IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A REVIEW ON EMERGENCY ALERT SYSTEM WEARABLE DEVICE FOR WOMEN SAFETY

Nirmala Mahato, Anil Bavaskar, Nilesh Dhanore

Student, Assistant Professor, Assistant Professor
Electronics and Telecommunication,
Jhulelal Institute of Technology, Nagpur, India

Abstract: This review paper explaining technological solutions for women safety considering state of the art in various categories of the domain. The categories for which the systems are explored are sessile systems, mobile systems, intelligent systems and other systems. After the detailed study of the existing work done in the area, desirable characteristics of a system for safety of women are identified and tabularized. Moreover, we have also identified responses of women under various categories based on identified characteristic which is illustrated graphically at the end of paper. This paper contributes three things, state of the art in various categories, ideal characteristics of system for women safety, and survey of women's feedback for future development of women's safety system.

Index Terms: **Women's safety, mobile applications, sessile applications, intelligent applications, ideal characteristics, survey response.**

1. INTRODUCTION

Women play vital role in development of society's socio-economic status from home and business fronts. Women have reached highest positions in many businesses and have great impact on the domain where they work. However, these key contributors need better and comfortable environment at workplace and home. Development of Information and Communications Technologies (ICT) have been helping many businesses in various capacities. It is good and ideal to consider men and women equal, bust still there are issues for women contributors such as harassment, staring from minor taunting and domestic mental torcher to physical abuse, etc. Even before she begin her life as a girl child, many a times, in her mother's womb, the girl child might have been killed just because of her gender. She might not have basic facilities such as good food, cloths, and schooling in her early life. Child marriage, dowry, owner killing, sexual harassments, etc. are other major issues what a women or girls likely to face in their lives. After successfully overcoming these issues in one's life, if a woman can reach to some significant position, where she can contribute, she again is a soft target for facing lot more problems at her workplace. This paper focuses mainly on safety problems for the women at workplace; expecting the ICT benefits towards the women candidates. The systems experimented for security of women are divided in to various categories.The first one is sessile systems; the systems which are fixed to a location (opposite to mobile) and have ability to monitor and warn women against possible threats. This category of systems is mentioned in section 2.1. Second category is mobile systems. This type of systems are most portable, not bounded to a specific location, very handy and generally developed as mobile apps in a smart phone; which a woman can always carry with her. Systems in this category are discussed in section 2.2. Third one is an intelligent system category. The system learns malicious behavior considering knowledge stored in it and proactively takes required decision without intervention of the user. Such system can be sessile system, for safety of women at a predefined work space; or it can be mobile for more portability and personal use. Systems in this category are discussed in section 2.3. Systems that are not meant directly for safety of women, but indirectly provide education, awareness and present innovative technology that can be utilize for the cause of women safety are also examined and mentioned in the category of other systems. Systems in this category are listed in section 2.4. Section 3 discussed the ideal characteristics of system for women safety, and survey of women's feedback for future development of women's safety system.

A. Sessile System

There are systems, which are location based and can monitor & warn women against possible hazards. Many women need to feel safe when they have any work outside office hours. This leads to have a safety system which helps them to mentally have peace of mind. Table 1 describes some prominent work done in the above mentioned category of the systems.

It is to be noted that the trend is inclining towards mobile and location independent non-sessile systems.

Table 1: Major Work Done in Sessile Systems

Sr #	Name of Device	Description	ICT used
1	Womens' Safety software and app	In emergency, it will send sms, navigate with google map, capture location and pictures of surrounding areas	Camera, SMS server, GPS navigator
2	RIFD based Automatic Street light control system	This system will automatically switch on the light according to time zone in early morning and Night.	RIFD, sensors
3	IOT based Women safety device	The device can be activated by pressing button and it sends instant message to police and family members.	Microcontroller, Power supply, GPS module, emergency switch, LCD and GSM modem

B. Mobile Systems

Many women feel safe and comfortable at her regular workplace and able to identify possible risks and hazards in such routine locations, where they work every day. Much more precautions are required while traveling and working at unknown places. In such situations women need mobile ICT solutions which help them monitoring the situations and alter them in time. Following are some example systems which are developed by various professional considering the aforementioned needs. Table 2 enlists such contributions.

Table 2: List of Mobile Apps

Sr No.	Name of Device	Description	ICT used
1	Raksha app	It will send alert signal to emergency contact nos, did not require internet connection. Person can shout by pressing volume key[[26].	GPS navigator/GSM, sensor recognize volume, SOS activation.
2	Nirbahya system & app	It will send alert signal when area is unsafe and by pressing a power button it will send SOS signal to all emergency nos[25].	GPS locator, sensors, GSM
3	Himmat app	It will activate alert signal as well as audio and video recording and send to police station. It is implemented by delhi police[27].	GPS activator, Sensors, Audio and Video sensors, SOS activation, GSM
4	Chilla app	It will activate alert signal as well as location trap to emergency contact nos by just scramming and pressing button[28].	GPS activator, voice recognizer, location trap, sensors, GSM
5	AVA by SAVE	It is a wearable device with your mobile, which will activate alert signal and location trap in case of emergency[29].	GPS activator, location trap, GSM
6	VithU: Gumrah Initiative	By pressing single button, it will trap your location and sends voice message to your emergency nos by saying that you are in danger[30]	GPS tractor, voice activator sensor. GSM(Global system for Mobile communication)

C. Intelligent Systems

Though there is a trend of mobile applications for women safety and security, various intelligent systems have also been experimented in the domain. An intelligent security system is designed and implemented in work of [***2***]. The authors have considered possibilities of attacks on women on public spaces such as railway and bus stations, malls and footpaths. The system considers four modules namely (i) chaotic situation analysis, (ii) male-female identification, (iii) facial expression recognition, and (iv) GSM module along with alarm system.

