International Journal of Engineering Applied Sciences and Teclogy, 2021
Vol. 6, Issue 7, ISSN No. 2455-2143, Pages 257-262
Published Online November 2021 in IJEAST (http://www.ijeast.com)

STUDY ON IOT BASED WOMEN SAFETY DEVICES WITH SCREAMING DETECTION AND VIDEO CAPTURING

T.P. Suma
Department of computer science and engineering
SPMVV, Tirupati, Andhra Pradesh, India

G. Rekha
Department of computer science and engineering
SPMVV, Tirupati, Andhra Pradesh, India

***Abstract*— To propose an idea for implementing wearable IoT devices using the Raspberry Pi, which is equipped with a sound sensor, camera module, GPS, and GSM. When the sound sensor detects screaming, the SVM (support vector machine) algorithm in machine learning eliminates unnecessary noise and evaluates only the victim screaming. After assessing the victim's scream, the gadget promptly activates the camera module, which takes 30 seconds of footage. GPS will track the geographical coordinates and, using the GSM module, will send an alert message and an emergency call to the nearest police station. When the victim activates the switch in the second scenario, the camera module is immediately activated, and a 30-second clip is captured. The GPS will be active, and GSM will send an alert message with the status. The idea's major goal is to present a smart gadget for a woman that is entirely comfy and portable. When compared to other existing safety devices, the first and most crucial difference is the smart band's ability to shrink the size of gadgets.**

Keywords— women safety, screaming, Global system for mobile communication, Global positioning system.

I. INTRODUCTION

Women are facing many problems globally based on their safety and security. A recent survey indicates 35% of women face many issues, abuse, and assault. Harassment of women is on the rise and there are countless articles in newspapers and on television about women being harassed and abducted, even though several regulations and statutes have been implemented to safeguard women's safety. Despite the prohibitions are in place, violence against women and girls has not lessened but risen dramatically in recent decades, according to surveys. Since the incident in (1978), the incident in (2004) Manipur, the incident in (2012) Delhi, and many other incidents throughout India, harassment against women has not decreased but has increased year after year. According to the National Crime Record Bureau's (NCRB) 2019 report, the crime rate increased to 7.3 percent in 2018, and the report also confirms that 31 percent of harassment cases in the country have occurred in the last ten years. The World Health Organization (WHO) stated that 40% to 60% of women in Samoa, Ethiopia, Bangladesh, Peru, Tanzania, and Thailand are ally abuses. Issues are occurring in the streets, schools, and colleges, making women feel unsafe when they are stepping out. Many victims were harassed as children but never reported it to their parents, guardians, or the police since it would impact her and her family. The safety of women is a societal issue that must be addressed as soon as feasible. To address all of these concerns, a multitude of IoT-based safety devices for women have been developed and implemented to date. Wearable devices, such as smart bands or wristwatches, are integrated into the majority of current systems. Few have been implemented, mostly on sensors that will monitor the heartbeat, temperature, and other human activities to activate the device based primarily on body temperature or pulse rate. Some use a fingerprint scanner to activate the gadget, while others use a variety of sensors and different approaches. Existing systems fail to execute in specified cases precisely and effectively while protecting the victim from hazards. All of the system's limits will be met by the suggested application I-based women's safety idea based on machine learning that will assure women's safety and protection. To abolish the need for physical availability of a person to control and monitor the situation Also, regardless of age, offer adequate women's security. The location is then sent to the neighboring "SHE" squads so that officers can reach in time to save the ladies or children.

To propose an idea on the smart gadget for women's safety that detects a victim's threat by screaming's. Where screaming is detected using machine learning's SVM algorithm. It can be incorporated with added functionality such as video recording, which can be used for further inquiry. In addition to current systems such as smart bands or smartwatches, the suggested idea may be implemented in the form of a smart pendant, which is flexible and wearable, by reducing the size. To eliminate violence and harassment

against women and girls, society needs a women's safety device, with the presented idea implemented.

The paper's main objective is to propose an effective and smart ideology on women's safety. To help reliant women who are in need, this proposed idea will act as a third eye on women and also by helping them in their critical situations. Safeguarding the women who are in danger by just screaming or by just pressing the push button can save them from peril. For screaming detection, the method employed in this is SVM in machine learning.

