various safety issues like harassment, rape, molestation, and domestic violence due to different social or cultural reasons. Internet of Things (IoT) is becoming a promising technology to support day-to-day concerns and provide support in handling various affairs. Many IoT-based devices have been introduced by the community to help women deal with their potential safety threats. This study presents a systematic literature review of research studies exhibiting the IoT devices for women's safety, the main features these devices offer as well as the wearable, sensors used, and the machine learning algorithms used. The review is carried out by carefully examining and synthesizing the research articles published between 2016 to 2022 in well-reputed research venues. The results revealed that different types of sensors are used to capture the state of women undergoing safety issues where the pulse-rate, and pressure sensors are most commonly used sensors in these devices. Furthermore, several machine learning algorithms such as logistic regression, hidden Markov, and decision trees are used to identify the potential under threat women and help prevent the undesirable situation for women beforehand. It was identified that despite producing notable research in the underlying domain the systems emphasizing auto-activation of alert generation with lesser human interaction and improved accuracies are required to be developed for effectively addressing the concern. In addition to reviewing the literature, this study suggests a taxonomy posing different techniques, features, wearables, and sensors used in IoT-based women safety devices. Furthermore, the gaps and challenges pertaining to the IoT devices and their usability for women's safety have also been highlighted. In addition, this work proposes an architectural model that presents prominent components necessary to develop IoT-based women's safety devices.

Keyword: - women's safety, women's safety using IoT, safety devices, human safety, machine learning, IoT-based security devices

1. INTRODUCTION

Women's safety has been one of the critical issues where several women are globally facing different types of threats such as violence, molestation, and harassment. Many organizations reported the statistics about women's violence cases indicating the worldwide severity of the issue. ActionAid UK reported at International Safe Cities for Women that nine out of ten women have dealt with some sort of violence. The findings of WHO (World Health Organization) also showed that every one in three women are subject to violence globally. The Global Gender Gap Report showed that every fifth woman is suffering sexual violence globally. These figures show that the women are becoming unsafe day-by-day. Women face safety issues at public places, which include workplaces and markets, as well as in their houses. Women are harassed not only during night-time or evening but also during daylight even in public places. Almost 80% of women have fear of being not safe at all. In the recent situation, women are employed and working outside to meet their ends but there is a lack of safety for them.

2. LITERATURE SURVEY

Women's safety has been highlighted as one of the major concerns of any society where several women are dealing with various safety issues like harassment, rape, molestation, and domestic violence due to different social or cultural reasons. Internet of Things (IoT) is becoming a promising technology to support day-to-day concerns and provide support in handling various affairs. Many IoT-based devices have been introduced by the community to help women deal with their potential safety threats. This study presents a systematic literature review of research studies exhibiting the IoT devices for women's safety, the main features these devices offer as well as the wearable, sensors used, and the machine learning algorithms used. The review is carried out by carefully examining and synthesizing the research articles published between 2016 to 2022 in well-reputed research venues. The results revealed that different types of sensors are used to capture the state of women undergoing safety issues where the pulse-rate, and pressure sensors are most commonly used sensors in these devices. In addition, the devices used different technology to transmit the alerts including global positioning system (GPS), global system for mobile communication (GSM), and Raspberry pi. Furthermore, several machine learning algorithms such as logistic regression, hidden Markov, and decision trees are used to identify the potential under threat women and help prevent the undesirable situation for women beforehand. It was identified that despite producing notable research in the underlying domain the systems emphasizing auto-activation of alert generation with lesser human interaction and improved accuracies are required to be developed for effectively addressing the concern. In addition to reviewing the literature, this study suggests a taxonomy posing different techniques, features, wearables, and sensors used in IoT-based women safety devices. Furthermore, the gaps and challenges pertaining to the IoT devices and their usability for women's safety have also been highlighted. In addition, this work proposes an architectural model that presents prominent components necessary to develop IoT-based women's safety devices. Lastly, this study emphasizes the use of combinations of sensors to get multiple types of input data that could lead to determining the possibility of threat with better accuracies and precisions. [1]

In the present day scenes women safety is considered to be the major problem in both urban and rural areas. It is quite difficult to change the mind-set of the entire society, but we can provide several security devices for the women who are facing sexual harassment, acid attacks, molestation, etc. For providing the security, various smart devices and applications were developed. Many smart devices and applications are also available in the market; but, it doesn't provide an effective solution. Experts from various field discovered women's safety device which works in both manually and automatically. This article examines various women safety related techniques. The drawbacks and opportunities in women's safety devices are also discussed.[2]

