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# Design and Development of E-Jacket for Women's Safety

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**ABSTRACT:** In today's world, women's safety has become a major social concern in society. This paper intends to present an integrated combination of wearable jacket and mobile technology for the safety of women in society. This technique helps in alerting the family member and people near the victim using GPS and WIFI module, buzzer and LED module. Upon activation of the system, a GPS module receives the victim's current location and sends an emergency alert message to a registered contact using the WIFI module. LED modules and buzzers are used to catch the stress of bystanders and attackers off-guard. The main advantage of this system is that the user does not need a smartphone unlike other applications developed earlier and furthermore, the system considers a time action gap that helps the victim to escape immediately.

**KEYWORDS** – LED, WIFI, women's safety, wearable jacket, GPS,

## I. INTRODUCTION

In the global scenario, the main question in every girl's mind is her safety and harassment issues. The only thought that haunts every girl is when they will be able to freely roam the streets even at odd hours without worrying about their safety. This project proposes a new technology to protect women. This project focuses on safety for women so that they never feel powerless. The women's safety jacket allows for immediate response and mainly focuses on different parts to protect women in emergency, the first is to provide immediate protection to the user with an alarm sound using a buzzer. In the second part, the user can send real-time location to pre-defined numbers using GPS. Bluetooth transmits data serially. The main objective of the design of this jacket is to implement a simple, reliable, comfortable and easy-to-carry device with generous functionality for women, which allows an immediate response in case of harassment or attack and provides protection at an affordable price that can be easily borne by ordinary users. The proposed system is to design a portable device that resembles a regular jacket. It consists of WIFI microcontroller, WIFI/GPS modules, screaming alarm, LED modules and emergency switch. The prototype contains two independent systems controlled by a switch.

When the switch is pressed, the device will be activated, the victim's location will be tracked immediately using GPS, and an emergency message along with the latitude and longitude value will be sent every minute to the saved contacts with updated location. At the same time, the LED module will be activated along with the screaming alarm unit. The LED module consists of high-intensity LEDs connected in series that emit a flash that causes the attacker to lose turning for a few seconds while the alarm emits sirens to call for help. After pressing the second switch the coordinates that can be used to find the exact location using GOOGLE MAPS.

## II. RELATED WORKS

In [1] Cloud based Smart Mobile Application for Women Safety - Women face numerous difficulties in today's competitive environment, including abuse. Women's safety has become a serious concern as the amount of crime against women and girls continues to increase. The government has undertaken several proactive steps to prohibit such unethical acts, but they've had little effect on the rising number of such offenses and have remained unchanged. As a solution, in this study, a wearable smart device combined with numerous sensor devices and a microcontroller is used in conjunction with an android-based phone app with a model employs that alerts and provides location-based intelligence. The smart wearable device proposed consists of a series of sensors such as temperature and pulse sensors which send the input signals to the microcontroller which is integrated with GPS and GSM modules. When the sensors send in signals which indicate that the user is in distress or trouble the GSM module connected with the Wi-Fi module sends a message to relatives and calls the nearby police station through a mobile app designed for this device. The GPS integrated with the microcontroller sends the location details through the mobile app. The proposed model's primary

goal is to offer women safety in public locations, and the key advantage of this proposal is that this gadget is compact enough to be worn anywhere.

In [2] Safety Solution for Women Using Smart Band and CWS App - Women endure a lot of sexual harassment these days which is becoming alarming day by day. The situation is extremely serious in developing countries as well as underdeveloped ones. Consequently, it poses a significant challenge to women's empowerment as well as to a country's budgetary growth. In this project, we are advancing an IoT device along with an android app that can make women's movement safer. Women can get swift and supreme safety support by pressing the device's emergency switch. If any incident occurs, this device can track the user's location in real-time and send it to the nearby police box and volunteer. The user can also get location of the nearest safe zone by this device as well. In addition, this device functions in both online and offline mode. If there is no internet available, the user can still use the device to access the nearest police box and volunteer support. The device consists of Arduino nano, GPS, GSM, Bluetooth, etc. The aggregate of all these elements collectively offers this device to be affordable and easy to navigate

### III. PROPOSED SYSTEM

Concept diagram of the proposed system. When the user is attacked, they can press a button on the right sleeve to activate the defense mechanism, send an SOS and sound the alarm. Also the system records the user's GPS location when the button is pressed.