II. LITERATURE SURVEY

MD. Imtiazhanif et al. [10] suggested an IoT-based embedded self-security system implementation. The gadget will be activated by a (li-poly) rechargeable battery that provides a two-push button option. First, long-press or the panic button, which will send an automated call to pre-saved contacts such as family and friends, as well as to emergency cell numbers. If the single press is triggered, coordinates of the current position of the victim will be accessed by the (GSM) global system for mobile communication sim800l modules and GPRS (general packet radio services) sim800l modules. The information will subsequently have been sent to the corresponding application via HTTP using the (at) attention command and the server coordinates. The application server will then instantly share the geocoordinates position to the relative and emergency cell phone number via the SMS system, the microphone, and speaker are the added function, used for transferring the voice from the safety device to protecting agency.

Dhiraj sunehra et al. [9] designed and developed a wearable security device for women. The gadget will be triggered by the use of a panic button alert, in which a push button or panic button, GPS, and USB webcam are attached to the raspberry pi (version 3). When the panic button is pressed, the camera module captures a picture of the surroundings, and the GPS position is relayed over GSM to the preprogramed emergency contacts. It has a buzzer function that will warn individuals in the surrounding area.

N. penchalaiah et al. [8] have suggested and executed female-specific gadgets When a victim is attacked, she is instructed to click a button that activates the GSM and GPS modules. The gadget also has a voice command mechanism, so if the victim is unable to press the button, she may use the voice command system to activate the device's function by just uttering the word help.

Wasim Akram et al. [7] have implemented a safety device. Initially, the user's fingerprint is scanned and pre-stored in the device. When the user begins to scan the finger, the fingerprint is scanned for a minute. If the fingerprint is not scanned, the device activates the alert buzzer for the public, and the location is sent along with the MSG to the police and family. Another added feature is a shock wavy generator to protect herself, and group MSGS are sent. A sound sensor records audio, and the captured audio is delivered to all saved contacts on the mobile. It entails an app that, if installed and saved on the victim's mobile device, will utilize maps to take the victim to the safest spot from their present position.

B. Sathyasri et al. [6] have offered a concept and developed a safety device based on IoT technologies. It is made up of microcontrollers, neurostimulators, GPS, and GSM modules. This implementation proposes that every time the victim is attacked, she must push the trigger, which triggers the function of the modules. The gadget communicates the positions to register numbers and neighboring police stations using GPS and GSM modules. It delivers a deadly electrical shock to the attacker by employing a neurostimulator. It also has the added benefit of sending the victim's last known position if the gadget is damaged.

A. Jesudoss et al. [5] has provided a solution for women's protection and safety, as well as user health monitoring. The concept proposes that it primarily works on sensors, such as a heartbeat sensor for monitoring the user's pulse rate, a flex sensor that is used as a band, a titled sensor for monitoring changes in wrist positions, and a vibration sensor for monitoring any vibration or shivering that occurs in the body. All of these sensors are linked to an Arduino board and a Raspberry Pi. This concept primarily stimulates vibrations and changes in the body's pulse rate. When the sensors detect a change, it activates the GPS module, which sends the location to the nearest police station and family. All of the readings are updated every 20 minutes and are saved in the cloud.

G. C. Hari Kiran et al. [3] has implemented a smart security band in which the band is connected to the victim's mobile phone via Bluetooth and the band is equipped with several sensors such as a pulse rate sensor for sensing the heartbeat, temperature sensor (LM35) integrated sensor for sensing human body temperature sensing, and the smart band is preloaded with all human reactions and behavior are from various situations. And the linked mobile or user phone continually monitored the body's temperature, pulse rate, and movement, which is pre-installed in the mobile. When the pulse rate increases and danger is defined, a mobile phone message will be delivered using GSM, along with the position using GPS.

