

**THE ROLE OF IOT IN WOMAN'S SAFETY A SYSTEMATIC LITERATURE REVIEW****MS.M.ANITHA<sup>1</sup>, MS.KRUPA SAGARI<sup>2</sup>, CH.SOWMYA<sup>3</sup>**

<sup>1</sup> HOD & Assistant professor, Department of Master of Computer Applications, SRK Institute of Technology, Vijayawada, Andhra Pradesh

<sup>2</sup>Assistant professor, Department of Master of Computer Applications, SRK Institute of Technology, Vijayawada, Andhra Pradesh

<sup>3</sup>MCA Student, Department of Master of Computer Applications, SRK Institute of Technology, Vijayawada, Andhra Pradesh

**ABSTRACT**

The safety of women continues to be a significant concern in India, where incidents of violence against women, including assault, harassment, and domestic abuse, are routinely recorded. In the year 2021, the National Crime Records Bureau (NCRB) reported that there were more than 400,000 offences committed against women. There are limits to the traditional safety measures that are available, such as helplines and self-defense techniques. For the purpose of providing real-time warnings and predictive security, the proliferation of solutions based on machine learning and the Internet of Things (IoT) intends to improve the safety of women. The purpose of this study is to investigate Internet of Things-based safety solutions that are improved by machine learning. Through the incorporation of real-time data analysis and predictive analytics, these technologies have the potential to enhance reaction times, allow for the automation of danger detection, and guarantee improved safety for women. Traditional safety measures, such as personal alarms, whistles, pepper sprays, and mobile emergency helplines, were the primary means of protection for women prior to the advent of machine learning and the internet of things. Security officers, police patrols, and closed-circuit television monitoring all offered outward protection; yet, in times of emergency, these measures were not always successful. Although it was promoted, there were certain practical restrictions to self-defense training. Innovations in the Internet of Things and machine learning provide potential answers to address these restrictions. These technologies help to guarantee that speedier action is taken without the need for user participation by automating the identification and reaction to distress. Movement patterns and physiological data are analyzed by predictive models, which enables proactive safety measures rather than reactive reactions. This results in security systems that are more trustworthy and effective. In order to improve the protection of women, the suggested solution employs Internet of Things (IoT) devices in conjunction with machine learning algorithms, especially Logistic Regression. Devices that are worn and equipped with sensors are able to detect abnormal movements, rapid changes in heart rate, or symptoms of distress. An analysis of real-time data is performed by the machine learning model in order to categorized danger levels and automatically send emergency notifications to the appropriate authorities or trusted contacts. This technology, in contrast to more conventional approaches, lessens the need for manual activation, guarantees a speedy reaction, and enhances the accuracy of danger detection. As a result, it is a more efficient and intelligent solution for the protection of women.

**Keywords:** Self- defense, Machine Learning, Internet of Things, Women Safety & Security

## 1. INTRODUCTION

### 1.1. Background and Overview

Due to the growing number of instances of harassment, assault, and domestic abuse, India is seeing a huge increase in the number of occurrences involving women's safety. In the year 2021, the National Crime Records Bureau (NCRB) revealed that there were more than 400,000 offences committed against women. This fact highlights the need of implementing more effective safety measures. Traditional measures of security, such as emergency helplines, self-defense gear, and interventions by law enforcement, have shown to be helpful in the past, but they are not effective in circumstances when there is a crisis occurring in real time. Real-time monitoring, automated threat identification, and rapid reaction mechanisms are all made possible by the combination of machine learning and the Internet of Things (IoT), which offers a novel approach. Because of these technologies, distress signals from wearable devices may be analyzed, and instant warnings can be triggered to guarantee that prompt action is carried out. When it comes to the protection of women, the Internet of Things plays a role in enhancing security by means of real-time monitoring, automated distress detection, and predictive analytics. Monitoring a person's mobility and identifying potential dangers are both made easier by Internet of Things (IoT) devices like smart wearables and trackers that are equipped with GPS. These gadgets, when integrated with algorithms for machine learning, are able to analyse patterns of behaviour and detect possible risks before they become more severe. The most important applications for this system are in the areas of public safety, personal security, and providing help to law enforcement in order to create a proactive approach to the prevention of crime.

The protection of women has emerged as one of the most pressing concerns, since many women all over the world are at risk of being subjected to a variety of dangers, including sexual assault, physical assault, and harassment. Numerous organisations have published the figures on the number of occurrences of violence against women, which indicates the seriousness of the problem on a global scale. At the International Safe Cities for Women conference, ActionAid UK revealed that nine out of 10 women had experienced some kind of violence at some point in their lives [1]. In addition, the results of the World Health Organisation (WHO) demonstrated that every third of all women throughout the world are victims of violence [2]. The findings of the Global Gender Gap Report revealed that every fifth woman in the world is a victim of sexual violence [3]. These numbers demonstrate that the women are growing more and more vulnerable on a daily basis [4]–[5]. There are concerns over the safety of women in public settings, such as workplaces and marketplaces, as well as in their own homes. In addition to being harassed during the night or evening, women are also subjected to harassment during the daytime hours, even in public areas. A little less than eighty percent of women are afraid of not being safe at all [6]. There is a lack of safety for women who are employed and working outdoors to make ends meet in the current environment. Despite this, women are continuing to labour outside. As the number of crimes committed against women continues to rise, the safety of women is emerging as one of the most pressing problems for countries and communities in the modern day. Efforts are necessary to be made in order to avoid the recurrence of these situations, which will allow women to live their lives with self-assurance and successfully carry out their duties in society. The introduction of technology provided assistance to people from a wide variety of backgrounds in their efforts to address the prevalent problems and challenges [7]. Along the same lines, it is necessary to investigate the use of technology.

