iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VII **Month of publication:** July 2021

DOI: https://doi.org/10.22214/ijraset.2021.36911

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

RAKSHA 24x7: Women Protection Device Using Arduino

Daliya Joy[1], Subhana T B[2], Swaliha N[3], Unnimaya U[4], Asst. Prof Rasha Mohammed[5], Asso. Prof Shamna A R[6]
[1, 2, 3, 4, 5, 6]*Department of Electronics and Communication, Musaliar College of Engineering, APJ Abdul Kalam Technological University, Kerala, India*

Abstract: ***In the present scenario, women are keeping pace with men in every walk of their life but unfortunately at cost being subjected to abuse, harassment, violence in public, and even at their own houses. They cannot step out of their houses at any time of the day, cannot wear clothes as per their will, nor can they even go to work in peace. There is some kind of inhibition that women are always subjected to, which not only takes away their sense of freedom but also shatters their self-confidence and dreams. Women safety has always been an issue even in this modern society with advanced technologies. Women are not safe anywhere. The daily number of cases of abusing women is raising every day is an ideal illustration of the atrocities that the women experience. So, it is essential to ensure the safety and security of women. For this purpose, a women protection device using Arduino is proposed with technologies like IoT, GSM, and MEMS. This device is entirely controlled by an Arduino UNO microcontroller and it can be activated either manually by using a push-button or automatically by using the accelerometer. When an emergency occurs the accelerometer points to an abnormal value and the Arduino gets triggered and the entire system will be activated. By using GSM and GPS, an emergency message with the victim's current location will be sent to the predefined contacts. And the camera incorporated with the device will capture the images and uploaded on the webpage. This image can be also uploaded on the webpage which will be useful for further investigation. Moreover, for first hand safety, a shock unit also designed to attack the perpetrator.***

Keywords: Women Safety, Arduino, Accelerometer, Automatic Activation, IoT.

I. INTRODUCTION

Women safety has always been an issue even in this modern society with advanced technologies. Women are not safe anywhere. There is no deficiency of issues that women actually face in India. This is an immense downside. Violence against women in India is much more than it may seem at first glance, because many manifestations of violence are not considered crimes, or may go unreported or undocumented due to certain Indian cultural values and beliefs. Domestic violence, sexual assault, and murder are the most common forms of violence against women in India. violence is deeply rooted and common in India. Research published in the Journal of Epidemiology & Community Health reveals that one in three women in India is at risk of physical, emotional, or sexual partner violence but findings show that only one in 10 of these women formally report to the police or health care professionals. The National Crime Records Bureau (NCRB) 2019 reports that 30.9% of all the 4.05 lakh cases under crimes against women are registered under Section 498A of the Indian Penal Code (IPC) which deals with ‘cruelty by husband or his relatives. The number of complaints of domestic violence received by the National Commission for Women has increased from 2,960 in 2019 to 5,297 in 2020 during the year of lockdown when most people were confined to their homes due to Covid-19. The year after the lockdown the NCW continued to receive more than 2000 complaints of violence against women every month with nearly one-fourth of them are associated with domestic abuse. According to the report of NCW, about 1463 complaints were received on domestic violence against women from January 2021 to March 2021.

Apart from domestic violence, there is no shortage of rape cases, kidnapping, and murder in India. India recorded an average of 87 rape cases daily in the year 2019, with a rise of over 7% from the year 2018. As per the NCRB report, a total of 32,033 cases of rape were filed in 2019 which was 7.3% of all crimes against women during the year. In 2012 Nirbhaya was brutally gang-raped in a moving bus in Delhi, in Mumbai a 22-year-old photojournalist was gang-raped by five persons including a juvenile, the Odisha rape victim was just 3-year-old, Banda victim was 8-year-old, Hathras victim was just 19, Bulandshahr girl who was raped and then set on fire was also 12-year-old, and Jisha murder case was a rape and murder crime that shook the Indian state of Kerala. These are some of the most heartbreaking cases reported in India and the list can go on and on. From all this, we can realize that women are not safe anywhere and there is a striving need for women's security in our country. So, we propose a device named "Raksha 24x7" to ensure the safety and security of women in aspects of tracking, recording, and self-defence.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

II. PROPOSED SYSTEM AND DEVELOPMENT

The proposed system is a women safety device named "RAKSHA 24x7". It is entirely controlled by Arduino uno R3. The device ensures maximum safety and protection for women. This device can be operated either automatically or manually. When the device gets activated an alert message with the current location of the victim to the predefined contacts, the camera will capture the incidents. Moreover, for first hand safety, a self defence mechanism is also provided.