Nandita Viswanath et al. [2] has developed and deployed smart foot devices to ensure the safety of women. It proved that a safety gadget called Light Blue Bean, which is an Arduino Bluetooth microcontroller that can be engaged by

International Journal of Engineering Applied Sciences and Teclogy, 2021
Vol. 6, Issue 7, ISSN No. 2455-2143, Pages 257-262
Published Online November 2021 in IJEAST (http://www.ijeast.com)

tapping one foot on another four times, can be activated by touching one foot on another four times. The safety device is linked to the smartphone's Bluetooth whenever a tap is detected, the triaxial acceleration sensor in the safety device measures the acceleration of the tap with three perpendicular axes, and an alert message is sent to the user's pre-saved contacts in the smartphone via Blue-tooth.

Geetha Pratyusha Miriyala et al. [1] This implemented system has presented a wristband for the protection of women. This gadget is activated by employing a pressure switch, which simulates the activation of tear gas and the blooming alarm system for self-defense. By utilizing GPS and GSM modules. It shares the location along with the streaming video.

TABLE1: RELATED WORK ANALYSIS

S.NO	AUTHORS	METHOD USED	RESEARCH METHODS USED/FINDINGS	RESEARCH GAPS IDENTIFIED
1	Md.Imtiaz Hanif Et Al. [10]	It features a device that can be triggered in two ways, a single press Announces the location. Utilizing gsm. And by pressing the button for a prolonged amount of time, a call will be made to the emergency alert contacts.	Victims can utilize two buttons, one for minimal risk and one for high danger.	The device will only be engaged if a panic key is pressed.
2	Dhiraj Sunehra Et Al. [9]	It Has Included a Wearable Device for Women's Security. The Gadget Will Be Activated Through a Panic Button Alert, Following Which a Camera Will Be Enabled and The Position Will Be Sent.	It Has A Buzzer Feature That Will Sound an Alert to Everyone in The Vicinity.	When The Camera Is Turned On, The Hand Will Be In An Unfavourable Posture, Resulting In Improper Photo Capture And The Inability To Identify The Offender.
3	N. Penchalaiah Et Al. [8]	A warble security device is engaged when a message or a call is sent, and a voice command mechanism is utilized to activate the device and deliver the message.	It has two activation phases from which the victim might pick based on the circumstance.	Because the voice command word "help" is often used, it may result in a misleading alert.
4	W. Akram Et Al. [7]	It has first installed a device, and the user's fingerprint is scanned and prestored in the device. When the user starts scanning his or her thumb, the device is activated and the fingerprint is scanned for every minute. When the fingerprint is not scanned, the device activates the public alert buzzer and sends the location to the police.	1. It entails installing and storing an app on the user's mobile device that will lead them to the safest spot from their present position using a map. 2. It has an audio recording feature that can send to all the saved contacts on the mobile.	The victim must utilize her biometric for a maximum of 1 minute

5	B. Sathyasri Et Al. [6]	This implementation has proposed that whenever the victim is under attack then she has obligated to press the trigger, so it initiates the function of the device and sends the message to the family.	1. It has a neurostimulator it gives a lethal electrical shock to the attacker 2. Also sends the last location of the victim in case of any damage to the device.	Has used neurostimulator to give a lethal shock to the attacker, these neurostimulators are used in the medical sector may have chances of user can also affect by this
6	A. Jesudoss Et Al. [5]	It has implemented a wearable device it works based on the heartbeat, vibration, and tilt sensors whenever heartbeat raises it will stimulate the device and send the location to the family	Can be used not only for security but also for health monitoring of the user	It mainly works on the heartbeat, vibration, and tilt sensors. Whenever the user participates in any adventure, sports activities, etc it may lead to a false alarm
7	S. Kalpana Et Al. [4]	Has implemented wearable device this system makes use of several sensors like sound sensor, flex sensor, temperature, pulse rate sensor. From these 5 sensors if any 4 sensors are activated and are considered as a threat situation and send the location	It does not require an explicit active Action because the device completely relies on biological aspects like the heartbeat	The sound sensor has a threshold value from 2540db, the value can easily reach the threshold value in heavy traffic areas and noisy environments.
8	G. C. Hari Kiran Et Al. [3]	It has suggested and built a smart warble band that is pre-programmed with all human behavior such as fear, anxiety, and so on and sends the observed data to a smartphone that is connected to the internet. All of these reactions are tracked by a pulse rate sensor, among other things. Whenever a threat is defined, a message is issued.	It does not require and explicit activation because the device completely relies on biological aspects like a heartbeat	1. A smartphone with an internet connection is necessary. 2. It operates on biological principles therefore the gadget may readily activate when the user is participating in sporting activities.
9	Nandita Viswanath Et Al. [2]	By tapping one foot on another four times, the gadget will be activated. The safety device is linked to the smartphone's blue-tooth, whenever a tap is detected, the triaxial acceleration sensor in the safety device measures the acceleration of the tap with three perpendicular axes, and an alert message is sent to the user's pre-saved contacts in the smartphone via Bluetooth	The size of the device is small and easily carry in the foot.	The data needs to train more accurately and sensors can integrate based on age factors for more accuracy in detection