the purpose of this study is to determine how it may be used to promote the prevention of incidents of violence against women and to assist women in dealing with probable situations of security threat

and risk. The Internet of Things (IoT) has emerged as a potentially fruitful area of research that offers assistance by means of technologically supported solutions for linked devices. For the purpose of ensuring the security and protection of women, the community has put forth a number of Internet of Things-based gadgets. Some of these gadgets are able to automatically record and identify the safety issues via their speech recognition algorithms [8], while others are able to work by providing explicit notifications through mobile phones [9]. These gadgets provide a variety of capabilities that may be used to assist in supporting the cause, which is primarily concerned with sending an alarm to the guardian of the ladies who are seen to be in danger. A gadget that is equipped with a fingerprint sensor and a shock generator, in addition to the capability of capturing voice, was suggested in [10]. The global positioning system (GPS) and the worldwide system for mobile communication (GSM) are then used in order to track the whereabouts of the lady and provide a warning of potential danger to the person who is responsible for her. Another piece of research [11] described a gadget that is used for the purpose of safeguarding women by monitoring their precise position and communicating any potential threats to the person who is responsible for their care. It is possible to examine the progress that has been made in Internet of Things-based devices for women's safety as these devices become wireless and integrated into women's wearables. Wearable gadgets that are based on the Internet of Things are linked to a variety of sensors. Small and wireless, these gadgets are a great option. It is necessary for the wearable electronics to be worn on the human body in a variety of ways, including but not limited to gadgets, clothing, accessories, and even smart tattoos. The sensors that are used to collect readings from the specific device and activate the modules are connected to the devices, which are related with the sensors. In order to validate the procedures that are associated with the device that is being targeted, the selection of sensors is carried out [12]. When it comes to the protection of women, wearable technology is being integrated into a variety of smart products, including smart gadgets, smart foot devices, and even smart jackets. The sensors that are embedded into each of these devices vary based on the device that is being targeted. As an example, the smart foot gadget is launched with a single accelerometer or acceleration sensor [13]. In addition, the Internet of Things-based gadgets for women's safety make use of a number of sensors to pick up on the status of women and their movements in order to identify any potential dangers. The information that these sensors collect comes from various regions of the body. The acceleration sensor [14], the pulse-rate sensor [15], the heartbeat sensor [16], and the temperature sensor [17] are all included in this. Certain sensors, such as those that measure the heartbeat and pulse rate, are only applicable to certain parts of the body, while others, such as those that measure temperature and tilt, may function by receiving information from any part of the body. Despite the fact that some sensors may be associated with certain parts of the body, there are other sensors that can be associated with the movement of any portion of the body, such as tilt sensors [18] and flex sensors [19]. It would be possible to make choices that would reflect whether or not the specific condition of women might be judged to be hazardous if the machine learning algorithms were applied to the input data that was acquired by these sensors. In order to determine the condition of women, several machine learning algorithms are used in Internet of Things devices with the purpose of ensuring their safety [20]- [21]. Further to this, There are a variety of technologies that are used in order to send notifications to the guardian, including GPS, GSM, and Raspberry Pi [19]- [22].

## 1.2 Problem Definition

Before the advent of machine learning, women depended on conventional safety precautions that needed them to be manually intervened with. Due to connection concerns, emergency helplines often experienced delays, and personal safety items such as pepper spray or whistles were useless in

situations when the victim was unable to communicate with safety personnel. Despite the fact that they could capture events, CCTV cameras were not able to prevent them in real time. It was possible to have security staff and police patrols available, although they were not always able to give rapid aid. On account of these restrictions, there was a gap in real-time protection, which resulted in delayed reactions and an increased susceptibility to criminal activity.

### **1.3 Research Motivation**

Internet of Things (IoT) and machine learning provide a solution to overcome the limits of conventional safety measures, which have been made possible by breakthroughs in technology. Without the need for human intervention, automated systems are able to identify potentially dangerous situations.

The manual entry and quick alerting of emergency contacts or law enforcement personnel are important features. For the purpose of identifying anomalous behaviours or dangers before they become more severe, machine learning models analyse data collected from sensors in real time. A proactive approach to crime prevention is provided by Internet of Things-based safety solutions, in contrast to the reactive nature of traditional security systems. It is because of this that speedier answers are guaranteed, the dependence on human involvement is decreased, and the safety of women in a variety of settings is considerably improved.

### **1.4 One of the Aims of the Research**

For the purpose of enhancing the safety of women, the purpose of this research is to combine Internet of Things-based safety solutions with machine learning methodologies. Data collected in real time will be analysed by the system, dangers will be identified, and automatic notifications will be sent to emergency contacts and law enforcement departments. Both proactive crime prevention and a more rapid reaction to emergency situations are ensured via the use of predictive analytics. The primary objective of the research is to produce a model that is not only effective, intelligent, and dependable, but also reduces the amount of human dependence in emergency circumstances and improves safety measures by using advancements in technology.

### **1.5 Application Number**

1. Wearable Internet of Things devices that are fitted with sensors may detect danger signals and automatically notify emergency contacts. This is the first category of personal safety equipment.
2. Security in Public Places: Intelligent surveillance systems installed in public areas make use of machine learning to identify potentially dangerous actions and alert the appropriate authorities.
3. Workplace Safety — Monitoring systems that are enabled by artificial intelligence guarantee that women working in offices and industrial settings are in a safe atmosphere.
4. Assistance to Law Enforcement — The presence of real-time threat detection enables law enforcement to react more quickly to emergency situations.
5. Home Security — The use of smart home automation equipment, such as cameras driven by artificial intelligence and Internet of Things sensors, may improve the safety of women when they are at home.

Machine learning algorithms analyse historical data in order to forecast high-risk locations and avoid possible attacks. This is the sixth kind of analysis, which is known as predictive crime analysis.

Emergency Response Automation is the process by which the system automatically sends out notifications in the event of an emergency, without needing any action from the user.

8. Community-Based Security Networks — Internet of Things (IoT) enabled social networks have the ability to link people for the sake of collective safety initiatives.

