iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** II **Month of publication:** February 2023

DOI: https://doi.org/10.22214/ijraset.2023.49063

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue II Feb 2023- Available at www.ijraset.com

WOGUARD - Smart Safety Device

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Abstract: ***Nowadays, the amount of violence against women has increased manifold due to greater exposure of women in every sphere of life. It has become a big issue now. Crime rate is at its peak. Recent crimes against women, especially rape cases, have been appalling. As a result of such crimes, women's safety has become a controversial issue in India. Despite international agreements, new legislation and the gender movement, women remain particularly vulnerable to assault. It is estimated that 35% of women have been subjected to physical or sexual abuse at some point in their lives. Looking at all these issues we have proposed a device which will really be of great help to the women. In order to reduce violence against women, this paper provides a variety of ideas and approaches from several authors that have examined numerous applications and gadgets using current technologies and processors and have modified them with specific specifications. Additionally, the tiny amount of change suggested in this research will enhance the functionality of these devices and increase the protection of women.***
Keywords: IOT, Women Safety, Shock wave, Security Device

I. INTRODUCTION

Sexual harassment of women is a common occurrence today and is getting worse every day. Both developing and impoverished nations are facing a very dire scenario.As a result, it presents a serious obstacle to both a nation's fiscal progress and women's empowerment. In this project, we're developing an Android app and an IoT gadget that can make women's movement safer. By activating the device's emergency switch, women can receive immediate and exceptional safety support. If an issue occurs, this gadget may track the user's location in real-time and communicate that information to the volunteer and police station in the area. This device can also provide the user with the location of the closest safe zone. The proposed concept is to build a security device that will send an emergency message and location to the user's friends, family or the police. WOGUARD is a safety device specially designed for women in emergency and danger unsafe situation. It has multiple functions and is simple to use and carry. The number of smartphone users is increasing all over the world due to which, this device would be more useful. This device will be just one of many useful applications that can be found on a smart phone. It is a product for personal protection that is made to keep you and your friends safe at all times. This is the ultimate tool for everyone as it has tons of features for real world emergencies as well as everyday security. This easy-to-use application can be accessed by anyone with our device and a smartphone that has it installed. Our goal is to provide you with the fastest and easiest way to get in touch with the help closest to you. The radical strategy, known as "single click", involves threatening the immediate location, sending a distress message to the police, and calling pre-determined numbers to prevent an unfortunate incident and become a real deterrent to the prosecution of female sex offenders. It can also assist the police in reducing crimes against women and the evidence can be used to trace the culprit. Additionally, both internet and offline modes are supported by this gadget. The user can still utilise the gadget to access the closest police station and volunteer assistance even if there is no internet connection available.

II. LITERATURE

The study [1] suggests a safety tool and programme named FEMME that uses an ARM controller. It is a security measure created especially for females. To reach the device in an emergency, a smart phone must either have the programme loaded or be able to purchase it. When someone is in need of assistance, FEMME offers the quickest and most convenient method of contact. By simultaneously tapping the power button and the volume key, you can launch the application. When using the application, the four key icons—audio recorder, SOS message, video recorder, and hidden camera detector—are displayed initially. It either sends messages and recordings to the pre-set contacts or discovers concealed cameras, depending on the option that is currently selected whereas pushing the button to turn on the gadget. When the device is activated by pressing the button on it, the device is connected to the smartphone and has 2 buttons, one is the emergency button and the other is to activate the detection of the hidden camera.

When the emergency button is clicked once (one click), the GPS location is tracked and sent to predefined contacts once every 2 minutes with the updated location. Clicking on it twice (double click) activates the recorder and sends an emergency message to predefined contacts. If it is pressed for a long time (long press), it will automatically call a predefined contact. Using the ARM controller, the device works without a internet connection and is an all in one system, the controller consumes less power and provides more power.