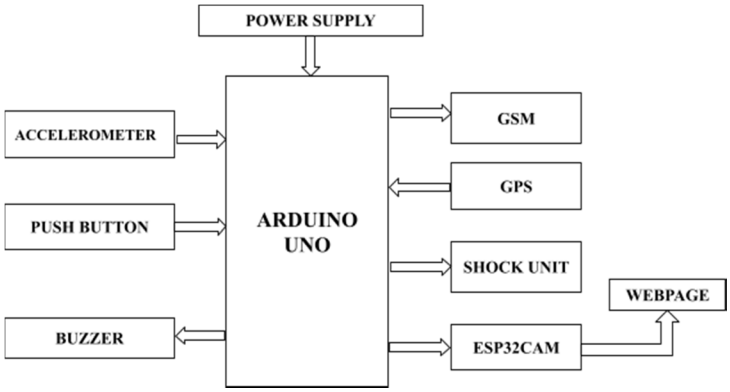


Fig.1 Block Diagram

This women protection device is incorporated with an accelerometer sensor, GPS, GSM, ESP32 CAM Wi-Fi module, push-button, and a shock unit. This device will automatically trigger if the accelerometer points to an abnormal value, in case if the victim is in any troublesome situation, she can also use the pushbutton to turn on the device. GSM module enables the facility to send alert messages to the enrolled contacts. GPS module is to analyses the location of the victim by tracking the latitude and longitude positions. Thus, the victim's location along with an alert message will be sent to the predefined contacts using GSM. The camera incorporated with the Wi-Fi module will capture the images of the current incident and it will be uploaded and displayed on the webpage. These images will also be saved into the SD card provided on the ESP32 Cam, so that appropriate action can be taken place. In the aspects of defence, the system is incorporated with a shock unit to propagate electric shock to the attacker. In case if the victim is in an isolated situation, this shock unit is very much helpful for self-protection until the rescue team arrives. The continuous beep sound produced by the buzzer will help to attract the attention of nearby people and this alarm can also intimidate the perpetrator.

III.SYSTEM COMPONENTS

A. Arduino Uno R3

The Arduino Uno is an open-source microcontroller board based on the ATmega328.The Arduino Uno has 14 digital input/output pins, 6 analog input pins, a 16 MHz crystal oscillator, a USB connection, an ICSP header, a power jack and a reset button. It contains everything required to support the microcontroller; This can be simply connected to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

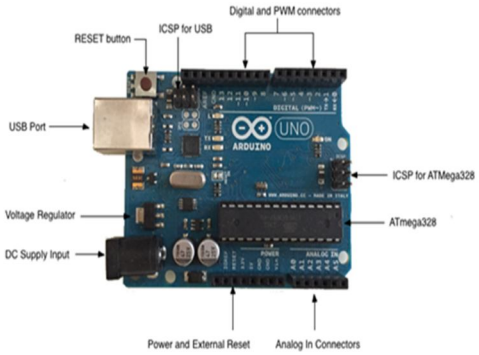


Fig.2 Arduino UNO

©IJRASET: All Rights are Reserved

B. Accelerometer Sensor

An accelerometer is a device that measures the vibration, or acceleration of motion of a body. The force caused by vibration or a change in motion of the body causes the mass to squeeze the piezoelectric material which produces an electrical charge proportional to the force exerted upon it. The ADXL335 is a triple axis accelerometer that has extremely low noise and power consumption. Accelerometer sensor can measure the static acceleration due to gravity in tilt-sensing applications, as well as dynamic acceleration that results from shock, motion, or vibration of the body. By measuring the amount of acceleration due to gravity, an accelerometer can find out the angle it is tilted at with respect to the earth. By sensing the amount of dynamic acceleration, the accelerometer can figure out how fast and in what direction the device is moving.