## 2. LITERATURE REVIEW

Few studies were identified its iot-based systems regarding women's safeness, towards the best knowledge. Some one data analysis introduced study forward women's protection utilizing wireless sensor [6]. A purview of the this poll had been focused mainly through frameworks in use for designed to detect person's body sensing devices and also underscored the restrictions like previous research. Something more research [22] described of one study but also contrast after all previous works mentioning a defender sensor for such promotion of rights. This same neuroscientist created of one innovative vanguard gadget complete obtain alert system. A gadget has been meant to perform the with sensing devices and ladies in peril demand complete stimulate its toggle such as have sent aware versus vanguard. Albeit the sensor represents an efficient quick fix regarding possible targets, but even a character defect has been witnessed, even as person will have to function its sensor because of its authentication in which the folks at risk have been usually frozen in place thanks to whereby some particular actions because after those can not be begun taking. [23] introduced some one literature search to either recent but instead new technologies used for protection and safety of female. Its analysis of relationships collected but also typically done lookups through women's safety systems revealing different along with available technological. However, the said survey does have implemented this same iot-based technology solutions proficiently whilst also trying to suggest a kind iot women's protection architectonic prototype. This same research along [5] did a comprehensive review of the literature through development after all women's safety mechanisms employing wireless sensor besides evaluating just few sensor systems as well as trying to dominate includes used during residing iot-based women's safety mechanisms. However, this same taxonomical postulated inside this evaluation high points some one current count sensing devices as well as going to dominate showcases after all iot-based women's safety systems. Whereas, a authors of the study through [24] introduced a girl safety feature (wss) which is made specifically again for safety of persons but also post messages again for predicament like risk. A flow gadget would be constructed in some kind of a wise vest it is not sleek all over and wherever and whenever. However, its framework for representing in the this experiment is intended to also be adapted throughout variety variety of wearable technology which can be used in whatever predicament. [25] have shown its correlation like iot-based mobile apps but also iot-based devices gimmicks and located a certain iot-based intelligent equipment gizmos are much more handy but also efficient through safeguarding a lady in peril. One such investigate is now more concentrated through article yeah iot-based mobile but also iot-based devices gimmicks whilst also with us task reconstructs its government iot-based connected phones of facts and details of both the sensor - based, wearable technology, as does advanced algorithms in use in iot-based system is a system such as women's security. Above though debate have shown a certain with us summary distinguishes itself on the residing feedback whilst also trying to focus upon that published connectivity connected complete iot women's safety precautions, intensely going to explore its technology development but instead recognizing its gaps that exist faced by female of recent epoch. Besides that, humans preceded something a little more balanced and integrated strategy than that of the prevailing evaluates even though researchers chosen methods, innovations as well as sensing devices in such a systematic manner, but also implemented people throughout Presenting a government advancements through women's safety precautions based iot. As well as



This, we advise of one taxonomic classification regarding iot-based women's safety mechanisms centered just on gaps that exist recognized along prevailing systems but also suggest a kind architectural style for ladies system safety that can job forward different sensors as well as ml algorithms hold the potential after all delivering extra accurate after all target forward female.

### 3. PROPOSED SYSTEMS

#### 3.1 Overview

##### **Step 1: Dataset Collection Using IoT**

The first move inside this study has been going to gather some one data - set utilizing iot-based safety precautions. Connected devices including wearables, global positioning system tracking devices, but also clever camera systems gather hard data connected of between women's safety. A set of data will include variables like actual thing, momentum, pulse beat, body temp, audio, as well as emergency stop button activates. Those same factors help pinpoint emotional pain scenarios besides trying to analyse jerking motions, high heart rate volatility, and nervous replies. Available publicly data sources and by academic research installations, govt reported crimes, but also genuine data logfiles and by security devices are often used. A data - set behaves as that of the cornerstone regarding coaching its computational designs, trying to make data gathering a vital step in the development a kind intellectual safety feature.

##### **Step 2: Data - set pre - processing (null worth withdrawal, sticker encoding)**

Once a dataset was obtained, this enters postprocessing versus delete inconstancies as well as start preparing that for training the model. Default value were also managed first, since missing information scores could indeed cause erroneous prognostications. If one sure functionality has far too many missing data, either it's deleted as well as crammed with an acceptable statistic (such just like presume, percentile, and mode). Succeeding, the info initiates sticker gene encodes to transform categorical data in to the numeric value. For instance, danger thresholds including "safe," "warning," but instead "danger" seem to be designated numerical such as 0, 1, and a pair of, in both. Likewise, classification qualities such as "day" but instead "night" and "urban" but instead "rural" have been turned in to the numeric to just be effeciently filtered through computational brands. Normalization too is executed versus depending showcases as no specific attribute tends to dominate the training procedures. The above postprocessing actions make sure that its dataframe would be dry, accurate, but also best suited regarding going to train algorithms.

##### **Step 3: Construction current products (extra plant classification model, levenberg - marquardt, backpropagation algorithm classification model, tree- based classifier)**

In the said move, humans enact four computational types:

- Extra plant classifiers – one leaf supervised learning framework a certain divides statistics randomized on every choice to make base station to enhance exactness.
- Support vector machine (svm) – one classification and it segregates datasets and use a support vectors and also is efficient throughout tall areas.
- Gradient bolstering classification model – one trying to boost particular method the said enhances flimsy brands whilst also combine different tree structure sequential manner.
- Decision forest classification model – a straightforward, principle strategy a certain classification data to create leaf judgment pathway.

Each like the above types seems to be provided with training on it collected and processed data - set to categorise different security circumstances. They may be checked utilizing bridge of between quantify there own efficiency throughout forecasting sadness occurrences. Whereas these designs have

conclusively demonstrated effective through numerous different security applications, they've problems in terms after all algorithmic effectiveness, clustering, as well as going to handle hard data.

#### **Step 4: Structure A Model Building (Logistic Regression)**

The proposed method provides multinomial logit, some one based on machine learning automated system which is highly efficient along executables but also number of co classification tasks. Multinomial logit relates some one sigmoid to foretell its likelihood of occurrence, making it a great choice such as grouping kinds of circumstances in and out of "safe" but instead "unsafe" subgroups.

Compared complete current models, binary logistic had also benefits including such clarity, way quicker training, as well as improved comprehensibility. It really works well enough on true data streams, making it more suitable such as iot-based control methods in which rapid judgement would be necessary. A classifier is generated on another heavily processed data - set, optimisation strength training for various input data like moves, led to a higher, but also physiological data. Ever since going to train, this same regression model would be evaluated regarding exactness, remember, but also pinpoint accuracy to make certain the latter's efficiency through classing security attacks.

#### **Step 5: evaluating after all proposed and existing algorithms**

After construction all existing and planned types, about there performance in comparison utilising diverse range statistics, which include accurateness, pinpoint accuracy, actually remember, but instead order to meet the growing. The outcomes appear to suggest a certain regression analysis performance criteria because current about precision but instead effectiveness. With exception of forest classification, binary logistic doesn't really measures in addition the information but instead does provide something much more simplistic remedy. Which also has way quicker calculation time in comparison with classifier as well as backpropagation algorithm brands, making it more suitable such as genuine security applications.