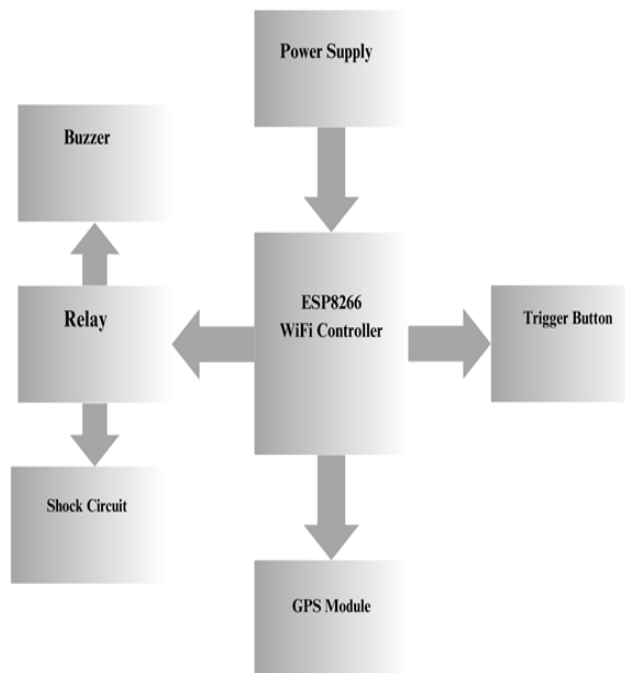


Figure 1: Block Diagram

Application design and implementation is the stage in the Application engineering process at which an executable application system is developed. Application design and implementation activities are invariably inter-leaved. – Application design is a creative activity in which you identify Application components and their relationships, based on a customer's requirements. – Implementation is the process of realizing the design as a program. The proposed system is to design a portable device which resembles a normal jacket. It consists of WIFI microcontroller, WIFI/GPS modules, screaming alarm, LED modules and emergency switch. The prototype includes two independent system controlled using switch. When switch is pressed the device will get activated, immediately the location of the victim will be tracked with the help of GPS and emergency message along with latitude and longitude value will be sent to stored contacts every one minute with updated location. Simultaneously the LED module along with the screaming alarm unit will be activated. The LED module consists of high intensity LED's connected in series that will let out a flash which will make the attacker lose his veering for few seconds, while the alarm will send out sirens to call out for help. When second switch is pressed coordinates which can be used to find exact location using GOOGLE MAPS. The

project is powered by a 12V DC power supply, it consists of atmega8a microcontroller which is a 24 pin IC. The circuit consists of two switches which functions differently to give different output and activate the circuit. The circuits include GPS, LED and buzzer. The GPS module is connected to the RX pin of the microcontroller through its TX pin and sends the location via the GSM module .The GSM module which is connected to the TX pin of the microcontroller through its RX pin. The output devices include the LED module and the buzzer .The is used to show the longitude and latitude value which is not the part of end product. The two LED modules and the buzzer are used to grab attention of nearby people and throw the attacker off-guard. When switch one is pressed all these feature i.e. location , LED modules and the buzzer start working simultaneously, and when switch two is pressed only the location is send to the emergency contacts.

**Arduino IDE:** Arduino IDE is software which is used for program the controller ESP38266 using Embedded C language.

**Blynk App:** We are using the Blynk App. that has its own IOT Cloud and all the Data can be sent and received using the App. Blynk is an IOT platform for IOS and Android smartphones that is used to control Arduino, Raspberry-Pi and Node MCU via the internet.