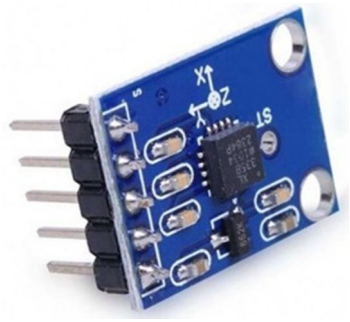


Fig.3 Accelerometer Sensor

C. Wi-Fi Module (ESP32 CAM)

The ESP32-CAM is a microcontroller that has an integrated video camera and microSD card socket. It is inexpensive and simple to use, and is ideal for IoT devices requiring a camera with advanced functions like image tracking and recognition. This ESP32 CAM has a small size, low power consumption camera module OV2640 camera and provides an onboard TF card slot. It can be used in wide range of applications such as wireless video monitoring, Wi-Fi image upload, QR identification, etc.



Fig. 4 Wi-Fi Module

D. GSM Module (SIM800C)

SIM800C is a quad-band GSM module that works on frequencies GSM850MHz, EGSM900MHz, DCS1800MHz and PCS1900MHz. SIM800C features GPRS multi slot and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 17.6*15.7*2.3mm, SIM800C can meet almost all the space requirements in customers' applications, such as smartphones, PDA and other mobile devices. SIM800C is a SMT package with 42 pads, and provides all hardware interfaces between the module and customers boards.



Fig.5 GSM Module

©IJRASET: All Rights are Reserved

E. GPS module

The GPS system currently has 31 active satellites in orbits inclined 55 degrees to the equator. The satellites orbit about 20,000km from the earth's surface and make two orbits per day. The orbits are designed so that there are always 6 satellites in view, from most places on the earth. The GPS receiver gets a signal from each GPS satellite. The satellites transmit the exact time the signals are sent. By subtracting the time, the signal was transmitted from the time it was received, the GPS can tell how far it is from each satellite. The GPS receiver also knows the exact position in the sky of the satellites, at the moment they sent their signals. So given the travel time of the GPS signals from three satellites and their exact position in the sky, the GPS receiver can determine your position in three dimensions - east, north and altitude.



Fig.6 GPS Module

IV. SYSTEM IMPLEMENTATION PROCESS

A. Flowchart

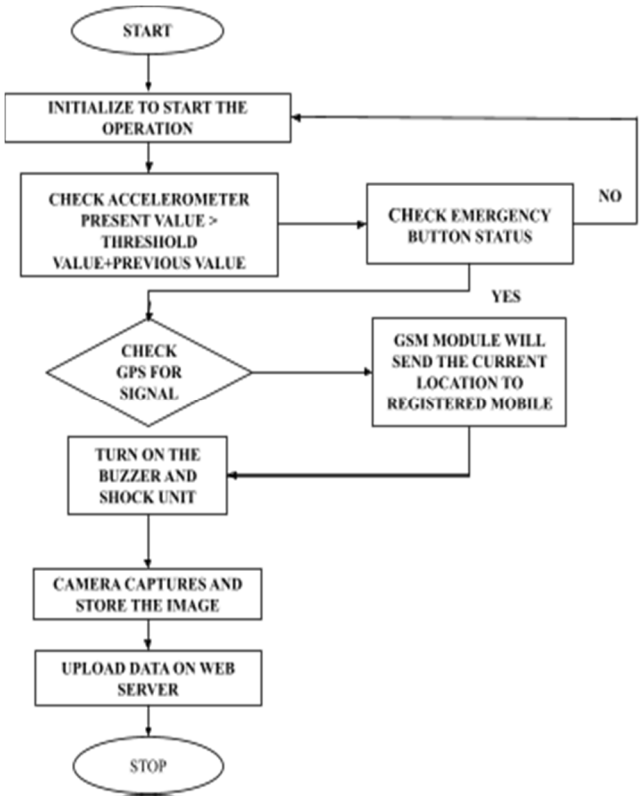


Fig.7 Flowchart

Above figure shows the flowchart of the system. This device can be activated in two ways. The accelerometer incorporated in this device will sense the value of acceleration continuously monitored. Then these values are checked with the predefined threshold value in the controller. When the value becomes greater than the threshold value the accelerometer will trigger the Arduino. The device can also be activated manually by using a pushbutton. When the Arduino gets triggered, the components connected to the microcontroller also get activated.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VII July 2021- Available at www.ijraset.com