Paper [2] proposes a device that is portable and also similar to a belt. This device was developed after we saw some programs and devices like VithUapp launched by popular TV series in Gumrah Channel [V], SHE (Society Harnessing Equipment) which produces current to help victims escape, and ILA security. the founder designed alarms that can shock and confuse attackers. This device includes Arduino board, GSM shield, GPS module, scream alarm and pressure sensors. The Arduino board has everything the needs to run the microcontroller, it can be run by connecting to a computer or the can be powered by an adapter or even a battery. GSM protection offers data, voice, text messages and fax in a small format with low energy consumption. It is a very powerful One-chip processor with high performance and call quality and supports cheap phones and also compatible with almost all phone services. The GPS module shows the current date and time, the corresponding latitude and longitude, and also transmits the speed and direction of travel while the victim is traveling. This helps track the victim and makes it easier to locate and find him. Screaming alarm provides single chip audio recordingand playback for 0-60 seconds. It is ideally used for portable audio recorders. A pressure sensor gives a signal to the when pressure is applied to it, typically used to register a change in pressure. In this device, a threshold limit is set on the pressure sensor and when the threshold is exceeded, the device is activated and tracks the location of the victim using the GPS module and sends the location to predefined contacts and other emergency services like police surveillance. subscribe to with location updated every 2 minutes. Screaming alarm activates and emits sirens to inform people that is in trouble and help is needed

The paper [3] focuses on a security system that is solely intended to provide security to women so that they never feel helpless. This paper discusses all of the devices that have already been developed for women's safety, such as, SHE stands for Society Harnessing Equipment. ILA security: It includes three alarms that can provide shock, disorient potential attackers, and generate 3800KV to provide electric shock to victims. AESHS (Advanced Electronics System for Human Safety): it includes a GPS module, as well as other features. The smart band module contains Bluetooth low energy (BLE), motion sensors, pulse rate sensors, and a temperature sensor.The smart band does three things: it sends messages to family members along with coordinates, it sends the location to the nearest police station, and it sends information to people in the surrounding area requesting public attention. The fact that this smart band uses a variety of sensors means that it can be truly effective and trustworthy. It is integrated with a smart phone, so it is inexpensive, and it uses BLE (Bluetooth Low Energy), so it consumes less power.

The study [4] suggests a Raspberry Pi 2, GSM SIM900A, GPS Receiver, Live Streaming Video, and Extras-equipped smart intelligent security system for women. features. Some currently in use systems, like: An emergency app called VithU was inspired by the well-known Indian crime drama "Gumrah," which aired on channel [V]. The stun pistol delivers approximately 700,000 volts to the attacker's body while charging them with electric shock. Lithium-ion batteries power them. In addition to SMS and email options, the Facebook status update is the only unique feature of this fairly basic software. The suggested design includes a portable device with a band around the wrist that comprises of: Raspberry Pi2 is a line of single-board computers the size of a credit card. The Raspberry Pi foundation created a line of single-board computers the size of a credit card in the UK. The Broadcom BCM2836 system on a chip, which has an ARMCortxv7 900 MHz processor, is the foundation of this device. Up to June 2015, between five and six million Raspberry Pis were sold. GSM SIM900A is a specifically created type of modem that functions via a mobile operator's authorization just like a mobile phone and accepts a SIM card. These GSM modems are frequently used to connect to the internet and to send and receive SMS and MMS messages. In Finland, these were initially made available in 1991. The SIM900A is a fully functional Dual-band GSM/GPRS module in an SMT type that was primarily created for the Chinese market. In Finland, these were initially made available in 1991. The SIM900A is a full Dual-band GSM/GPRS module in an SMT type that is primarily intended for the Chinese market. It benefits from compact dimensions and affordable solutions. GPS Receiver: Designed by the US Department of Defense, this module continuously collects data from satellites and delivers it in a corresponding manner to RS232. This module is intended to streamline the integration process for embedded systems and can support up to 51 channels. Live video streaming is accomplished by combining Wi-Fi, a Logitech C270 webcam, and the motion software on a Raspberry Pi 2 Model B. So, we may either see the live streaming video or save it. Extra Features—The main component of this feature is a tear gas mechanism that can be integrated into one side of the eyewear.

A 3v electromagnetic buzzer is used to yell for assistance during shrill alarm. Thus, wristbands and eyewear are used in all of these proposed systems. similar to GPS and live video streaming.