Today in the current global scenario, women are facing many problems like women harassment. We propose to have a device which is the integration of multiple devices, hardware comprises of a wearable "Smart band" that endlessly communicates with sensible phone that has access to the web. This paper covers descriptive details about the design and implementation of "Smart band". The device consists of a trigger, microcontroller(ATmega2560), GSM module (SIM900), GPS module(Neo-6M),IoT module(ESP-12E),Neuro Stimulator, Buzzer and Vibrating Sensor. In this project, when a woman senses danger she has to hold ON the trigger of the device. Once the device is activated, it tracks the current location using GPS(Global Positioning System) and sends emergency message using GSM(Global System for Mobile communication) to the registered mobile number and near by police station.IoT module is used to track the location continuously and update into the webpage. Neuro Stimulator will produce non-lethal electric shock in emergency situations to detect the attacker, buzzer is used as an alarm to alert the nearby people so that they may understand that someone is in need and vibrating sensor will send the last location in case if the device gets defected. The main advantage of this project is that this device can be carried everywhere since it is small. [3]

Providing accurate and opportune information on people's activities and behaviors is one of the most important tasks in pervasive computing. Innumerable applications can be visualized, for instance, in medical, security, entertainment, and tactical scenarios. Despite human activity recognition (HAR) being an active field for more than a decade, there are still key aspects that, if addressed, would constitute a significant turn in the way people interact with mobile devices. This paper surveys the state of the art in HAR based on wearable sensors. A general architecture is first presented along with a description of the main components of any HAR system. We also propose a two-level taxonomy in accordance to the learning approach (either supervised or semi-supervised) and the response time (either offline or online). Then, the principal issues and challenges are discussed, as well as the main solutions to each one of them. Twenty eight systems are qualitatively evaluated in terms of recognition performance, energy consumption, obtrusiveness, and flexibility, among others. Finally, we present some open problems and ideas that, due to their high relevance, should be addressed in future research [4]

The goal of this article is to build a smart gadget that can help women who are feeling insecure and threatened. We put our effort to develop a Smart Foot Device with a view of Women's Safety. Every day, everywhere, young girls, ladies and other females of different societies fight to be safe and defend themselves from the incredibly disrespectful men's roving eye that molests assaults and abuses women's dignity. In General, the roads, public transport, and public place have become the hunter's dominance. A smart safety footwear aimed at womenfolk grounded on the Internet of Things was suggested because of these crimes happening in the current scenario. This is realized with the usage of a smart IoT device. This smart gadget can be fixed into the footwear well as it shall be activated invisibly. A button, a Microcontroller board, GPS, GSM, and a buzzer are all part of the smart wearable device. An alert is activated by tapping one foot behind the other thrice. This permits the GSM and GPS to direct a message to pre-configured numbers such as a guardian or police department. The findings were analyzed using a decision tree classifier, which revealed that this low-cost gadget had substantially greater reliability.[5]

3. METHODOLOGY

3.1 EXISTING SYSTEM

People often express their views freely on social media about what they feel about the Indian society and the politicians that claim that Indian cities are safe for women. On social media websites people can freely Express their view point and women can share their experiences where they have faced abuse harassment or where we would have fight back against the abuse harassment that was imposed on them . The tweets about safety of women and stories of standing up against abuse harassment further motivates other women data on the same social media website or application like Twitter. Other women share these messages and tweets which further motivates other 5 men or 10 women to stand up and raise a voice against people who have made Indian cities and unsafe place for the women. In the recent years a large number of people have been attracted towards social media platforms like Facebook, . It is a common practice to extract the information from the data that is available on social networking through procedures of data extraction, data analysis and data interpretation methods. The accuracy of the Twitter analysis and prediction can be obtained by the use of behavioral analysis on the basis of social networks.

3.1.1 DISADVANTAGES OF EXISTING SYSTEM

1. Twitter and Instagram point and most of the people are using it to express their emotions and also their opinions about what they think about the Indian cities and Indian society.
2. There are several method of sentiment that can be categorized like machine learning hybrid and lexicon-based learning.
3. Also there are another categorization Janta presented with categories of statistical, knowledge-based and age wise differentiation approaches

