International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-9 Issue-7, May 2020

Iot Based Emergency Security System for Women

Pallavi Parlewar, Divya Daswani, Komal Kushwaha, Sakshi Agrawal, Pratiksha Charlawar

Abstract: ***In today's era, women are progressing and scaling the peaks of success. However, there's a significant hike in the number of crimes against women like molestation, eve-teasing, trafficking, etc. Also, there have been numerous attempts to ensure the safety of women ranging from the infamous mobile apps to the hefty belts &safety jackets,etc. However, it is not practical to carry such bulky systems and the victim may not be able to reach the smartphone without being noticed by the assaulter.This increases the risk factor. Therefore, to ensure the security of women, in this paper we propose an IOT based Emergency security system. This system includes a gsm, gps, raspberry pi, fingerprint module, camera module and IR led blasters. It aims at providing a dual security to the women with the help of panic button and fingerprint scanning device. Whenever a woman feels like she is in danger, she can manually switch on the system which will require her to scan her fingerprint for every 1 min. Practically, if she is in distress situation she would fail to scan and the camera module which is embedded in the woman's pendant will start capturing images and live video. The GPS module will trace the exact location & GSM module will send emergency text messages to the specified contacts and alert the nearby police station. An additional provision of improved vision during night time using IR led blasters is incorporated in this system.***

Index Terms: Image processing, IOT, led blaster, Night vision.

I. INTRODUCTION

We live in 21st century where both men and women are given almost equal opportunity in each and every aspect of life. On one hand, we hear news of women scaling the summit of success and bringing laurels to the society whereas on the other hand, we hear women being harassed by the same society. The instances of violence against women has increased by many folds as they have stepped out of their cocoons. Many heinous crime have been reported against women like acid attacks, eve-teasing, persecution for dowry, dowry deaths, etc. New reports show that 52% of the female at workplace have been sexually harassed by the senior employees and coworkers. Allover India 5.2 incidents/lakh population crime rate cases in rape have been reported.

Revised Manuscript Received on May 30, 2020.
***** Correspondence Author
Pallavi Parlewar*, Electronics and Communication Engineering Department, Shri Ramdeobaba College of Engineering and Management, Nagpur, India
Divya Daswani, Electronics and Communication Engineering Department, Shri Ramdeobaba College of Engineering and Management, Nagpur, India
Komal Kushwaha, Electronics and Communication Engineering Department, Shri Ramdeobaba College of Engineering and Management, Nagpur, India
Sakshi Agrawal, Electronics and Communication Engineering Department, Shri Ramdeobaba College of Engineering and Management, Nagpur, India
Pratiksha Charlawar, Electronics and Communication Engineering Department, Shri Ramdeobaba College of Engineering and Management, Nagpur, India

These striking statistics motivated us to design such a system which would ensure the safety of women even during odd working hours. In this research paper, we have proposed an IOT based emergency security system for women which includes image capturing, sending emergency texts and locating the exact position. In this system, whenever a woman feels she is in danger, she will manually switch on the device equipped with the fingerprint module. This system will require her to scan her finger for a regular interval of 2 minutes i.e.1 min/ scan, then if the device doesn't get any signal from fingerprint module it will send signal to raspberry pi which will predict that the women is in danger and accordingly, the camera module will start capturing videos and images. Simultaneously, GSM and GPS will be turned on. GPS will start locating the victim's exact location in terms of latitude and longitude and GSM module will start sending emergency text messages to the nearby police station and 10 specified contacts. For dual security, a panic button is also provided for utmost emergency situations. Taking a record of recent statistics, we have found that most of the women harassment cases have been reported to take place at night hours. Thus, the provision of improved vision during night time has added a considerable value to the system.

II. LITERATURE SURVEY

Martina J et al. [1] proposed a women security system using GSM and GPS involving the biosensors. The biosensors are mainly used to sense the vital body parameters such as blood pressure, temperature and heart rate. The sensors employed are heart rate sensor, BP sensor and pulse rate sensor. It resembles the normal device tracking system which tracks the live location of the victim through GPS and sends emergency texts to the family members via GSM. It is an effective wearable technology which gives a high sense of security to women. However, this system is not reliable. It is because in case, the woman has a cardiac arrest the vital body parameters will attain their threshold value & the biosensors will be activated which is the drawback of the proposed system.