The study [5] suggests a design for a bracelet that offers women safety. The band features a transmitter made up of an Arm7 microprocessor, which is coupled to a power source (battery), temperature sensor, motion sensor, heartbeat sensor, GSM, GPS, and panic button. This band has two methods to get started. The location of the victim is first tracked using a GPS module when a threat is present, and then it is sent to the preset contacts with an emergency help message to the receiving end, which consists of a Raspberry Pi model or a laptop/PC that needs an internet connection to receive data from the transmitter, so that assistance can be given. Second, if a threat occurs that causes her entire body to be frozen, the motion sensors come into play. The sensors continuously relay their readings to the microcontroller, which compares them to the threshold values. If the sensor value is higher than the threshold value, an automatic help message is generated and sent to the receiving end along with the GPS location so that the contacts can assist the victim. This band is wearable and compact in size.

A mechanism for women's security is suggested in the publication [6]. In this system, there are two parts: the transmitter, which includes an emergency key, a microcontroller, an LCD, a GPS receiver, a GSM receiver, and a buzzer, and the receiver, which is the mobile phone. When a threat materialises, this system can be turned on by depressing the emergency key. By depressing the emergency key's trigger, two things happen. First, the microcontroller receives the latitude and longitude values from the GPS module and sends them via SMS through the GSM module to the registered mobile phone and to the control room. Second, it simultaneously shocks the threat with electricity. This method activates the buzzer, which is utilised as an alert.This system's buzzer is used to inform anyone nearby the victim that something is wrong and that assistance is required. The buzzer is activated when something goes wrong. The LCD is only used to display information or message updates, such as delivery alerts. This system uses a microcontroller, which reduces power consumption and increases efficiency. The gadget is portable, simple to use, concealable in a purse, and it gives one a sense of security. This device has a buzzer to change the environment and sends messages to the registered contacts.

Women's empowerment is the application that the paper [7] suggests. The smart phones can be installed using this application. Three modules make up the majority of this application: Women's Health (WH), Violence Against Women (VAW), and Emergency Call System (ECS). The user simply needs to sign in once to access the aforementioned choices. The VAW includes many legislation that pertain to women. Users can readily access criminal law information and make informed decisions to prevent crimes, which promotes women's awareness. It offers a few cell phone numbers for lawyers and NGOs that the victim might call to obtain justice. Breast cancer, breastfeeding, exercise, nutrition, HIV/AIDS, mental health, pregnancy, immunisations, and other topics pertaining to women's health are all included in WH.When users are in danger, they simply need to press a specific button, and the system will perform three successive actions calls and sends a text message to a previously saved number. It also sends the user's location via text message using the Global Positioning System (GPS). The benefit of this app is that, unlike many other apps, it not only sends the location of the victim to his or her family members but also assists in educating women about the laws and health issues.

III. DRAWBACKS IN EXISTING DEVICES

In paper [1] the device/application FEMME can be improved and usage increased by making the product small enough to be used as a watch or even a pendent. There may also be voice keyword recognition, which will cause the device to send an emergency message to the pre-programmed contacts.

In paper [2] the device can be made more useful by including any defence element in the device as a backup option to protect oneself if help is delayed.

According to paper [3] the smart band should also be capable of producing an alarm or buzzer sound, which can be used to draw public attention and help provide justice.

In paper [4] the proposed device is portable, has SMS capabilities, screaming sensors, and a defence element, thus meeting almost all needs. It can be improved by adding a few more sensors, such as pressure sensors and detection of hidden cameras.

In paper [5] the device can be made more useful by adding any alarm to alert the victim's surrounding areas as rapid protection can be provided to the victim as the Internet cannot always be relied on.

In paper [6] the device can be made more effective by adding a recording system to record the incident, which can help the victim get justice, or by adding sensors to activate the device automatically when in danger.

In paper [7] in addition to all of the features present, there may be a defence element that enables women to deal with the threat without having to rely entirely on others to come and rescue her.

IV. PROPOSED SYSTEM

We are working on creating a prototype of a smart device that can be worn on the wrist by anyone. The band is always on; the victim only needs to press the button when she needs it or believes someone is abusing her. The device will begin sending the current latitudinal and longitudinal co-ordinates to the ICE contacts and the police control room after you press on the button.After the device is activated, two nodes at the top of the band will emit an electric current whenever they come into contact with any surface. Leakage current is used to generate the current. The device and the smartphone are linked via Bluetooth, which is in charge of overall data sharing and connectivity. The device's heart is Arduino, which controls the entire device prototype.In this case, we're using a 9V power supply. Following regulation, a 5 V supply is provided to the microcontroller. Bluetooth is used to connect the hardware to the smart phone. It is activated when the switch is opened and delivers an electrical shock via physical contact that is not lethal but painful. This assists the victim in dealing with the distressing situation.

