A Survey on Women Safety Device Using IoT

Ramachandiran R[1], Dhanya .L[2], Shalini.M[3]

[1]Research scholar, Department of Computer Science, School of Engineering
Pondicherry University, Pondicherry
ramachandiran08@gmail.com

[2,3] UG Students, Department of Information Technology
Sri Manakula Vinayagar Engineering College, Pondicherry
dhanyasri097@gmail.com , mahashalini28@gmail.com

***Abstract:-*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.**

Keywords — Security, Smart device, various Techniques.

I. INTRODUCTION

Internet of things (IoT) is influenced with human life in both knowingly as well as unknowingly. With a help of internet every machine is controlled, which makes the people life easier. Nowadays girls were not permitted to move freely in the streets where they abused by strangers. Parents are distressing about their safety which has become the first barrier to send their daughters outside. Gradually the women harassment have been rises. Safety is the most required power for everybody in today's world in current generation. In our Country, even though there is an economic development, but still there are many crimes happens against women. In general 86% of working ladies in India, facing an obstacle which is greater in Delhi, Mumbai, Hyderabad, Kolkata, Chennai and Pune, comparatively to other places. Technology is the finest way to achieve their security. With the help of IOT we can control and access the machines and things which are connected to the internet even the distances are too long. Without the human-human and computer-human interaction, we can send and receive information. But the harassments, rape, acid attack are not reduced still.

In order to make them safe, a smart device are developed. Women safety device is specially designed for women in case of dangerous and emergency situation. The women safety devices should be very simple, easy to carry and that should be integrated with several functionalities. The smart phones usage has been drastically increased in the world. There are several mobile applications and smart devices are developed by the government and people in order to help the women when they are in the trouble. Even though, they developed various devices and applications the rate of the sexual offenses has not been decreased. The women safety devices or application should be combined with a several features which are used in day today life and real emergency cases.

II. WOMEN SAFETY RELATED FACTORS

There are several techniques that used in women safety device,

- Location Tracking.
- Notification.
- Sensors.
- Image capturing

A. Location Tracking

GSM stands for Global System for Mobile Communication. It is a digital mobile cellular network which has been used for transmitting the voice and data SIM 800C is a complete Quad-band GSM solution. It operates in low power consumption with a voltage range of 3.4v~4.4v.It gives an efficient transmission when compared to other types. GPS is a technique which is used to find out the actual position of the person. It communicates directly to the satellite by using the GNSS network.

@IEEE 978-1-7281-1524-5

B. Notification

With the help of GPS and GSM the location is identified. And thus the identified location is shared to the people through SMS, Email ID, calls Etc. With the help of buzzer an alarm sound is generated, through this sound the people who are in minimum distance can help them.

C. Image Capturing

The video camera is used to capture the image or video in order to send the photos or videos to the registered contact for the later Investigation.

D. Sensors

Sensor is a device which calculates or discovers a physical property that indicates, or otherwise it responds to the specific devices. There are several types of sensors which are used to measure several conditions; some of the sensors are detected by using various physiological sensors namely: MEM Sensor, Flex Sensor, Pulse Rate sensor, Temperature Sensor:

a. MEMS Sensor

MEMS Stands for Micro-Electro-Mechanical-Systems. This sensor is used to measure the acceleration. It can be applied to any sensor by using microelectronic fabrication technique. Since the range of an accelerometer varies in sensitivity it is used in shock and blast applications.

b. Flex Sensor

Flex sensors is a variable resistor. The resistance of the sensor increases when there is a movement occurs in a component due to high pressure. This sensor has two output wires and thus the resistance between these two wires varies accordingly to the pressure applied. It can be used in toys, horn switch, gaming, glove, auto control. It can also be used in music and computer interfaces.

c. Pulse Rate Sensor

The output of the pulse rate sensor is in the form of digital. That digital output can be combined with the Microcontroller in order to calculate the Beats per Minute (BPM) rate. The led flashes for every heartbeat, when heart beat detector is working.

d. Temperature Sensor

Temperature Sensors calculate the amount of heat energy or even coldness which is generated by an object or system, for to "sense" or detect any physical change to the temperature producing an analog or digital output

III. Related Works

In a country, Sexual offense happens against to the women and children. According to National Crime Records Bureau , New Delhi;

1. In 2011, over 42968 the criminal assault to women has increased to 84746 cases in 2016.
2. Around 309 acid attack cases are produced in the year 2014.
3. In 2011, 24206 rape cases have been enlarged to 38947 cases in 2016
4. According to this statistics, around 92 women's are raped every day in India

The mobile application and smart devices are produced in the women safety are:

A. Notification

Nishant Bhardwaj et al., [1] proposed A Women Safety Device which gives the basic idea of Suraksha which provides a warning to the police by giving an instant location when distressed victim takes place. So the incident could be prevented.