Rachana P et al. [2] suggested a system entitled, 'Smart shield for women safety' which is basically a safety jacket. It includes GSM, GPS, biosensors and shock mechanism circuitry. This smart system could be activated in 3 ways- by manual switching (button), by auto mode (using sensors) and by falling (fall detector). Additionally, defense is provided by the shock mechanism circuitry which generates an electric jolt when women is in distress. This is a smart system equipped with all the necessary provisions. However, nobody would like to wear a hefty jacket all the way to work or home and this is the limitation of the suggested system. Jismi T et al. [3] developed 'Touch Me Not' a women safety device. This device can be attached to the clothing and when pressed activates the system and alerts the contacts via emergency texts.

This system has mainly 4 parts – location tracking (GPS module), image capturing, image storing and sending (GSM module) and issuing alarm. In it the the images are acquired through a high definition button-spy camera. It is a more efficient system as compared to the other existing systems like separate garment, bulky belts and mobile apps.

Priyanka G. [4] proposed women safety device using Raspberry Pi which is a portable safety device with dual provisions of issuing emergency texts to alert family members and nearest police station. Also there is a defensive mechanism of giving mild shock to the assaulter. Moreover, the images fetched through the online video streaming are used as an evidence to prove the culprit guilty.It was a smart low-cost device designed to help women in distress & ensure safety by giving an electric jolt to the perpetrator.

III. METHODOLOGY

The IoT based emergency security system for women uses a fingerprint scanning module, GSM, GPS, arduino nano board, raspberry pi, camera module, 4*4 keypad and IR LEDs (infrared).

Fingerprint module: This module is equipped with a TTL UART interface, thus a user is allowed to store a finger print data in the module and can configure it in 1:1 or 1:N mode that is used for identifying a person. The working of fingerprint scanning module is divided into 2 parts- fingerprint enrollment and fingerprint matching. The fingerprints are fed into the system using the code for enrollment . Nextly, when the fingerprints are matched a signal is sent to the arduino board .

Arduino nano: This is a small, breadboard-friendly microcontroller board which is equipped with a number of digital & analog I/O pins. It resembles the arduino nano board and supports all its features in a compact area. It is used for UART TTL (5V) serial communication. It gets activated upon receiving signal from fingerprint scanning module and in turn activates the Raspberry Pi.

Raspberry Pi: The raspberry pi is a single board computer which has GPIO pins for connecting the electronic components, SD card slot, USB ports and ethernet port for supporting multiple functionalities. The SD card is inserted in the SD card slot and is used to store the images & the videos captured by the camera module.

Camera Module : It is a portable light weight camera supporting Raspi module.Thus, it communicates with raspberry Pi using the MIPI camera serial interface protocol. As soon as the system is triggered the camera module starts capturing images & online video streaming. It is generally used in image processing, machine learning or in surveillance process.

GPS: The receivers in GPS module use a constellation of satellites and ground stations to compute the position and time almost anywhere on the earth. Taking this information as an aid and performing some calculations, a ground based receiver or GPS module can estimate its exact position in terms of latitude & longitude. The GPS module requires a minimium of 4 satellites to track the exact location of an object. The 3 of the satellites are used to track the location in 3-dimensions and the 4th satellite is used to confirm the exact position.

GSM: It is an open and digital cellular technology which is used for transmitting mobile voice and data. It operates at 850MHz, 900MHz, 1800MHz and 1900 MHz frequency bands. It uses TDMA technique for communication purposes. The location traced by the GPS module is sent to the specified contacts & the nearby police station via the GSM module.

IR LEDs: It is a solid state lighting (SSL) device which emits light in the infrared region of the electromagnetic radiation spectrum. It allows for cheap, efficient production of infrared light, which is electromagnetic radiation in the 700nm to 1mm range. The IR LEDs are used to enhance the vision during night time & hence,facilitates an improved efficiency.