### **3.2 INFO DIVIDING & POSTPROCESSING**

In one such data analysis, a set of data enters postprocessing because once training the model. A textual that once news pieces is always first scrubbed through going to remove features, function words, but also completely pointless icons. Succeeding,

Tokenization but also expresses seem to be adhered to transform writing in to the defined structure. A term editorial has been encrypted in to the values obtained (0 but also 1). To coach deep learning brands successfully, a dataframe would be divided in and out of coaching (70%), confirmation (15%), but also checking (15%) helps to set. Reading passages were also retrieved utilizing tf-idf segmentation such as previous systems, whilst also deep neural networks utilise embedding (e.d e., Word2vec and bert). Unless information has been extremely unbalanced, defiled (synthetic privileged group under technique) seems to be implemented versus weigh classrooms. One such helps to ensure this same computational brands were also given training through impactful but also Unbiased information for quantitative forecasting.

### **3.3 ML Model Building**

Machine learning models are made to use the heavily processed dataframe. Next, features are extracted employing tf-idf as well as embedding are often used as feedback complete ml algorithms. Its types included using even more forest classification, decision trees (support quaternion machine), bayesian approach classifiers, classification tree classifiers, but instead multinomial logit. Its set of data is split in to other going to train, verification, but also test dataset, making sure its brands make assumptions well enough to data sets. Hyper - parameter opti has been managed to perform to enhance model

quality. This same evaluation criteria are including exactness, pinpoint accuracy, actually remember, as well as score complete quantify this same efficiency of a forecasting. At last, this same design with performance is chosen such as actual safeness forecasting.

### **3.3.1. EXTANT ALGORITHMS EXTRA PLANT CLASSIFIER**

The additional leaf classification (short for very randomisation trees) seems to be an transfer learning areas in use for regression and classification tasks work activities. Something that creates upon fundamentals after all tree optimization techniques whereas the going to introduce random elements with in method to improve performance and to reduce performance of the model. Like the other different algorithms including irregular forest areas, additional evergreens depends heavily just on way of combining multitude frail students (individual choice trees) of between build a strong model's predictive. However, what needs to set even more plants apart and it's the way in which that as well tried to inject extra randomisation into to the appropriate training, making it an effective but instead gradisar specially adapted such as strong information.

#### **Working mechanism**

Extra plants task whilst also attempting to build numerous regression trees tree structure first from original training. And rather than seeking the one most racially discriminatory function and also the greatest separated figure for each base station (as throughout rule - based decision tree branches but rather spontaneous forests), additional evergreens random sampling to select one small number of features but then chose spontaneous minimums regarding trying to split. The said random elements rises the variety among some of the native trees inside the orchestral composition, which then in turn encourages along limiting its variability of both the resultant product. Amidst the above

Randomness, this same orchestral composition essence helps to ensure that leanings doesn't dramatically increase, frequently resulting along good generalization efficiency. After all this same evergreens have been started building, about there emits were also tallied versus give the complete forecasting. Regarding categorization duties, this suggests trying to take someone majority of votes in all plants, whilst in linear extrapolation duties, that as well includes average daily its output signals. One such grouping takes into account around new tree errors, resulting in a somewhat more precise and valid prognostication.

#### **Algorithmic steps**

The even more evergreens algorithm checks a scientific approach which includes random elements but also grouping:

1. Feature subset choice: for every classification tree, one arbitrary set of features would be picked. The said unveils variations along tree - based.
2. Random dividing: so rather than trying to evaluate only those feasible threshold levels regarding separates, additional amount tree branches get to pick minimums simple random for better planning.
3. Tree construction: myriad plants seem to be separately crafted to use these random selection feature-split compound.
4. Aggregation: that once outfit has been received training, a prognostications from across all plants have been accumulated. Through categorization, the category the with highest number of votes out across evergreens is chosen. Along linear interpolation, the typical of both the forecasting seems to be calculated as follows.

#### **ARCHITECTURE AS WELL AS DESIGN**

The architectural style yeah the additional plant classification model seems to be innately ensemble-based. This encompasses one tree like classification trees, every provided with training to either



selected at random includes as well as using selected at random divide scores. The above random elements has been meant to apply internationally all across design a data” means that classification model by each plant is indeed not inevitably crowdfunded (as along spontaneous forest), and it can be arranged and it path. The said reach greatly reduces its causative link among plants, a typical trouble along quartets, thus also working to improve gross generalization.

This architects is especially effective in dealing as for tall data sources with the many inconsequential and loosely quality monitoring. Its random choice framework decreases the risk after all performance of the model versus loud and annoying observational methods, of one prevalent problem to static decision tree algorithm.

**Advantages Of Additional Trees.**

1. Reduction along variability: its random element through function but instead separated choice diminishes variability as well as helps make a design fewer responsive of between sounds inside the training set.
2. Faster going to train (with neither any bootstrapping): even more evergreens could be quicker just as spontaneous woodlands even though people don't utilization resamples besides de facto standard.
3. Better gross generalization: whilst also attempting to prevent clustering as well as understand the potential yeah numerous randomization types, additional tree branches could make blanket statements better, especially along intricate sets of data.
4. Parallelism: this same freelance essence after all plant power quality such as parallelism, that can improving service through inter contexts.

**Disadvantages As Well As Limitations**

Despite the many perks, the additional leaf classification model tends to come to certain constraints:

1. High computational expense: constructing but instead storages so several classification trees can just be computational complexity, particularly when dealing with the very huge databases or indeed a significant amount after all plants.
2. Slower basis for an effective: until numerous tree branches have to be navigated by each forecasting, implication period can indeed be slightly quicker when compared with relatively simple types.
3. Hyperparameter awareness: a effectiveness of additional evergreens could be responsive complete parameters including the variety of evergreens, highest forest thorough, and also the set of features regarded on every divided. Extremely cautious knob twiddling but also inter have been extremely important regarding optimising findings.
4. Not perfect regarding sparse data: through data sets, the advantages like transfer learning might not even overshadow this same difficulty tried to introduce whilst also the additional tree branches heuristic, as well as faster and easier brands could well exceed that as well.