As same as Nandita Viswanath et al., [2] in this article, a small and low cost device is developed. This device is clipped to the footwear and it is triggered automatically when the tapping occurs behind the other foot four times. The tapping sound is detected by the light blue bean which is aurdino microcontroller. Then, the message is send to the four contact list through the Bluetooth. Naïve Basye classifier is used to analyses the walking and tapping data. By this technique, accuracy is measured. This device is only useful for a trained data.

Similarly D. G. Monisha et al., [3] Proposed a system which contain a location tracking mechanism, it works if the suffered person press a single click it sends a SOS message with current location to pre-set contact of every 2 minutes, if the person clicks a button double times then it records and sends SOS message and also it calls to the pre-set contact numbers when the person pressed a button for a long time.

Likewise Dhruv Chand et al., [4] proposed a WoS application is developed. In this application it requires some basic information about the user and the emergency contact list. When the person feel some crisis happens against to them, a notification is send to the enlisted contacts by shaking their phone consecutively 40 times (i.e. upto 8 seconds)

or pressing the panic button which is present in the screen

B. Location Tracking

Vallidevi Krishnamurthy et al., [5] proposed a work with a women safety application. The mobile application is developed with a help of object-oriented manner. When women are in travel form one place to another, she has to activate the continuous global position system GPS. The GPS continuously tracks their respective location. In the case of the danger when she doesn't mark herself safe in particular duration then the SMS alert is send to the registered contact.

Similarly Dantu Sai Prashanth et al., [6] In this article an application is developed with unique features and all the existing features has been integrated to make efficient software which is useful for women safety. This application consists of dynamic GPS tracking system and it also includes spy-camera which is useful to record the incident .Initially it requires login details and the user has to update their information from time to time. In this, user has to be registered to a firebase database wh00ich is used for user login authentication which keeps application more secure. When the user is moving from one place to another a GPS tracking system is switched on and thus the live location is also viewed. It also offers various functionalities like first aid information, toll free call which is inbuilt. Through dynamic GPS tracking system the enlisted contacts users who all use the same application can view the user's location.

Likewise Sankalp Mehta et al., [7] proposed an application. This application gets activated by shaking the phone .Then the location is identified by GPS and the location is shared to the emergency contacts. It also provides calling facility, whenever the guardian phone is in silent mode. Thus it provides a calling and message facility to protect them from the incident.

C. Sensors used

Piyush Kumar Verma et al., [8] In This the proposed system deals with a device which is used for women to protect them from dangerous person while they are moving out in night and for an independent women also it is useful. It consists of buzzer, pulse sensor and switch. When the switch is pressed, the device sends a current location of the women to all the registered contacts and it also monitors the pulse rate of a women. If the pulse reading is abnormal, then SMS is sends to a hospital .Thus, the device is used to protect themselves from a danger and it is small in size.

Similarly Muskan et al., [9] Describes the women safety device which senses the human body temperature and heartbeat pattern. The normal heartbeat and the body temperature are stored in the cloud. When the human heart beat rate and the temperature are changed, it denotes that they are in the trouble Here they use a machine learning algorithm to collect the data. The collected data is compared with the data which are already stored in the cloud, when change occurs current location of the women is sent with the help of Zigbee mesh network. It is defined as sending of message without the internet access, as zigbee mesh network sends a data with the help of multiple hop distance.

As same as the above work Kalpana seelam et al., [10] The articles portrays about the safe and secured electronic framework for women or children which involves an Arduino controller and sensors, the several sensors used in this system are temperature, flex sensors, MEMS accelerometer, pulse rate sensor and sound sensor. The gadget detects body parameters like heartbeat rate, changes in temperature, movement of victim by flex sensor by flex sensor and MEMS accelerometer and the voice of the injured individual is detected by sound sensor and the location is send to the registered contacts

D. Video capturing

Mohamad Zikriya et al., [11] Gadget is used in the project. It is used to capture the image of the culprit who makes a distrust motion to the independent women, children. Thus the captured image is sent to the registered email ID. By using the captured image we can able to find the distrusted person.