The AVR microcontroller that is used is the device's brain. The serial port is used to connect the GPS module to the microcontroller. The software serial port connects a Bluetooth module to the microcontroller.

There are two buttons attached to the microcontroller. The taser and the panic buttons. When the panic button is pressed, the microcontroller uses the GPS module to determine the user's current location, which is then sent to recipient numbers (family/authorities) via the Bluetooth module. We can include as many recipient phone numbers as we want. Every 5-10 seconds, an SOS message will be sent to all of the numbers entered. When you press the taser button, the microcontroller activates the relay, which activates the high voltage electric generator. The high voltage generator produces 400kv. This causes a shock to the attacker, knocking him down for a few minutes without causing any fatalities.

A. *Advantages*

1) It is simple to use and can be used by children, teenager girls, elderly women, or elderly men.
2) Small in size.
3) Environmentally friendly system.
4) For remote information, send an alert message to your phone.
5) Used as legal evidence of a crime with precise location information for prosecution.

B. *Applications*

1) The proposed system can be used to improve the safety of women, children, and the elderly.
2) Women and children can use it for self-defense, and tourists can carry it for protection while exploring new and unfamiliar places.

V. COMPONENTS

1) *Arduino:* Arduino is a tool for creating computers that can sense and control more of the physical world than your desktop computer. It is an open-source physical computing platform based on a simple microcontroller board and a development environment for writing software for the board. The Arduino Uno will be used in our project. The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analogue inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It includes everything needed to support the microcontroller; simply connect it to a computer via USB or power it via an AC-to-DC adapter.
2) *Bluetooth Module:* Bluetooth is a specification for a small form-factor, low-cost radio solution that connects mobile computers, mobile phones, and other devices.It will allow users to easily and quickly connect a wide range of computing and telecommunications devices without the need to buy, carry, or connect cables. We are using Bluetooth Module to connect our device to our mobile device.
3) *GPS Module:* GPS receivers use a constellation of satellites and ground stations to compute position and time almost anywhere on earth. It consists of six wires out of which three wires are used for connection. The blue wire is the transmitter wire which is connected to the 15th pin of the microcontroller. Voltage supply is about 3.3V to 5V.When trigger button is pressed, GPS starts receiving signals from 8 satellites out of the 24 satellites in the orbit. Once if the connection is established the latitude and longitude values of the current location are obtained. The GPS acts as a transmitter. The 5V supply is given to the GPS from the microcontroller.

4) *Shock Generator:* In a situation where there are few or no people around, a woman must be able to protect and defend herself while also causing trouble for the abuser through simple means. The self-defense unit is made up of shock generator devices that deliver an instant electric shock, which when used by the woman can immobilise and injure the attacker. The circuit is made up of three major stages. Power Supply The oscillator
5) *Voltage amplifier:* When the battery is fully charged, the voltage is applied to the oscillator stage. The transformer increases the frequency of the oscillating signal, acting as a type of inverter. The transformer's output is then transferred to the capacitors, where the current is stored and later used to electrocute the attacker.
6) *Android Application:* In this system, an Android application is used to find the location and send it to the group of people stored in the phone. This app is linked to the device via Bluetooth, and when the user turns on the device, all modules are launched simultaneously, and an emergency SMS is sent immediately to the nearest police station, volunteers, and her family. The GSM module will perform the location update. This app's interface is so simple for users to use that all users need to do is register through the app and simply add those contacts to whom the user wants to send information.

VI. FEATURES AND FURTHER DEVELOPMENT

This paper is an attempt to create an effective self-defense device that will protect women in the event of an attack or unwanted contact. The main benefit of this product is its simplicity as well as its low cost. Effective and practical tool for women travelling alone. This has increased women's confidence in their safety. If the phone is lost or misplaced, this can also be used as a digital clock and phone locator. The model evolves from easily accessible and relatively low-cost components.This work is low-cost, productive, and efficient. There is, however, always room for improvement. Some enhancements can be made so that performance can be expected to improve without requiring a change in the existing design. This time around this app is only available for Android smartphones. As a result, it can be improved by making it compatible with any operating system. It can be modified as a spot and a small camera, warning aid for children, the elderly, and so on, embedded in the system to record the crime and serve as the attacker's identity. system is possible .It is further developed by adding sensors to detect fear and anxiety, allowing for automatic response.Including a voice recognition system for access will aid in performance.