The GPS module will collect the latitude and longitudinal information of the victim and an alert message including the current location of the victim will be sent to the enrolled contacts by the aid of GSM module. If the GPS module is unable to track the location, then an alert message "Emergency Location Unknown" is sent to the predefined contacts. At the same time, the buzzer will produce an alarm to alert the nearby people and let them know something went wrong and help is needed. Arduino will power the relay unit hence it will switch the shock unit and generate a high voltage electric shock to attack the perpetrator. The Wi-Fi module ESP 32 Cam having an integrated camera will capture the photos. These photos will be saved on a micro-SD card and are also uploaded on the webpage.

B. Circuit Diagram

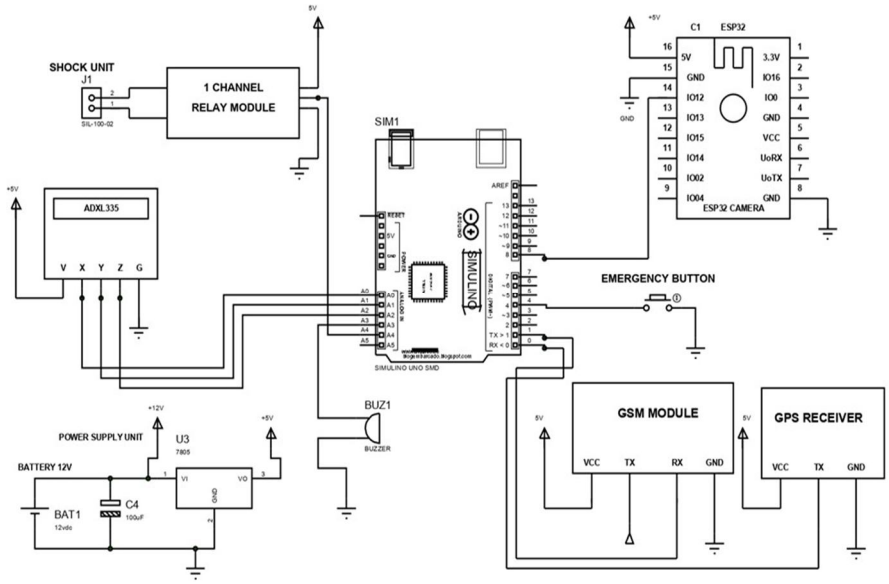


Fig.8 Circuit Diagram

A 12V battery is used for power supply. This 12V is regulated to 5V using U3 7805 regulator IC and is applied to the Arduino. A 100 µF capacitor is used as a filter to remove the noise. The +5V is connected to the VCC pin and ground is connected to the GND pin of the Arduino. The accelerometer ADXL335 measures acceleration along X, Y and Z axis and gives analog voltage output proportional to the acceleration along the 3 axis. The X, Y and Z output are connected to the analog pin A0, A1 andA2 on Arduino. The VCC pin is connected to the 5V pin and the G pin is connected to the GND pin of the Arduino. Buzzer is connected to the analog pin A3 of the Arduino. The shock Unit consists of a step-up transformer and a capacitor. When a mild voltage is applied to the primary coil of the transformer, an emf is induced in the secondary coil due to mutual induction and a huge voltage is produced. It will be stored in the capacitor and when the relay is turned on, this huge voltage will be discharged through a copper panel. Shock unit is powered with 5V and is connected to the analog pin A4 of the Arduino. Emergency button is connected to the 4th digital pin of the Arduino. Its value will be either 0 or 1. The Wi-Fi module ESP 32 Cam is connected to the 8th digital pin of the Arduino. The +5V of ESP32 Cam is connected to the VCC and ground is connected to the GND pin of Arduino. The live coordinates received by the GPS receiver module is sent to a mobile phone via SMS using a GSM module. The Rx pin of the GSM module is directly connected to the Tx pin of Arduino and Tx pin of GPS module is directly connected to Rx pin of Arduino.