(a) BLOCK DIAGRAM

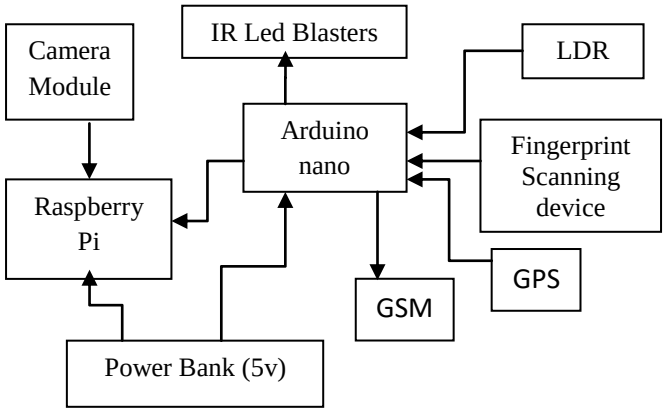

Figure 3.1 System Block Diagram

(b) WORKING OF THE SYSTEM

The device can be activated into 2 ways –

1. Manual Switching (using panic button)
2. Auto mode (using fingerprint scanning module)

This system is switched ON by the woman. The power bank (5V) will reboot the system by giving voltage supply to Arduino nano and RPi simultaneously. Hence, every component gets activated. Now the fingerprint scanning module will require the scanning of woman's fingerprint after every 1 min. Practically, if the woman is in danger and miss to scan for every duration of 1 min, the system will further wait for 2 mins. If for continuous 2 mins, fingerprint is not scanned, the arduino will send signals to RPi which will allow camera module to start capturing images and videos.The captured images and videos are stored in the SD card which can be used in future as an evidence against the assaulter. At the same time, GPS will be activated and will trace the live location of woman in terms of latitude and longitude with an accuracy of about 10 metres.Then, the GSM module will start sending emergency texts messages **"Help me! I am in danger"** and exact location in terms of latitude and longitude to the specified contact members and nearest police station. The updated location will be sent everytime to the contacts hence, increasing the accuracy of the system. Also, the woman can also manually feed any contact number using the 4*4 keypad , as per her convenience.

Additionally, IR LEDs emit infrared light and allows us to see in night time or in darkness.
Hence, an improved vision is achieved during the night time. This system can be placed in the handbag of the woman and can be carried easily.

(c) FLOW CHART

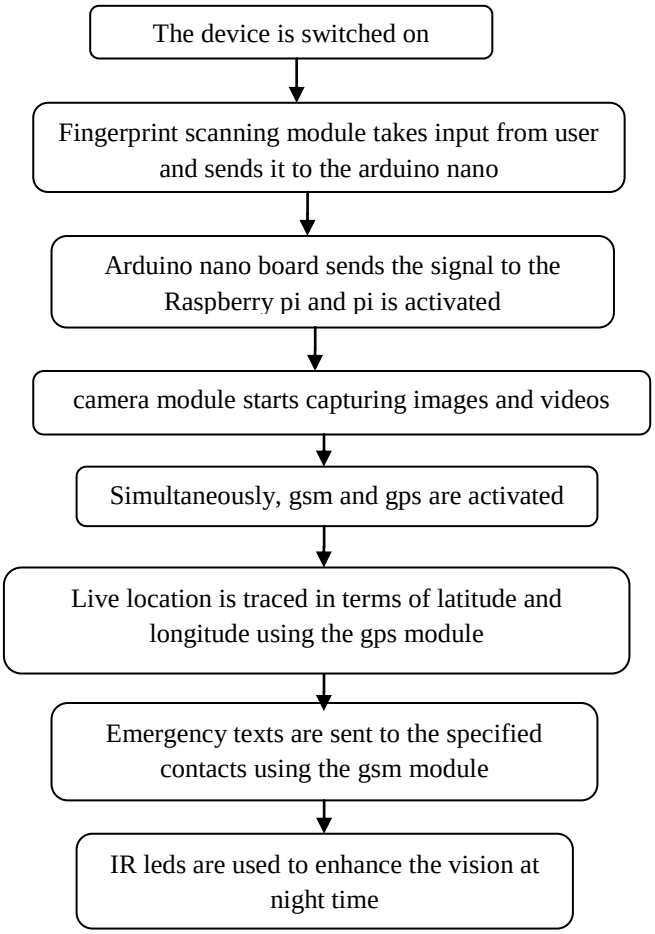

Figure 3.2 Flow Chart

IV. APPLICATIONS

- Used for Child monitoring and security purposes
- Used for physically challenged and elderly people
- Used in military applications for tracking soldiers
- It can be employed for tracking pets or wild animals
- Live location tracking which would serve as an evidence for the prosecution of culprit