Figure.2 Proposed System

## MAIN COMPONENTS

### The hardware parts of the project include

- ☐ Power Supply circuit (consisting of Diode, Capacitor, Voltage Regulator and Battery)
- ☐ Buzzer connected to Microcontroller (AT89C2051)
- ☐ Emergency Switch and Strain Wire connected to Microcontroller
- ☐ ESP8266 WIFI module
- ☐ E-Jacket
- ☐ Android Phone to connect mobile with the hardware part of the Jacket through Wi-Fi Module.
- ☐ GPS Module

### Battery: -

- ☐ Constant 9v Output
- ☐ Easy to install and
- ☐ Product name: 3.3 to 5V Active Buzzer Alarm Module Sensor
- ☐ Transistor drive module uses 8550
- ☐ With Fixed bolt hole-easy installation-2.6mm aperture.
- ☐ Operating voltage 3.3V-5V
- ☐ PCB Dimensions: 34.28(L) \* 13.29mm (W) \*11.5(H)
- ☐ ESP8266 WIFI Controller:
- ☐ Microcontroller: Ten silica 32-bit RISC CPU

☒ Xtensa LX106

**Relay**

- ☒ LED Indication of Relay ON.
- ☒ Direct input from 3-5V Microcontroller for relay control.
- ☒ Output terminal for relay contacts.
- ☒ Provision of 2×3 pin male header for wire connection.
- ☒ Powered from external 5V or from male header

**Other**

- ☒ Microcontroller: Ten silica 32-bit RISC CPU Xtensa LX106
- ☒ Operating Voltage: 3.3V
- ☒ Input Voltage: 7-12V
- ☒ Digital I/O Pins (DIO): 16
- ☒ Analog Input Pins (ADC): 1
- ☒ UARTs: 1
- ☒ SPIs: 1
- ☒ I2Cs: 1
- ☒ Flash Memory: 4 MB
- ☒ SRAM: 64 KB
- ☒ Clock Speed: 80 MHz
- ☒ USB-TTL based on CP2102 is included onboard, Enabling Plug n Play.
- ☒ PCB Antenna
- ☒ Heating Coil/Shock Circuit
- ☒ PTC Thermistor
- ☒ Shell Material: Aluminium
- ☒ Lead wire: Silicone Line
- ☒ Voltage: 12V
- ☒ Power: 30W
- ☒ Surface Dry Heating Temperature: 120°C

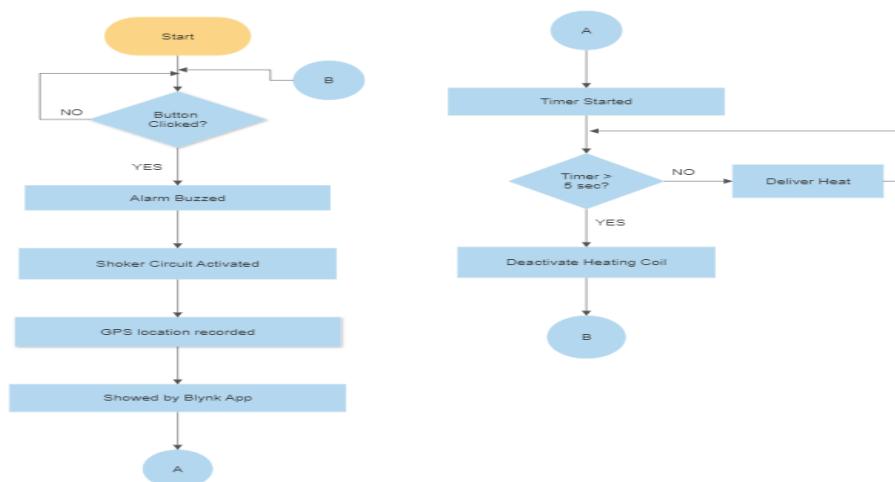


Figure 3. Flow Chart

The flowchart in Fig. 3 shows the working method of our project. If a person is in danger, he has to press the push button attached to the right hand glove. When the button is pressed, the shock circuit and the buzzer turn on

simultaneously. A small shock net is attached to the gloves on both hands of the jacket and when the victim is in danger he can put his hands forward in defence and the attacker will receive a continuous shock for 5 seconds. In this project a buzzer is used to alert people around the victim. GPS is also activated at the same time when the button is pressed and the victim's location coordinates are sent to BLYNK via GPS. As shown in the flowchart, the if button is. If not pressed the shock circuit and buzzer are deactivated preventing the victim from being shocked.