Similarly, Jismi Thomas et al., [12] Proposed the system with a security devices called TOUCH ME NOT. This portable device is attached to the clothing. This device consists of button which is integrated with two modules. The first module contains a camera which records the short videos to capture the assailant. The second module is used to send the current location to the family or friends.

Likewise Pragna B R et al., [13] a device is developed. It consists of a four button (i.e. red, green, yellow, blue) .Each button represents one functionalities to protect the person who is in danger. Red is used for triggering alarm, blue is used to sending messages, green is used to record audios and yellow is used to detect hidden cameras. Thus by pressing the various colour buttons the women can be protected for that instant

TABLE I: RECENT RESEARCH WORKS IN WOMEN SAFETY DEVICES

Authors	Contribution	Limitation
Nishant Bhardwaj et al., 2014[1]	The nearest police station gets a location alert when distress happens to a woman.	Even though the location alert is sent to the nearest police station they might be take some time to reach the spot.
Nandita Viswanath et al., 2016[2]	A small foot wearable device is developed. It consists of a light blue bean microcontroller, when the tapping sound occurs four times it sends an alert message to the emergency connects through the Bluetooth.	The speed of the light blue bean microcontroller is minimum.
D. G. Monisha et al., 2016 [3]	A button pressing device is developed for the emergency people with a single, double and a long press	If the network is not available then the message is not send to the preset contact.
Dhruv Chand et al., 2015[4]	A notification is send to the enlisted contact when the person shakes their phone for about 8 second or pressing the panic button.	This application is not supported to windows, ios mobile phones.
Vallidevi Krishnamurthy et al.., 2017[5]	A dynamic location is tracked using GPRS. The information is updated for every 30 secs and sent to their contacts.	Even though the women are safe, it sends a message automatically to the emergency contacts when there is a network issue.
Dantu et al.., 2018[6]	An application is developed with unique feature for security purpose. Initially it requires a login details for authentication purpose. Only if the person is authenticated can use this app. It provides security from third parties.	Even though it is a security application at the time of emergency they can't login and provide their information.
Sankalp Mehta et al., 2017 [7]	By shaking the phone the device gets activated and the location is send to the emergency contacts.	The major disadvantage of this system is it leads to confusion even if the mobile phone trembles usually.
Piyush Kumar Verma, et al.., 2018[8]	A device is developed to keep track of pulse rate and temperature. If the reading is in abnormal state then it automatically sends a location to the hospitals. To protect themselves the person has to press a buzzer and the location is send to their contacts.	The People who are in the minimum distance only can help the affected person.
Muskan et al.., 2018[9]	A device is introduced to read the human temperature and heartbeat. In case of emergency the alarm is generated and the location is shared to their contacts even when there is no internet facility.	Only the People who are located at minimum distance can help the person who is in danger, when the alarm is generated.
Kalpana seelam et al.., 2018[10]	A secured electronic system is developed which contains various sensors to track the temperature and the sound is also sensed through sound sensor , when the sound rises above the particular range the device gets activated automatically	Mobile Tracking Devices for locating friends must have the same device in order to send the alert when the person is in victim.
Mohamad Zikriya et al.., 2018[11]	A gadget is used. It is used to capture the image of a culprit and thus the image is send to the registered email id which is used for a later use.	Accessing of network is one of the major problems faced in this system.
Jismi Thomas et al., 2018[12]	A portable security device is identified which is attached to the clothing .It captures the video of the incident and the location is sent to the police station and relatives.	It is not safety devices since it is attached to the clothing.
Pragna B R et al., 2018[13]	It is a wearable device which consists of four buttons. These buttons are used to provide different functionalities to protect them.	Since it uses many sensors to perform various functions, the cost wise product is more expensive.

The above table I shows the brief summary about various application used in previous work

TABLE II: COMPARISON OF RESEARCH WORKS USING WOMEN SAFETY

Researchers	Women Safety Related Features			
	Location Tracking	Notification	Sensors	Image Capturing
Nishant Bhardwajet al.,2014 [1]		✓		
Nandita Viswanath et al., 2016[2]	✓			✓
D. G. Monisha et al., 2016 [3]	✓	✓		
Dhruv Chand,et al.,2015 [4]		✓		
Vallidevi Krishnamurthy, et al.., 2017[5]	✓			✓
Dantu Sai Prashanth et al.., 2018 [6]	✓	✓	✓	
Sankalp Mehta et al., 2017 [7]		✓		
Piyush Kumar Verma, et al..,2018 [8]			✓	
Muskan ,et al.., 2018 [9]	✓	✓		
Kalpana seelam, et al.., 2018 [10]	✓		✓	
Mohamad Zikriya ,et al.., 2018 [11]		✓		✓
Jismi Thomas, et al.., 2018 [12]		✓		
Pragna B R et al., 2018 [13]				✓