V. RESULT AND DISCUSSION

The system consists of components such as Arduino, ADXL335 accelerometer, Wi-Fi module ESP 32 Cam, GPS and GSM module (SIM800C). Here the device ensures the safety of women in aspects of tracking, recording and self-defence. With the help of GSM and GPS modules, the family and friends of the victim can know that the victim is in danger and track the location of the victim easily so that the victim can be accessed with help. GPS is used to track the current location of the victim, while the GSM module sends the alert message to predefined contacts including the current location. Fig 9 shows the alert message sent to the enrolled contacts. The emergency message will be a google map link and it will provide the latitudinal and longitudinal information of the victim. If the GPS is not able to track the location, an alert message "Emergency Location Unknown" will be sent to the contacts.

©IJRASET: All Rights are Reserved

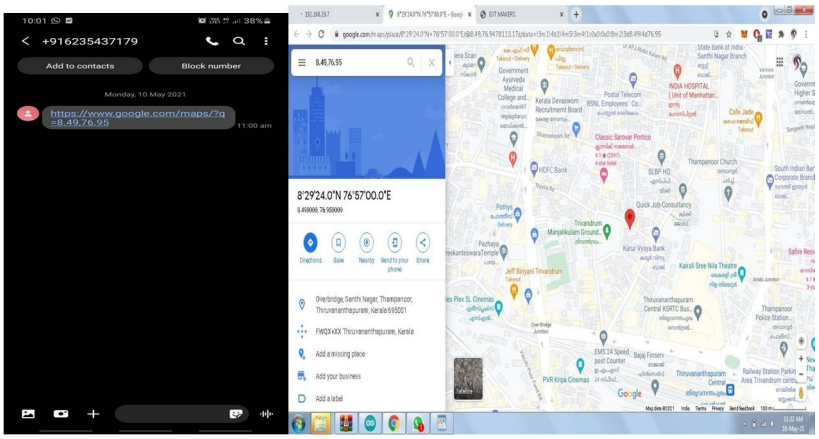


Fig.9 Location Details

When the device gets activated, the camera incorporated on the Wi- Fi module will capture the incident. This image will be uploaded on the webpage of the ESP32CAM and can be viewed by searching its IP address. The image has a resolution of 640x480 with a size of approximately 100 Kb. Once the camera is turned on, it will capture ten different shots. There will be a time gap of 10 sec between each photo. The images will be also saved on the microSD card provided on the Wi-Fi module. During the next activation the images on the webpage are removed and the new photos are uploaded. The Fig 10 shows the image uploaded on the webpage

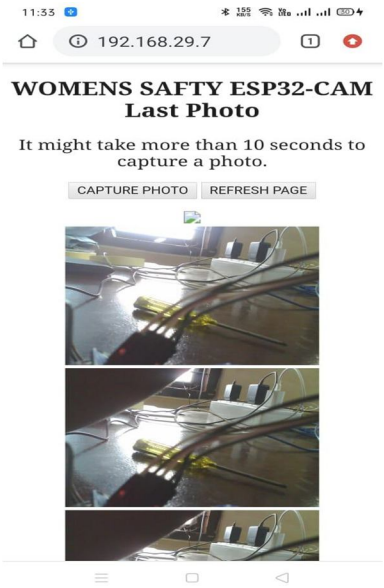


Fig.10 Image captured by camera

VI. ADVANTAGES AND LIMITATIONS

A. Advantages

1) The automatic activation makes this device ideal in situations where it cannot be activated manually with the push button.
2) Images saved on the SD card can be used as evidence for future case investigation.
3) In case no one is available for help the shock unit can be used for self-defence.
4) Raksha 24*7 is a device that protects women and helps them to protect themselves so we can use this device anywhere, anytime, in any situation.

B. Limitations

1) It is expensive to make the components in miniature size and also to manufacture as a wearable device.
2) This device can also be used to vent their anger and resentment towards someone due to personal interest.

©IJRASET: All Rights are Reserved

VII. FUTURE SCOPE

1) This device can be made more efficient by adding a voice assistant based on Machine Learning, AI, On-Device Intelligence etc. Thus, when an emergency situation occurs the user can send location details to the predefined contacts and call the police or family members for help. The voice assistant can also be used to activate the device.

2) The device can be activated by scanning the face of the user or by the use of a fingerprint sensor. It ensures the privacy of the user.