V. RESULTS

The IOT based emergency security system for women is designed to help women in distress situations and alert the surrounding people. It has incorporated dual security by the provision of improved vision during the night time and odd hours. This system was designed by taking into consideration the previously developed systems. Hence, measures have been taken to overcome the loopholes of the previously suggested designs. The results obtained are as follows –(i) The prototype of the system is implemented which can address all the problems of women safety (Fig 5.1).

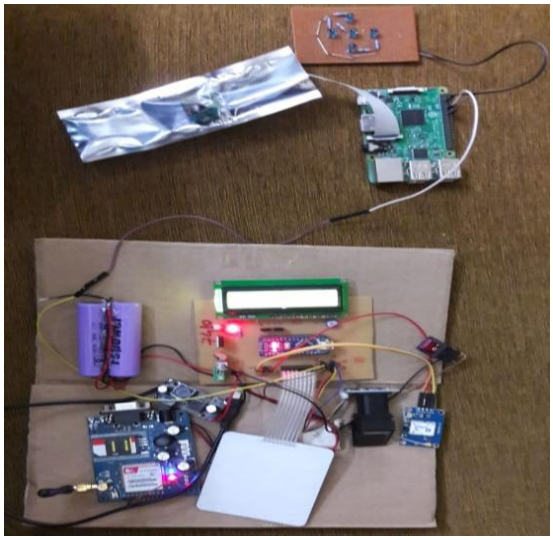

Figure 5.1: Prototype

(ii) The images and live video captured by the camera module are stored in the SD card and can be retrieved as and when required (Fig 5.2).

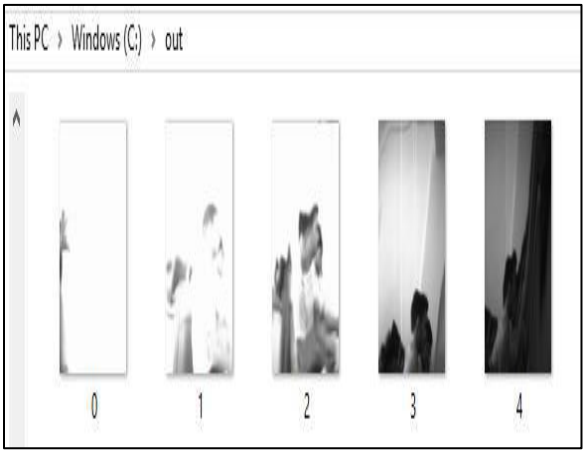

Figure 5.2: Camera Module output

(iii) The live location traced by the GPS module in terms of latitude and longitude are sent in the form of emergency texts via the GSM module. The women safety device continuously sends the updated location and hence, increases the accuracy of the system (Fig 5.3)

Figure 5.3: Message on receiver mobile

(iv) The live location is shown on the google map (Fig 5.4)