RELATED PARAMETERS

From the above table II, different techniques are proposed to safeguard the women; those techniques had their own drawbacks;

- It is quite impossible to use a mobile phone during an emergency situation.
- The literature depicts that there are auto detection women safety device based on parameters such as voice recognition, temperature heart beat rate are exists, still these system may have a chance of failure due to women abnormal health condition.
- Though the location is shared to the faraway people it proceeds time to reach the spots.

IV. CONCLUSION

The occurrence of threats to women leads to increase in number of security devices and applications. This research shows the various factors which have been used in applications and smart devices developed for women safety. In this paper, the various techniques used so far for the sake of women safety against the fraudulent people have been discussed. Also a brief explanation about the devices and components used in these techniques are also provided.

REFERENCES

[1] Nishant Bhardwaj and Nitish Aggarwal "Design and Development of - Suraksha", IEEE International Journal of Information & Computation Technology, ISSN 0974-2239 Volume 4, 2014.

[2] Nandita Viswanath, Naga Vaishnavi Pakyala, Dr. G. Muneeswari, "Smart Foot Device for Women Safety" IEEE Conference, ISBN:978-1-5090-0931-2, 2016.

[3] D. G. Monisha, M. Monisha, G. Pavithra and R. Subhashini "Women Safety Device and Application - FEMME" Indian Journal of Science and Technology, ISSN : 0974-5645, 2016.

[4] Dhruv Chand, Sunil Nayak, Karthik S. Bhat, Shivani Parikh, Yuvraj Singh, Amita Ajith Kamath" A Mobile Application for Women's Safety: WoSApp" IEEE conference-, ISBN: 978-1-4799-8641-5, 2015.

[5] Vallidevi Krishnamurthy, Saranya. S, Sharanya Srikanth, Simran Modi, "M-WPS: Mobile based Women Protection System" IEEE International Conference on Energy, Communication, Data Analytics and Soft Computing ISBN:978-1-5386-1887-5 , 2017.

[6] Dantu Sai Prashanth, Gautam Patel, Dr.B.Bharathi "Research and development of a mobile based women safety application with real-time database and data-stream network" IEEE International Conference on ciruits power Aand computing technologies, ISBN 978-1- 5090-4967- 7, 2018.

[7] Sankalp Mehta, Sachin Janawade, Vinayak Kittur, Suraj Munnole, Sandhya Basannavar "An Android Based Application or Women Safety" International Journal of Engineering Science and Computing, 2017.

[8] Piyush Kumar Verma, Arpit Sharma, Dhruv Varshney, Manish Zadoo," Women Safety Device With GPS, GSM And Health Monitoring System", International Research Journal of Engineering and Technology, ISSN:2395-0056,Volume:05,2018.

[9] Muskan, Teena Khandelwal, Manisha Khandelwal, Purnendu Shekhar Pandey "Women Safety Device Designed using IoT and Machine Learning" IEEE Smart World, Ubiquitous Intelligence & Computing, Advanced & Trusted Computing, Scalable Computing & Communications, Cloud & Big Data Computing, Internet of People and Smart City Innovations, ISBN: M978-1-5386-9380-3, 2018.

[10] Kalpana seelam, K.Prasanti," A Novel Approach to Provide Protection for Women by using Smart Security Device" IEEE International Conference on Inventive Systems and Control, ISBN: 978-1-5386-0807-4, 2018.

[11] Mohamad Zikriya, Parmeshwar M G , Shanmukayya R Math, Shraddha Tankasali , Dr.Jayashree D Mallapur "Smart Gadget for Women Safety using IoT ", International Journal of Engineering Research & Technology, ISSN: 2278-0181, 2018

[12] Jismi Thomas, Maneesha K J, Nambissan Shruthi Vijayan, "TOUCH ME NOT-A Women Safety Device" International Research Journal of Engineering and Technology, ISSN: 2395-0056 Volume: 05, 2018

[13] Pragna B R, Poojary Praveen Mahabala, Punith N, Sai Pranav, Shankar Ram "Women Safety Devices and Applications" International Journal of Engineering Research and Technology Vol. 7 Issue 07, 2018