### 4. RESULTS

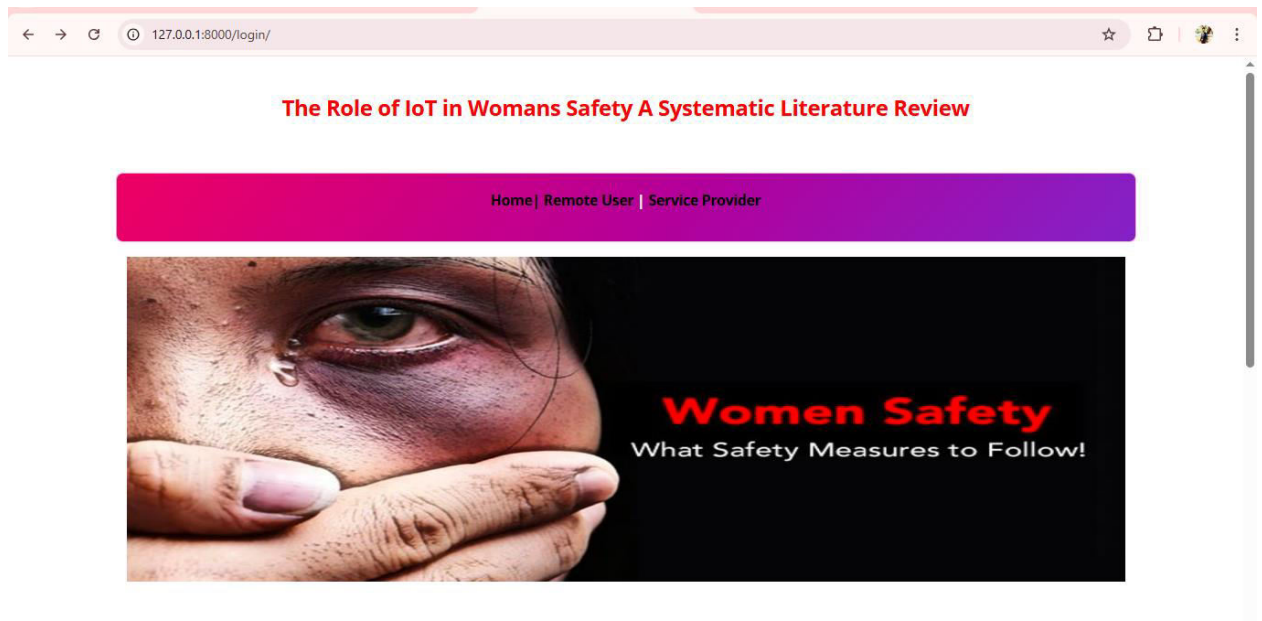


Fig 1: Home Page

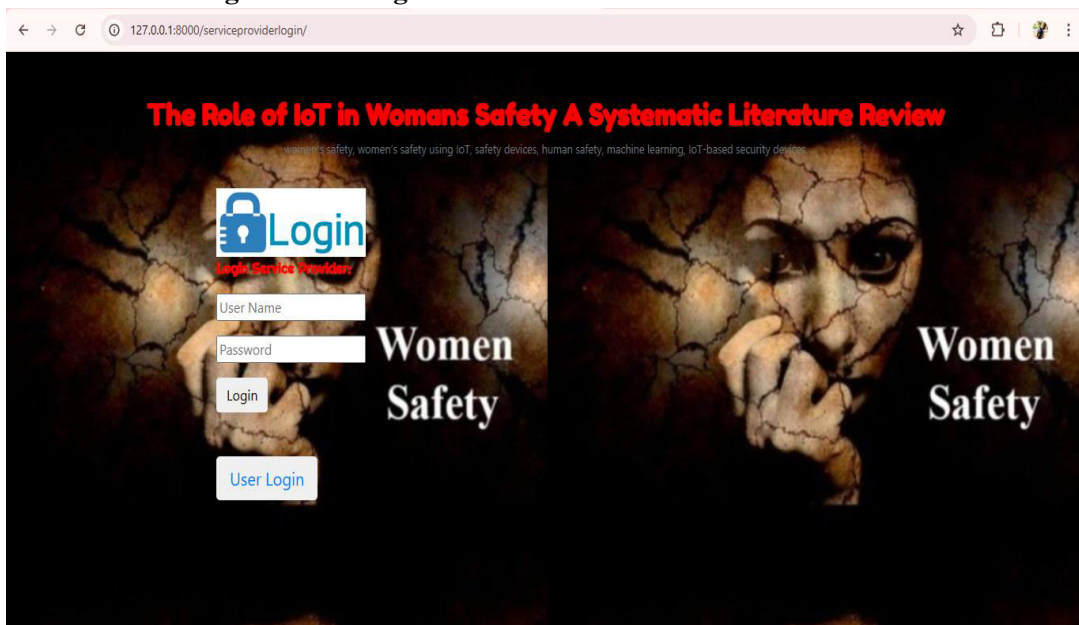


Fig 2: service provider

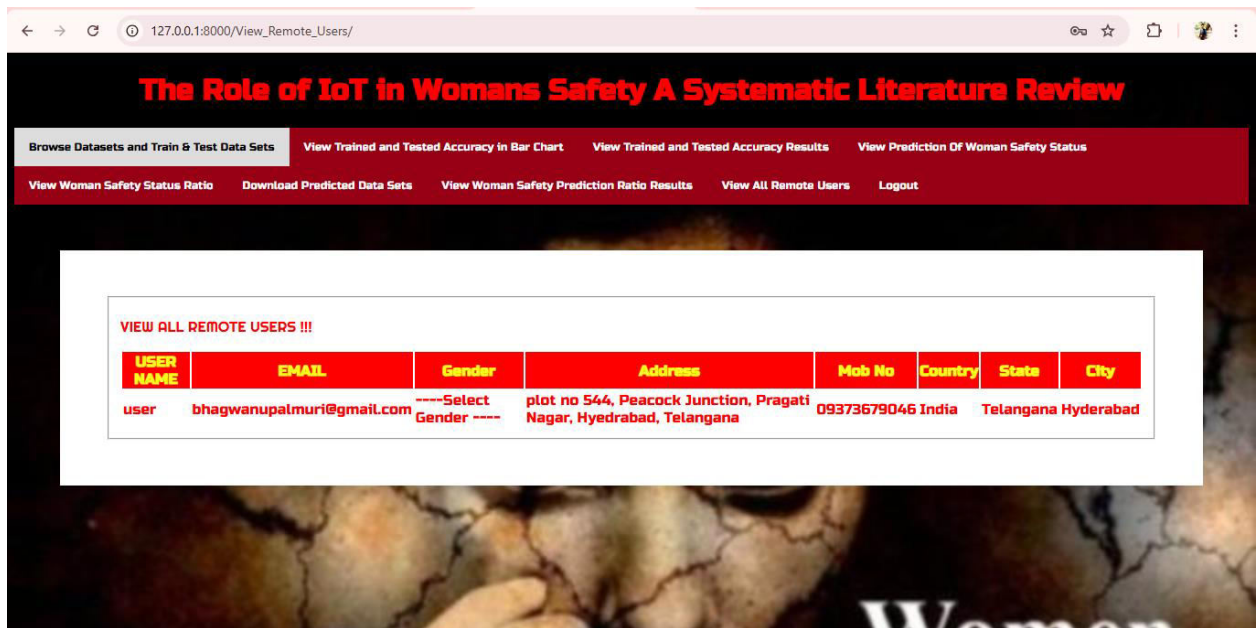


Figure 3: user logged in

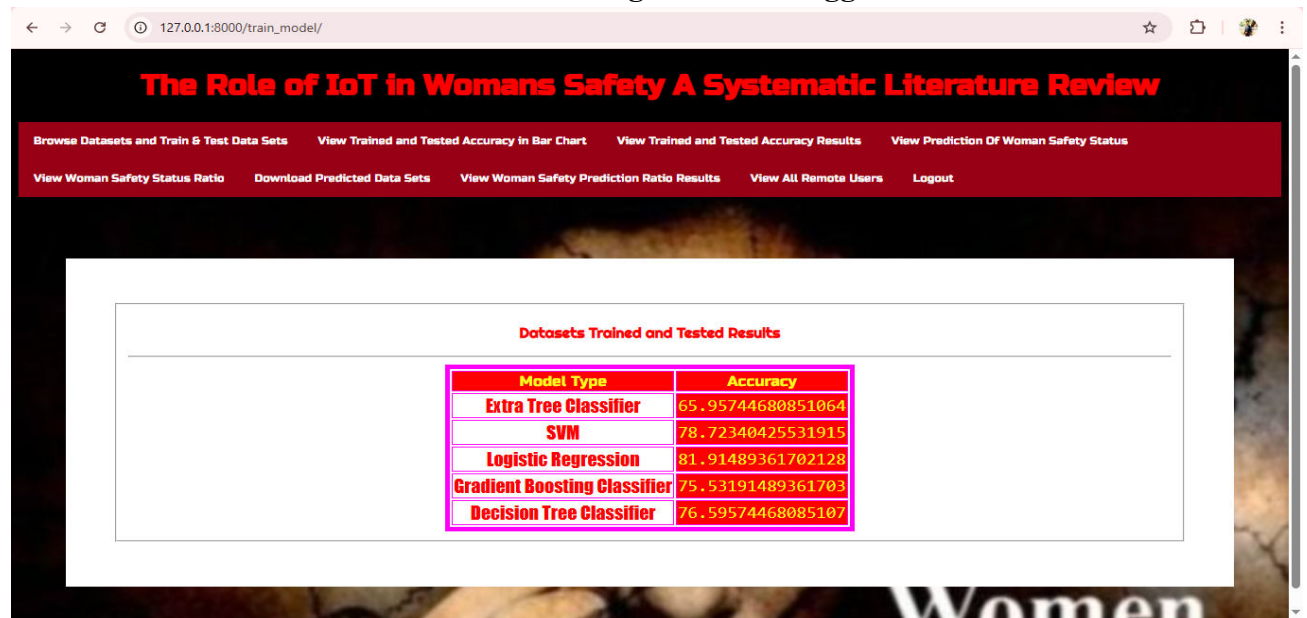


Figure 4: Dataset Loaded and trained algorithm

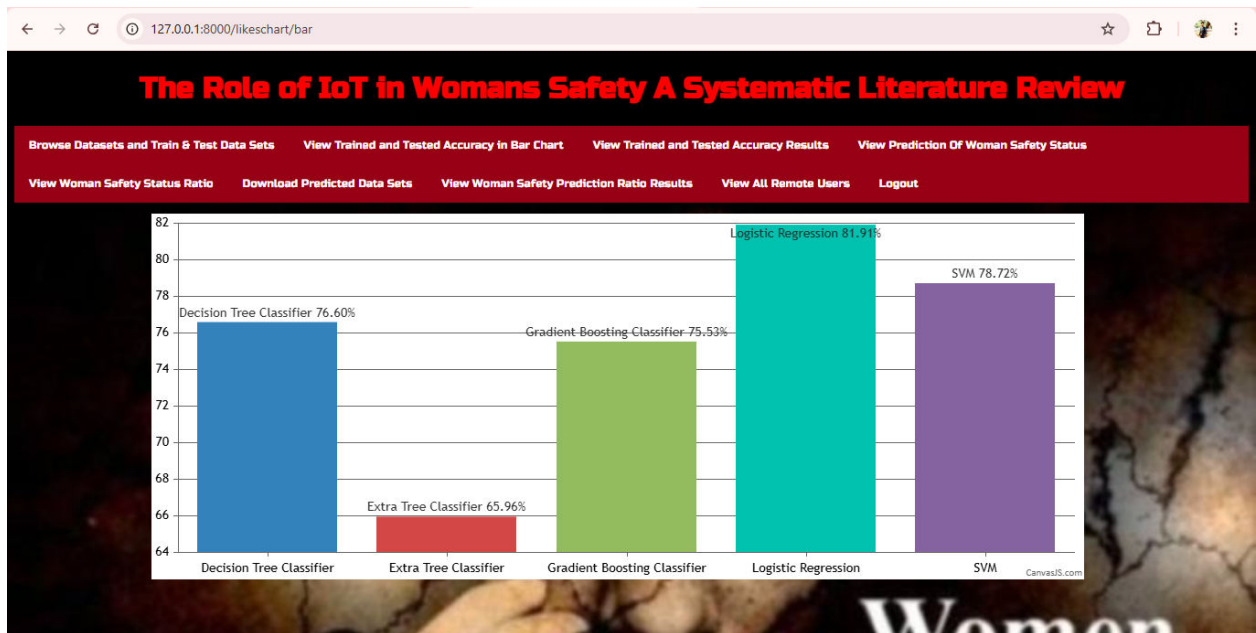


Figure 5: Barplot of the accuracies

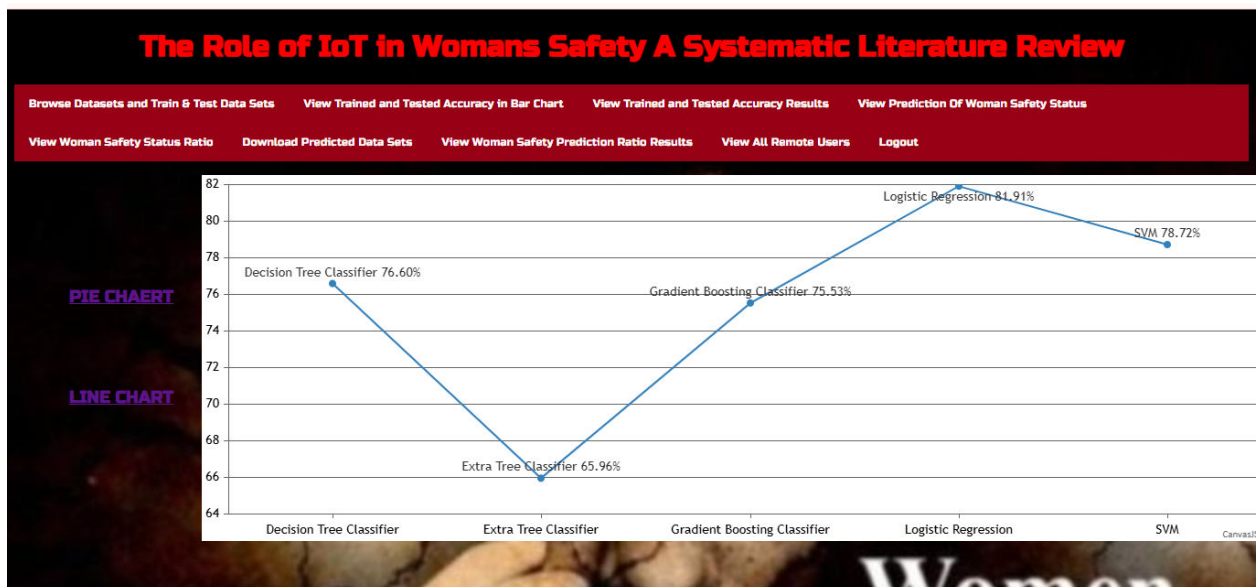


Figure 6: line plot

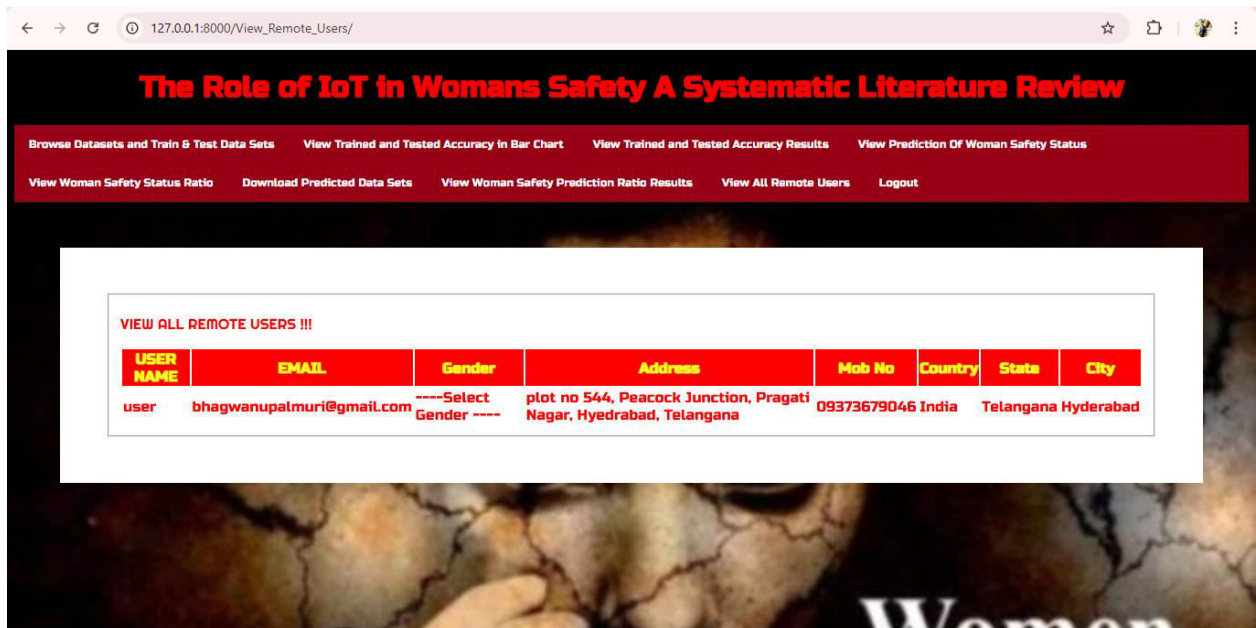


Figure 7: User Registration

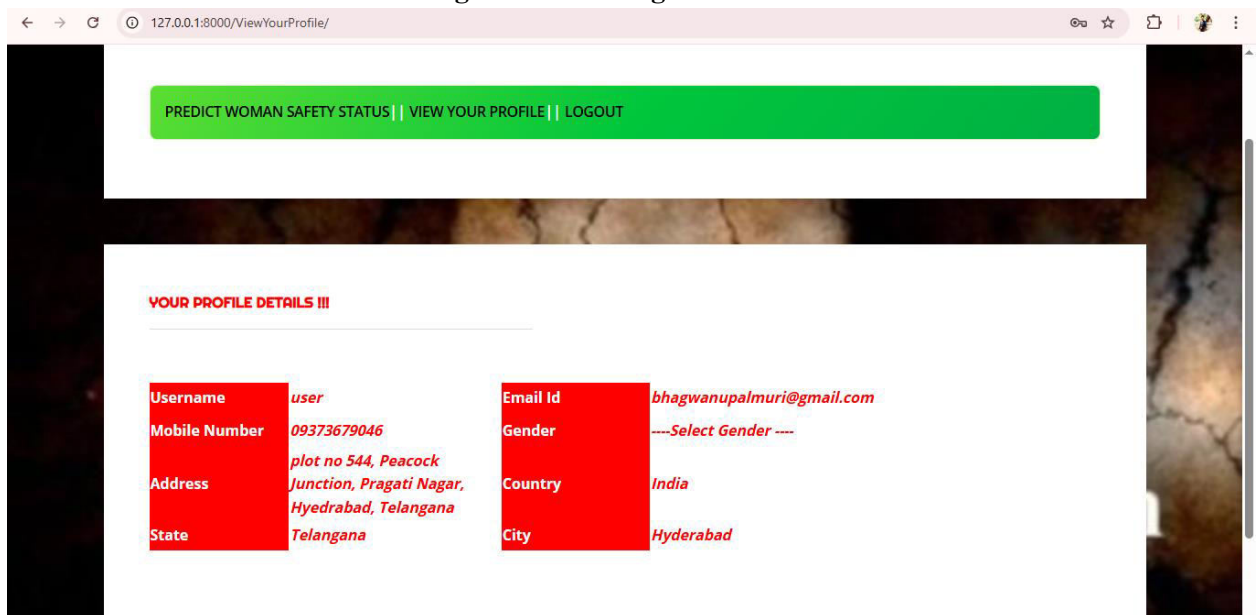


Figure 8: user register





**Figure 9: Predicted class as violence**

## 5. CONCLUSION

Traditional methods for protecting women's safety, such as emergency helplines, self-defense training, safety gadgets, and monitoring via CCTV and security staff, have surely played an important part in setting the groundwork for protective measures. Emergency helplines such as 112 and 181 have given a direct conduit for frightened women to seek assistance; nevertheless, their effectiveness is limited by the victim's capacity to access and use them during a crisis. Similarly, although self-defense training and safety gadgets such as pepper sprays and alarms provide a feeling of empowerment and preparedness, their efficacy is largely influenced by the scenario, surroundings, and the individual's state of mind. Surveillance systems and security guards help to discourage crime, but their coverage and reaction time are sometimes insufficient, particularly in distant or impoverished locations.