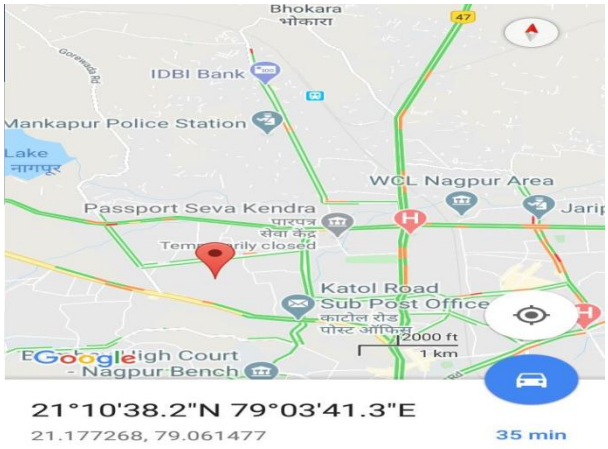

Figure 5.4: Location on Google maps

VI. CONCLUSION

IoT based emergency security system has been designed keeping in mind the increase in the number of heinous crimes against women like eve-teasing, molestation, trafficking and all types of sexual assault .The objective is to provide security to the women in distress situations and issue alert messages to the specified contacts and nearest police station. It is a easy to use, comfortable and handy system. It is more efficient as compared to the infamous mobile apps like VithU app ,bulky garments and safety jackets. It is proposed with the view that no stone is left unturned to ensure the maximum safety of women.The implementation of such real-time systems can keep a check on such crimes against women. This device will honour the women with a sense of safety even when she is alone and feeling helpless. The improved vision during night time using IR LEDs will prove to be of immense significance as the images of the culprit are captured and stored in the device without his knowledge. This further reduces the risk factor as the assaulter will not harm the women triggered by the knowledge that she is carrying any of such safety devices proposed earlier.This will promote gender equality as women will be able to step out of their cocoons and achieve their dreams. They will feel more confident and independent .The women will be able to work in late night shifts with no sense of fear or insecurity. This system can also be employed for child monitoring purpose and tracking pets or wild animals.

REFERENCES

1 Mrs. A. Martina Jenitha, E. Divya, V. Kalaiselvi, K. Parameshwari, R. Snegha, "Biosensor based Women Security System using GSM and GPS", IJSRD - International Journal for Scientific Research & Development| Vol. 5, Issue 08, 2017 | ISSN (online): 2321-0613

2 Rachana B. Pawar, Manali H. Kulabkar, Kirti S. Pawar, Akshata R. Tambe, Prof. Smita Khairnar , "Smart Shield for Women Safety", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 04 | Apr-2018

3 Jismi Thomas, Maneesha K J, Nambissan Shruthi Vijayan, Prof. Divya R, "TOUCH ME NOT-A Women Safety Device", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 03 | Mar-2018

4 Priyanka Yuvaraj Gonde – "Women safety system using Raspberry Pi" , International Journal of Advance Research, Ideas and Innovations in Technology, ISSN: 2454-132X, (Volume 4, Issue 6)

5 Available online at: www.ijariit.com

6 Vijaylakshmi, Renuka.s, Pooja Chennur, S. Patil, "GPS based wireless Application", International Journal of Application or Innovation in Engineering and Management (IJAIEM), ISSN 2319-4847, Volume 3, issue 4, April 2014.

7 www.irjnet.net – Internet source

AUTHORS PROFILE

Dr. Pallavi Parlewar, Associate Professor at Shri Ramdeobaba College of Engineering and Management, Nagpur. She received her B.E. degree in Electronics and Telecommunication Engineering in the year 2000. She completed her MTech in VLSI Design in 2006. She has done her Ph.D on "An Explorative study of X-Let Transform fo image denoising Applications", from RTMNU, in March 2013. She has published 1 paper in International Conference & 1 in International Journal.

Divya Daswani, currently pursuing B.E. in Electronics & Communication Engineering from Shri Ramdeobaba College of Engineering & Management,Nagpur. She is certified in C++ and Java programming languages. She is placed in Accenture.

Komal Kushwaha, currently pursuing B.E. in Electronics & Communication Engineering from Shri Ramdeobaba College of Engineering & Management, Nagpur. She has worked on an IoT based project namely Web controlled Raspberry Pi Surveillance Robotic Car. She is certified in C++ and Java programming languages. She is placed in Accenture and Larsen & Turbo Infotech (LTI).

Sakshi Agrawal, currently pursuing B.E. in Electronics & Communication Engineering from Shri Ramdeobaba College of Engineering & Management,Nagpur. She has worked on projects like persistence of vision display and online food ordering website using HTML.

Pratiksha Charlawar, currently pursuing B.E. in Electronics & Communication Engineering from Shri Ramdeobaba College of Engineering & Management, Nagpur. She has completed her summer internship at Bharat Sanchar Nigam Limited (BSNL), Chandrapur in 2017. She is certfied in C and C++ programming languages.