3) The components can be miniaturized and can be designed as a band or watch.

4) If any emergency situation occurred to the user the real time incidents can be streamed on the webpage and it will be helpful for the family, friends and police to identify the correct location and the attacker.

VIII. CONCLUSION

Nowadays harassment is a big issue in the world. Sometimes, women, children are facing various kinds of abusing, violation on a daily basis. So, the Raksha 24x7: Women protection device might be a solution to this problem. The project ensures the safety of the victim in some intense situation by tracking their location and providing them proper support instantly. In aspects of recording, the images captured by the camera incorporated with this device can be used for further investigation. Even the shock generator that comes with our system could be used for self-defence. We conclude that this project is the part of the electronics field which has huge scope for research and development.

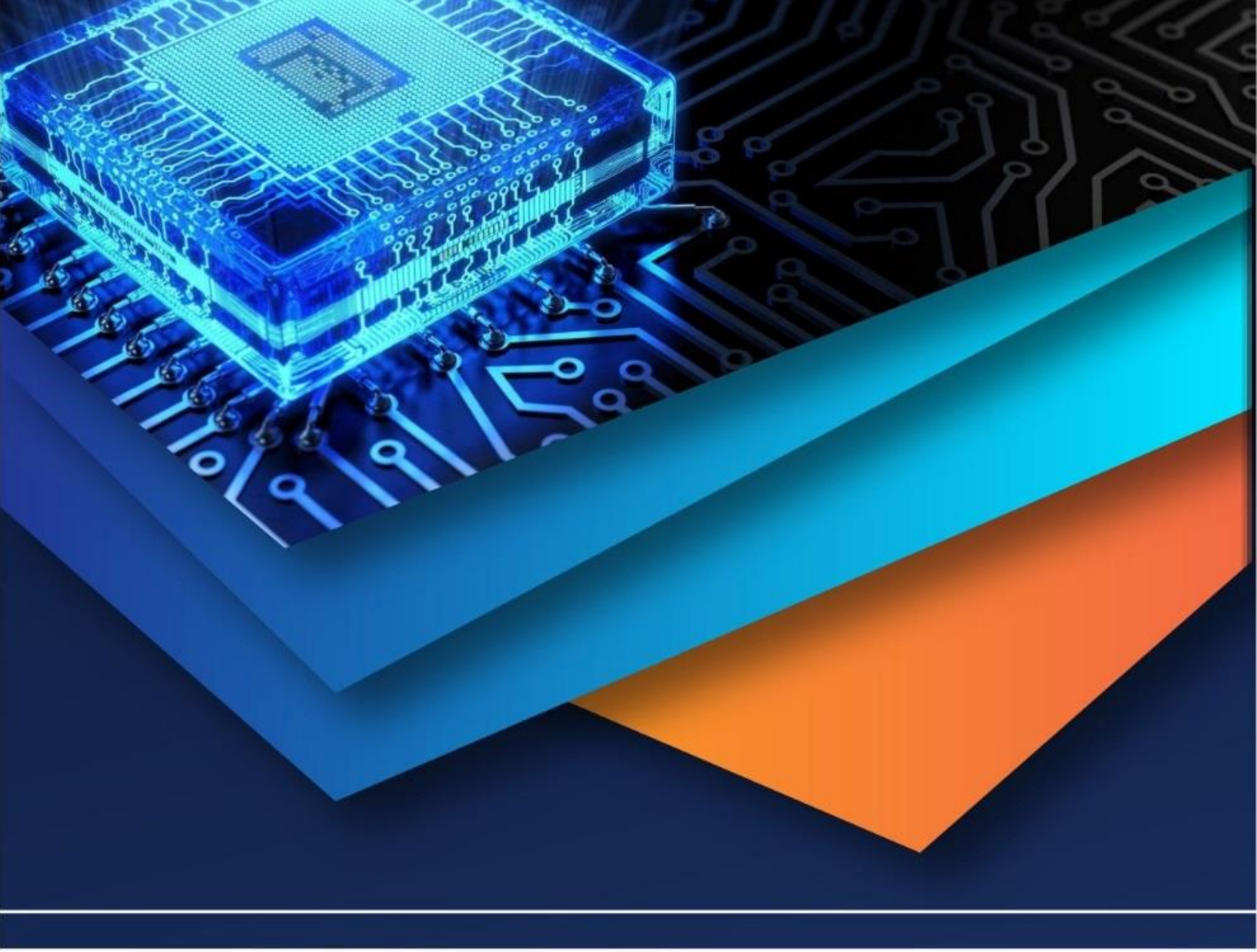
IX. ACKNOWLEDGMENT

The authors would like to thank Asso. Prof Shamna A R (Head of Department, Electronics and Communication Engineering) for giving technical advice and Asst. Prof Rasha Mohammed for providing Valuable guidance.