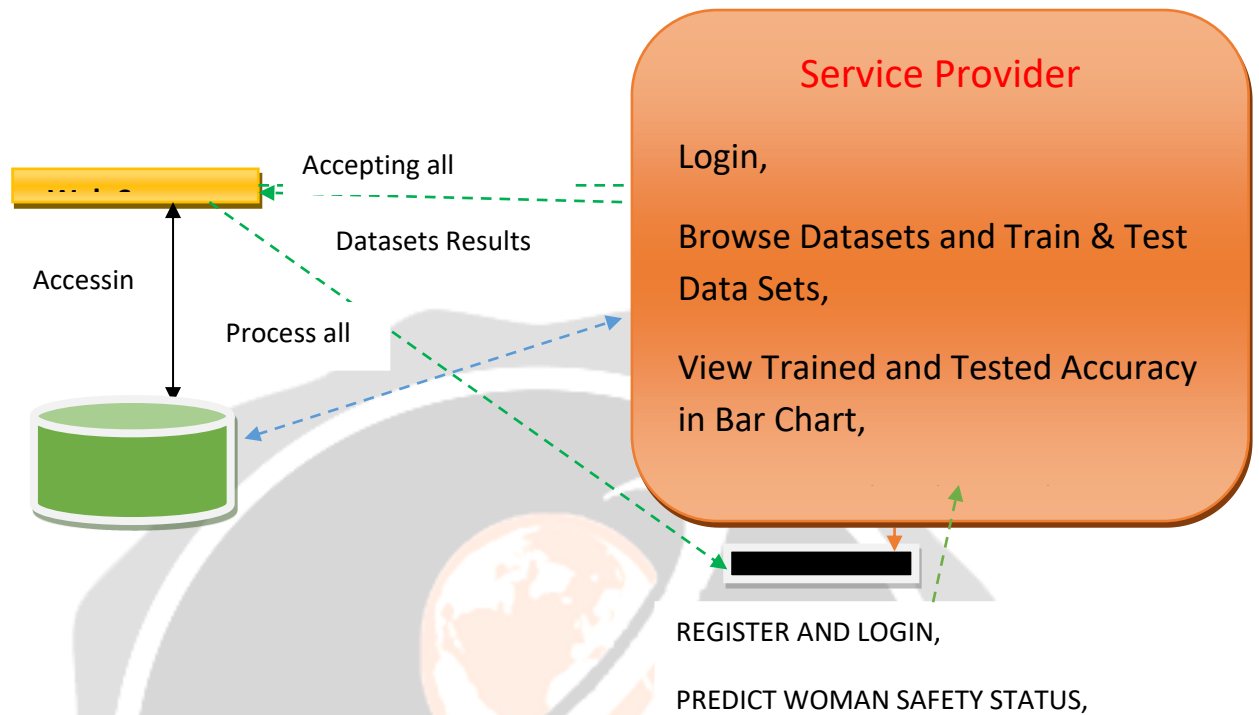
3.2 PROPOSED METHODOLOGY

Women have the right to the city which means that they can go freely whenever they want whether it be too an Educational Institute, or any other place women want to go. But women feel that they are unsafe in places like malls, shopping malls on their way to their job location because of the several unknown Eyes body shaming and harassing these women point Safety or lack of concrete consequences in the life of women is the main reason of harassment of girls. There are instances when the harassment of girls was done by their neighbours while they were on the way to school or there was a lack of safety that created a sense of fear in the minds of small girls who throughout their lifetime suffer due to that one instance that happened in their lives where they were forced to do something unacceptable or was abusely harassed by one of their own neighbor or any other unknown person. Safest cities approach women safety from a perspective of women rights to the affect the city without fear of violence or abuse harassment. Rather than imposing restrictions on women that society usually imposes it is the duty of society to imprecise the need of protection of women and also recognizes that women and girls also have a right same as men have to be safe in the City.

4. SYSTEM DESIGN

It is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to understand the old system thoroughly and determine how computers can best be used in order to operate efficiently

4.1 SYSTEM ARCHITECTURE



4.2 MODULES

In this Proposed System, There are two Modules. They are:

1. Service Provider
2. Remote User

4.2.1.SERVICE PROVIDER

In this module, it will perform following operations:

1. Login
2. Browse Datasets & Train & test Datasets
3. View Trained & tested Accuracy in Bar chart
4. View Trained & Tested Accuracy results
5. View Prediction of Women Safety Status
6. View Women Safety Status ratio
7. Download Predicted Datasets
8. View Women Safety Status ratio results
9. View all Remote Users
10. Log out

4.2.2.REMOTE USER

In this Module, it will perform following operations:

1. Register & Log in
2. Predict Women Safety status

3. View Your Profile
4. Log out

5. RESULTS AND PERFORMANCE

EXECUTION PROCEDURE

The Execution procedure is as follows:

1. In this research work with data with attributes are observable and then all of them are floating data. And there's a decision class/class variable. This data was collected from Kaggle machine learning repository.
2. In this research 70% data use for train model and 30% data use for testing purpose.
3. Logistic Regression is used as Classifier .
4. In the classification report we were able to find out the desired result
5. In this analysis the result depends on some part of this research. However, which algorithm gives the best true positive, false positive, true negative, and false negative are the best algorithms in this analysis.