VII. CONCLUSION

The proposed design will address critical issues confronting women and contribute to their resolution by utilising cutting-edge tools and concepts. The effectiveness of this device is undeniable, as it only provides protection through a self-defense mechanism. Crime against women can now be eliminated with the proper systematic implementation of the proposed model.

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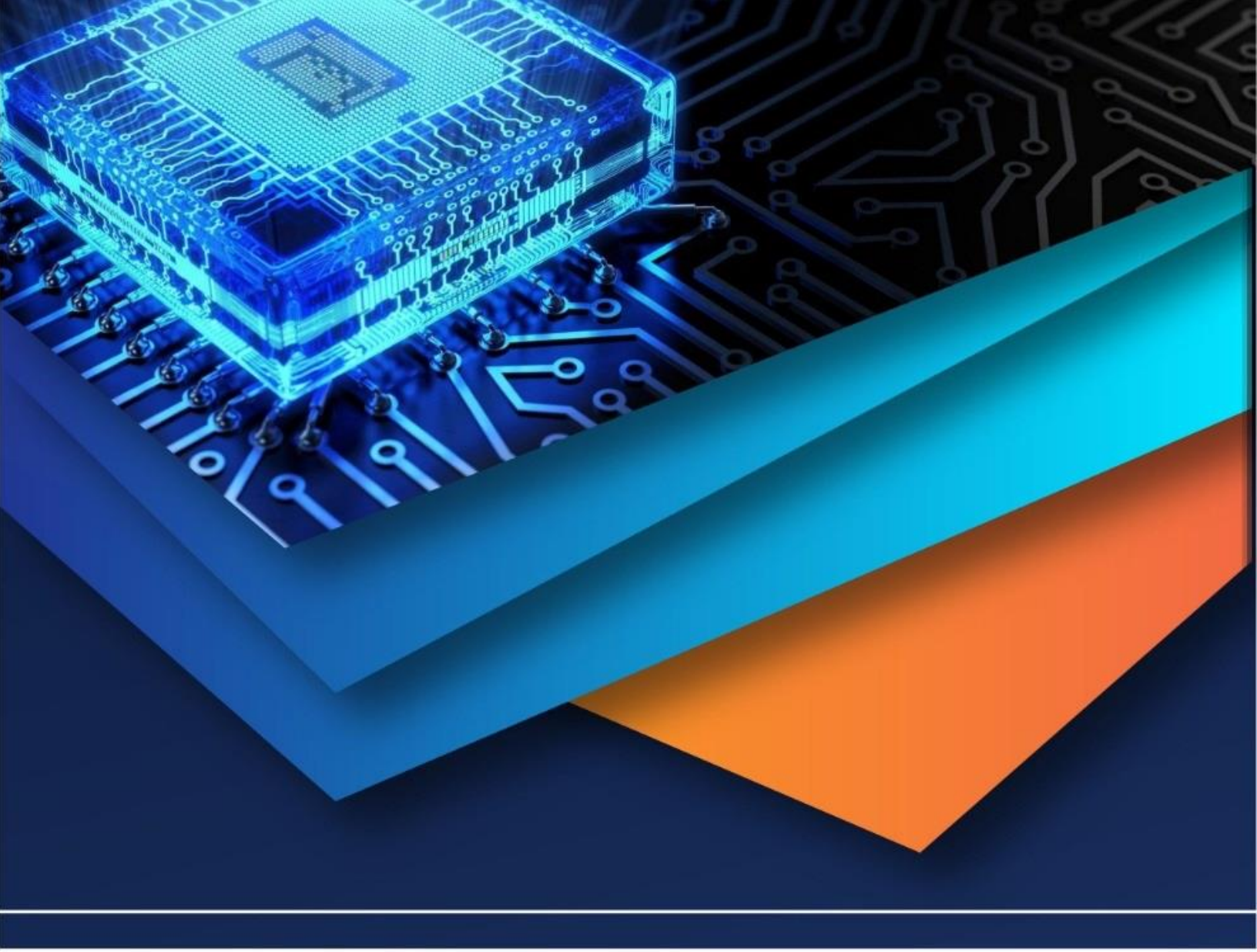

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