Furthermore, by evaluating several machine learning models such as Logistic Regression, SVM, Decision Tree, and others on a dataset including crime-related data, the study demonstrates the potential of technology in improving women's safety measures. Logistic Regression in particular shows promise, with an accuracy of 81.91% in predicting significant crimes, beating other models. This highlights the limits of conventional methods and the increasing need of data-driven predictive analytics. The visualization (bar and line plots) highlight the importance of machine learning in detecting crime patterns and supporting preventative actions. While conventional systems have proven useful, they lack real-time intelligence, proactive intervention, and scalability—gaps that may be filled by integrating new technologies such as IoT and AI.

## REFERENCES

1. ActionAid, "Violence against women and girls".
2. W. H. Organization, "Violence against women," 2021.
3. W. E. Forum, "Gender Inequality," 2020.
4. Gurubani Gulati, Dr. Satinder Singh, "Modern Era and Security of Women: An Intellectual Device," International Research Journal of Engineering and Technology (IRJET), 2020.

5. Ms. K. Opika, Ms. C. Shilpa Rao, "An Evolution of women safety system: A literature review," An International Bilingual Peer Reviewed Peered Research Journal, 2020.
6. B.Sindhu Bala, M.Swetha, M. TAMILASARI, D.VINODHA, "Survey On women safety using IoT," International Journal of Computer Engineering in Research Trends, 2018.
7. Shivani Ahir; Smit Kapadia; Jigar Chauhan; Nidhi Sanghavi, "The Personal Stun-A Smart Device For Women's Safety," in International Conference on Smart City and Emerging Technology (ICSCET), 2018.