The screenshot shows a web application interface for predicting woman safety status. The interface is displayed in a browser window with the URL '127.0.0.1:8000/Predict_Woman_Safety_Status/'. The form has a red background and contains the following fields:

- Enter City:** Ghaziabad
- Enter Title:** Labourer thrashed by thr...
- Enter Body_Text:** with a spade on Thursday night in Surana village of Ghaziabad. The labourer, Jamalluddin, is said to be in a critical condition and is undergoing treatment at a nearby hospital. The three arrest
- Enter PDate:** 2022-12-16 05:35:49+09

A **Predict** button is located below the fields. Below the form is a red box labeled **PREDICTED WOMAN SAFETY STATUS**.

Fig Enter Values For Prediction

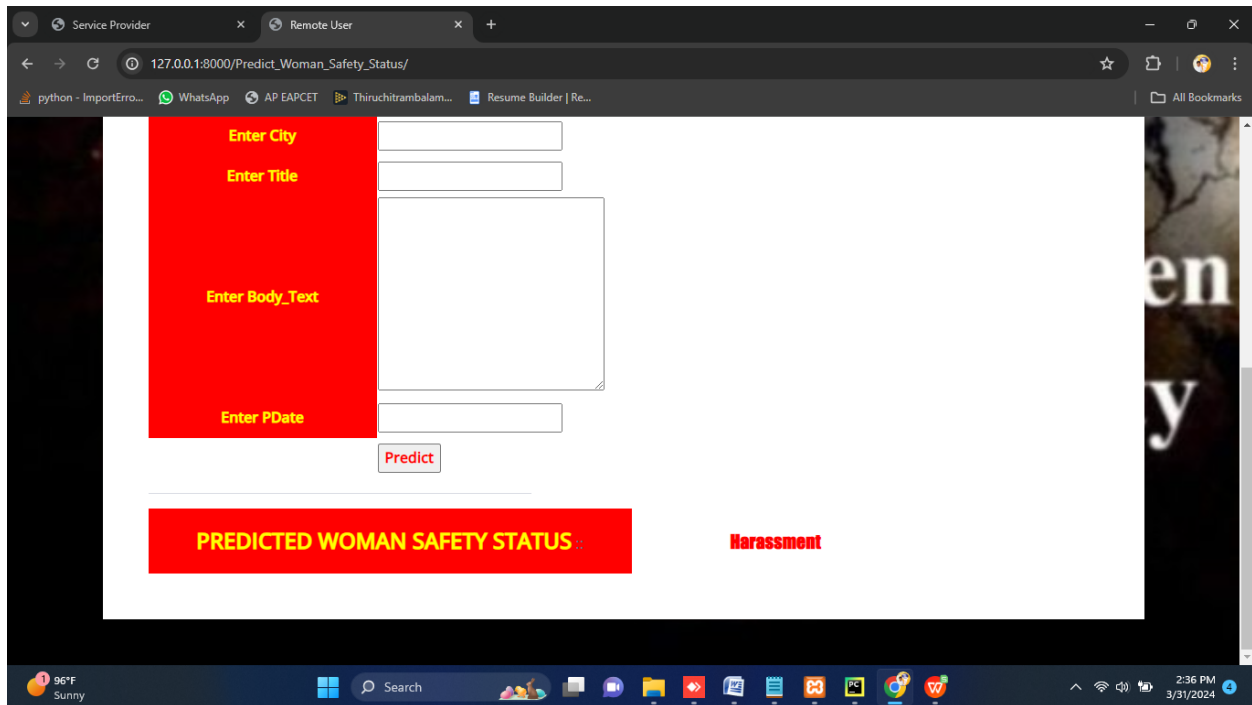


Fig Prediction Result

6. CONCLUSION

A systematic literature review of IOT-based devices designed for women's safety to protect them from threats like molestation, harassment, rape, and abuse. It was conducted by reviewing 34 research articles gathered through eminent publication sources. The papers for reviewing the IOT-based devices for women's safety are gathered by considering a number of keywords and their alternate words. Though a number of the keywords are used to search the relevant literature, there exist the possibility that some studies used other words and their synonyms in their work that could affect the final results.

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