International Journal of Engineering Applied Sciences and Teclogy, 2021
Vol. 6, Issue 7, ISSN No. 2455-2143, Pages 257-262
Published Online November 2021 in IJEAST (http://www.ijeast.com)

10	R.S. Yadlapalli Et Al. [1]	This implemented system has proposed a wristband for women's safety. This device can be initiated by using a pressure switch then it results in activating the tear gas and blooming alarm mechanism is imposed for self-defense when threat is defined it will send the location to the nearby police	It has two self-defencing modules the victim can make use of them for self-defencing herself	In case of false alarm, the tear gas may trigger which causes trouble to the surrounded people

III. PROPOSED METHOD

The suggested idea for implementing women's safety devices includes a raspberry pi, camera module, sound sensor, GPS, GSM, switch, and relay. The raspberry pi acts as a bridge between the input and output modules. When the victim begins to shout, the device is activated, and the system determines that the victim is in danger. The victim's scream would then be collected as an input by the sound sensor. The support vector machine would filter out the unwanted noises and consider only the victim's scream. The camera module would activate and collect a 30-second of the video clip. The video will be kept on a memory card that is incorporated into the raspberry pi. GPS will be engaged and will track the geographical coordinates, while GSM will send an emergency message with the location to the nearest authorities and pre-saved contact numbers. The camera module is immediately activated when the victim activates the switch in the second scenario. and a 30-second clip is captured. The GPS will be active, and GSM will send an alert message with the status.

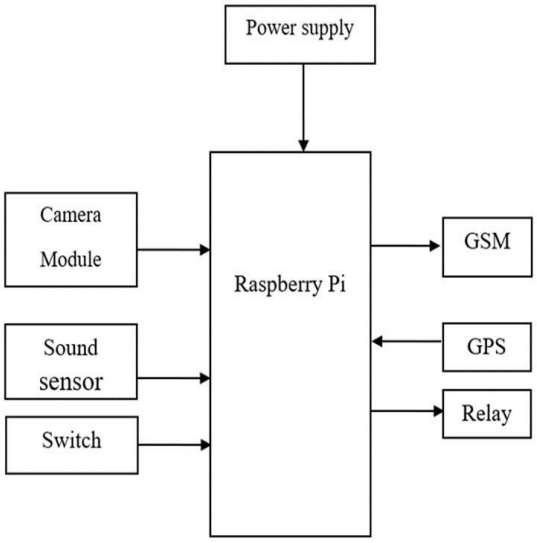

FIG :1. The architecture of the proposed model

This proposed study can use machine learning and deep learning principles to recognize and analyses human screaming in a real-time scenario for screaming detection. The first step in the design process is to construct the methodology called user interface, where users may readily engage with the system. Then moving on to select the essential data is collected and sorted into two groups positive and negative. Each data set comprises a significant amount of data or screaming, whereas the positive class is made up of human screaming that is taught to develop the model. Negative classes are made up of undesirable sounds. The Librosa program is then used to extract Mel frequency cepstral coefficients (MFCCs) from the data collection. The MFC is extracted and saved in a CSV file. The sports vector machine model has now taken over the MFCCs. The sports vector machine model has been trained to discriminate

between scream speech, yell, and noise in the surrounding. The words will next be expelled, with just the scream and shout taken into consideration. Finally, it will only take the scream into account. When the hole taring is accomplished, the TensorFlow library will be used to store it. The multilayer perspirations models are then applied to the screams included in the data sets. Following training and saving, both models are now analysed to identify the amount of risk in each screaming. There are two levels of risk, high risk, and medium risk. Based on the amount of danger, an alert message will be generated.