8. Agrima Agrawal, Ankita Maurya, Prof. Amruta Patil, "Voice Controlled tool for anytime safety of women," journal of emerging technology and Innovative tool, 2021.
9. Navya R Sogi, Priya Chatarjee, UNETHRA, V SUMA, "SMARISA: A Raspberry Pi based Smart Ring for Women Safety Using IoT".
10. Wasim Akram, Mohit JainC. ,Sweetlin Hemalatha, "Design of a Smart Safety Device for Women using IoT," Procedia of Computer Science, 2019.
11. B. Sathyasri, U. Jaishree Vidhya, G. V. K. Jothi Sree, T. Pratheeba, K. Ragapriya, "Design and Implementation of Women Safety based on IoT technology," International Journal of Recent Technology and Engineering (IJRTE), 2019.
12. Aleksandr Ometov, Elena Simona Lohana, "A Survey on Wearable Technology: History, State-of-the-Art and Current Challenges," Computer Networks, 2021.
13. Raja, S. Pravinth; Rachel, S. Sheeba; R, Sapna, "Women's Safety with a Smart Foot Device," in 2021 4th International Conference on Computing and Communications Technologies (ICCCT), 2021.
14. T. Sowmya, D. Treevani, D. Keerthana, A Vasantha Laxmi, "women' safety system using IoT," International research journal of engineering and technology, 2020.
15. Aishwarya, "IoT Based Smart Security Gadget for Women's Safety," in 2019 1st International Conference on Advances in Information Technology (ICAIT), 2019.
16. Sumanth Pagadala, Lakshmi Prasanna, Anusha Reddy, "A Novel ML-Supported IoT Device for Women Security," International Research Journal Of Engineering and Technology(IRJET), 2021.