REFERENCES

[1] Vinay Mishra, Sandip Shinde, Nilesh Shivankar, Mohd.Amaan Khan, Sanam Gadpayle, Prof.Sonali Zunke, “Women’s Safety System by Voice Recognition", IEEE conference 2020.
[2] Palash Kailash Rai, Ayoush Johari, Shivoy Srivastava,Pooja Gupta, “Design and Implementation of Women Safety Band with switch over methodology using Arduino Uno", IEEE conference 2018
[3] Ramachandiran R, Dhanya. L, Shalini.M, “A Survey on Women Safety Device Using IoT”, IEEE conference 2019.
[4] Rabbina Ridan Khandoker, Shahreen Khondaker, “LIFE CRAFT: An android-based application system for women safety”, IEEE Conference 2019.
[5] V.Hyndavi, N. Sai Nikhita, “Smart wearable device for women safety using IOT”, IEEE 2020.
[6] Saumya Pandey, Nikita Jain, Aditi Bhardwaj, Dr. Gagandeep Kaur, Vimal Kumar “Reach360: A Comprehensive Safety Solution", IEEE 2017.
[7] Niti shree "A Review on IOT Based Smart GPS Device for Child and Women Safety Application" International Journal of Engineering Research and General Science Volume 4, Issue 3, May-June, 2016.
[8] Orlando Arias Jacob Wurm, Khoa Hoang, and Yier Jin "Privacy and Security in Internet of Things and Wearable Devices", IEEE Transactions 2015.
[9] B.Vijayalakshmi,Renuka.S, Pooja Chennur, Sharanagouda.Patil. "Self defence system for women safety with location tracking and SMS alerting through GSM network" International Journal of Research in Engineering and Technology 2015.
[10] Swapnali N. Gadhave1, Saloni D. Kale2, Sonali N. Shine 3 Prof. Amol C. Bhosale4 "Electronic Jacket for Women Safety " International Research Journal of Engineering and Technology (IRJET) 2017.
[11] A. Z. M. Tahmidul Kabir Department of Electrical and Electron,Al Mamun Mizan,Tasnuva Tasneem. "Safety Solution for Women Using Smart Band and CWS App" IEEE2020.
[12] Deepak Kumar, Shivani Aggarwal, "Analysis of women safety in indian cities using machine learning on Tweets" IEEE2019.
[13] Vishesh Sharma, Yati Tomar, D. Vydeki, "Smart shoe for women safety" IEEE2016
[14] Md. Raseduzzaman Ruman, Joybrota kumar Badhon, saikat saha, "Safety assistant and harassment prevention for women" 5th International Conference on Advances in Electrical Engineering (ICAEE) 2019.
[15] Priyanka.S,Dr. Shivashankar,Roshni.K.P,S.Pooja Reddy ,Rakesh.K, "Design and implementation of SALVUS women safety device" 3rd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT-2018) .
[16] R. Abhipriya, S. Aysha, K. Gayathri, and K. Kathiravan, "3S: A Radio identification based continuous spectrum sensing protocol for safety of women in cognitive radio networks" International Conference on Communication and Signal Processing 2017.
[17] Sharifa Rania Mahmud, Jannatul Maowa "Women empowerment: one stop solution for women" [Conference paper 2017].
[18] Dhruv Chand, Sunil Naik "A mobile application for women's safety: WoSApp" [conference paper IEEE 2018].
[19] Ravi Sekhar Yarrabothu, Bramarambika Thota, "ABHAYA: An android app for the safety of women".IEEE INDICON 2015.
[20] Soumi Karmakar, Tapan Kumar Rana, "Smart Bag for Women Safety".IEEE 2020

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)