A model for all in one safety system is proposed by [3]. The system consists of a database, multimedia facilities for calling and auto-receiving, auto key press systems and spy camera.

The system as mentioned introduces wrist band and spectacles as smart wearable system with inbuilt GSM and GPs technology to provide security to women. It does so by delivery live streaming of the situation or messaging a fixed text to a selected contact automatically. Similar work is also done by [5]. Similarly a wearable jacket with embedded smart system is designed by for women. Cognitive radio networks have also been utilized for women security as mentioned in work of .

Artificial Neural Network (ANN) based systems are also considered as effective instruments for the domain, as no generalized logic is available for hard coding the rules.

D. Other Systems

Beside the above mentioned categories, some indirectly helping systems are also designed and developed for women. For example in work of socio- economic uplift of women is suggested. Once women is socially and economically independent, they can raise their voce against malpractices in any field. Another such indirect help is provided through work of . The paper discusses an outline of a rescue system, however, it highlights important technological aspects under wireless communication categories, which further can be utilized in various systems for women security.

Many a women are working and as a part of their business they use information and communication technology as an instrument. In such cases, women must be aware of cyber security and laws related to that. This paper discusses applicability of cyber laws for women utilizing technology for their businesses.

Table 3: Safety Measure Devices

Sr #	Name of Device	Description	ICT used
1	Watch	It helps to detect location and gives alert to family members and police station.	Heart beat Sensors and GPS system.
2	Smart Pendent	By pressing button, it will alert your location emergency contact numbers.	SOS Activation, Key Trigger sensor, GPS navigator
3	Safelet Braclet	It contains two buttons. One button will send alert of your location to emergency nos and other button will	Key Trigger sensors, Audio recording sensor, GPS activator.

2. DESIRED CHARACTERSTICS OF SYSTEM FOR WOMEN SAFETY

Considering the above mentioned state of the art in the domain along with underlying models, techniques and applications, following aspects have been shortlisted as desirable characteristics of a system that utilizes technology for women safety. These aspects are namely parameters, categories, innovations, and underlying technology. These aspects with their desired characteristics are illustrated in table 4.

Table 4: Desired Characteristics of Systems for Women Safety

Suggestion	Characteristics
Suggested parameters	Applicability Accessibility Ease of use Cost-effective Use of multimedia Area covered for surveillance Minimal or automatic (pro-activeness) activation
Suggested Categories	School children Housewives and home managers Traveling women Senior citizen and differently able women Working women in various industries such as Television and films

3. CONCLUSION

Advancements of information and communication technology must be utilized for betterment of the society and industry. Women play key role in uplift of society. This is the key audience, which must be benefited by the technological advancements. The paper highlights variety of automated systems for women safety and identified the desirable characteristics of such system. By doing so, the paper helps future researchers to accommodate many such important parameters in the system under development. Further, the paper also illustrates the survey result which is taken from various categories of women for development of women's safety system.

REFERENCES

[1] Poonam Bhilare, Akshay Mohite, Dhanashri Kamble, Swapnil Makode and Rasika Kahane, "Women Employee Security System using GPS And GSM Based Vehicle Tracking", Department of Computer Engineering Vishwakarma IOT Savitribai Phule Pune University India, E-ISSN:-2349-7610 INTERNATIONAL JOURNAL FOR RESEARCH IN EMERGING SCIENCE AND TECHNOLOGY, Volume-2, ISSUE-1, JAN-2015.

[2] Daniel Clement, Kush Trivedi, SaloniAgarwal,Shikha Singh "AVR Microcontroller Based Wearable Jacket for Women Safety". IRJET, e-ISSN:2395-0056, p-ISSN:2395-0072,Volume 03,Issue 05|May 2016.

[3] Paradkar Abhijit and Deepak Sharma, "All in one Intelligent Safety System for Women Security", International Journal of Computer Applications (0975 – 8887) Volume 130 – No.11, pp 33-40, November 2015

[4] Geetha Pratyusha Miriyal and P.V.V.N.D.P Sunil, Smart Intelligent Security System for Women, International Journal of Electronics and Communication Engineering & Technology (IJECET) Volume 7, Issue 2, March-April 2016, pp. 41–46

[5] Sriranjini R, "GPS and GSM Based Self Defense System for Women Safety", Journal of Electrical & Electronic Systems, Volume 6, Issue 2, 2017