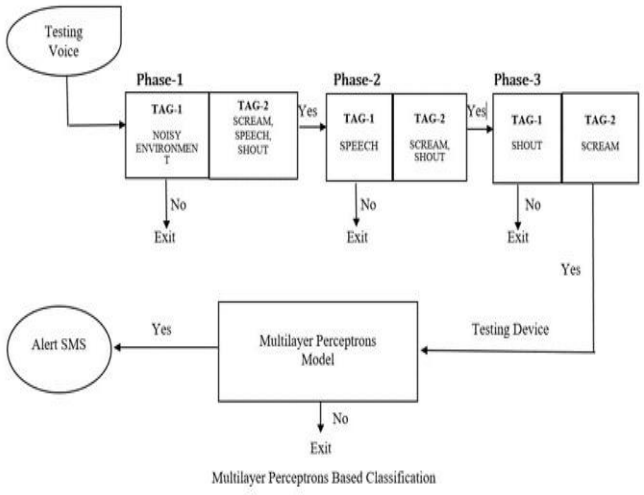

Fig: 2. Evaluation of proposed system [11]

IV. CONCLUSION

The proposed idea for women's safety incorporates video capture and screaming detection, which are upgraded versions of current technologies. It will be small and efficient in size. Ensure that the sufferer is saved as quickly as possible.

V. REFERENCE

[1] R. S. Yadlapalli, V. P. Rama Lakshmi, T. K. and A. Miriyala, "SMART INTELLIGENT SECURITY SYSTEM FOR WOMEN," *International Journal of Electronics and Communication Engineering & Technology (IJECET),* vol. 7, no. 2, p. 41–46, April 2016.

[2] G. C. Harikiran, K. Menasinka and S. Shirol, "Smart security solution for women based on Internet Of Things(IoT)," *International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT),* 2016.

[3] K. Seelam and P. K., "A novel approach to provide protection for women by using smart security device," *2018 2nd International Conference on Inventive Systems and Control (ICISC),* 2018.

[4] A. Jesudoss, N. Y. and S. R. T, "SMART SOLUTION FOR WOMEN SAFETY USING IoT," *International Journal of Pure and Applied Mathematics,* vol. 119, no. 12, pp. 43-49, 2018.

[5] B. Sathyasri, J. V. U, J. S. G. V. K., and P. T, "Design and Implementation of Women Safety system Based On IoT Technology," *International Journal of Recent Technology and Engineering (IJRTE),* vol. 7, no. 6S3, pp. 177-181, April, 2019.

[6] W. Akram, M. Jain and H. C. Sweetlin, "Design of a Smart Safety Device for Women using IoT," *INTERNATIONAL CONFERENCE ON RECENT TRENDS IN ADVANCED COMPUTING (ICRTAC),* vol. 165, pp. 656-662, 2019.

[7] N. Penchalaiah, . S. M, V. K. . R. C, . P. K. R. D. V and . S. D, "An IoT Based Smart Wearable Device for Women Safety," *Special Issue of First International Conference on Information Technology, Computing &Applications (ICITCA),* vol. 03, no. 05S, pp. 89-95, 2021.

[8] D. Sunehra, S. S. V, S. V and U. K. G. B "Raspberry Pi Based Smart Wearable Device for Women Safety using GPS and GSM Technology," *2020 IEEE International Conference for Innovation in Technology (INOCON),* no. 20307416, 2020.

[9] M. I. Hanif, A. Shakil, and A. Wahiduzzaman , "Anti-Molestation: An IoT based Device for Women's Self-Security System to Avoid Unlawful Activities," *(IJACSA) International Journal of Advanced Computer Science and Applications,* vol. 11, no. 11, pp. 722-727, 2020.

[10] N. Viswanath, N. V. Pakyala and M. G., "Smart foot device for women safety," *IEEE Region 10 Symposium (TENSYMP),* May 2016.

[11] https://www.geeksforgeeks.org/human-scream-detection-and-analysis-for-controlling-crime-rate-project-idea/amp/.