17. Muskan, Teena; Khandelwal, Manisha; Pandey, Purnendu Shekhar, "Women Safety Device Designed Using IoT andMachine Learning," in 2018 IEEE SmartWorld, Ubiquitous Intelligence & Computing, Advanced & Trusted Computing, Scalable Computing & Communications, Cloud & Big Data Computing, Internet of People and Smart City Innovation, 2018.
18. A.Jesudoss, "Smart Solution for Women Safety Using IOT," International Journal of Pure and Applied Mathematics, 2019.

19. Prottasha Ghosh, Emran Hasan, "Smart Security Device for Women Based on IoT Using Raspberry Pi," in 2nd International Conference on Robotics, Electrical and Signal Processing Techniques (ICREST), DHAKA, Bangladesh, 2021.
20. Seth, Debojyoti; Chowdhury, Ahana; Ghosh, Shreya, "A Hidden Markov Model and Internet of Things Hybrid Based Smart Women Safety Device," in 2nd International Conference on Power, Energy and Environment: Towards Smart Technology (ICEPE), 2018.
21. S. Srinivasan, P. Muthu Kannan & R. Kumar, "A Machine Learning Approach to Design and Develop a BEACON Device for Women's Safety," 2022.
22. Manikumar, M. Murugan, "Guardian device for women - a survey and comparison study," in Second International Conference on Robotics, Intelligent Automation and Control Technologies (RIACT 2021), Chennai, India, 2021.
23. Lauren F. Cardoso, SaraLanders, "Recent and emerging technologies: Implications for women's safety," Technology in Society, 2019.
24. Sagarika Das, Baswakiran, Shweta Dasar ,Jagadeesha, Shrinivas Rao, "women's security system," International Journal of Engineering Research & Technology (IJERT), 2021.
25. Deepinder Kaur, Ravita Chahar, Jatinder Ashta, "IOT Based Women Security: A Contemplation," in International Conference on Emerging Smart Computing and Informatics (ESCI) , 2020.