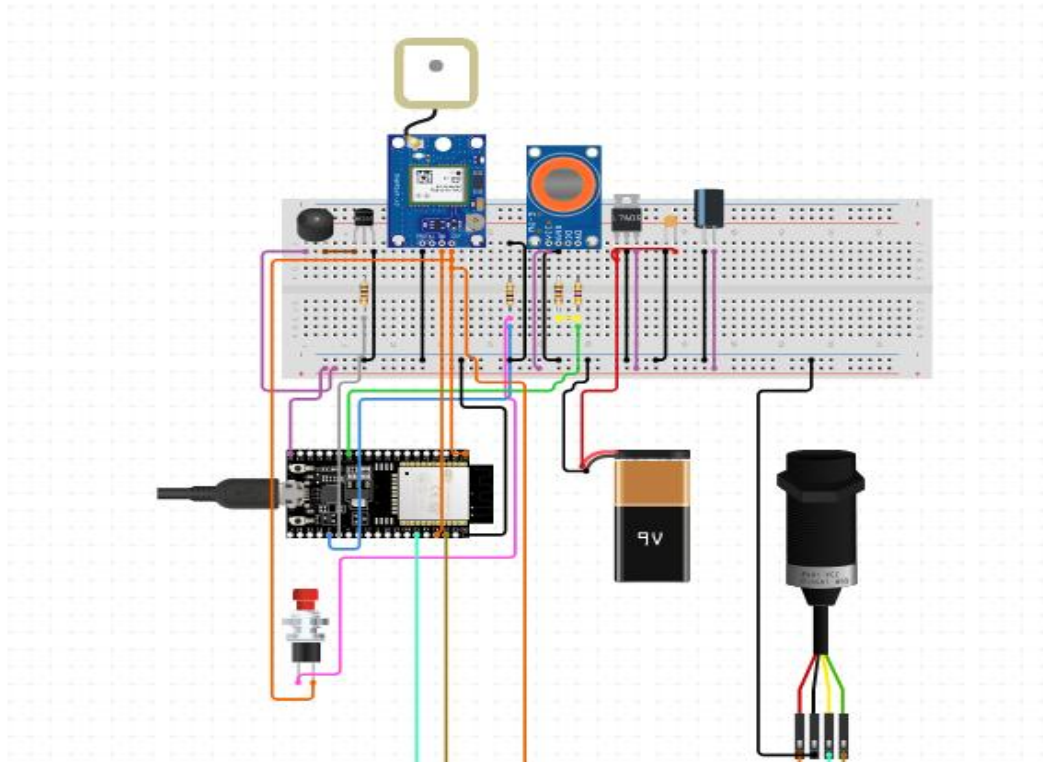


Figure 4. Circuit Diagram

#### IV. RESULT AND DISCUSSION

The proposed system is shown in Fig.2. The system circuitry is housed behind the jacket and the heating coil is placed outside. The ESP8266 microcontroller, GPS module and battery were placed on the back of the jacket to make the jacket more comfortable for the user to wear as shown in Figure 2. The circuitry is also protected from direct sunlight, user sweat and water as it is contained in the back of the jacket. A heating coil mechanism connected to the microcontroller through wires placed in the sleeves of the jacket. The heating coil mechanism is neatly and securely placed to prevent electric shock to the user when the jacket's safety mechanism is enabled. A button can be quickly pressed by the user to activate the system in case of a sudden attack. Once activated the gloves deliver a 230 V shock for 5 seconds

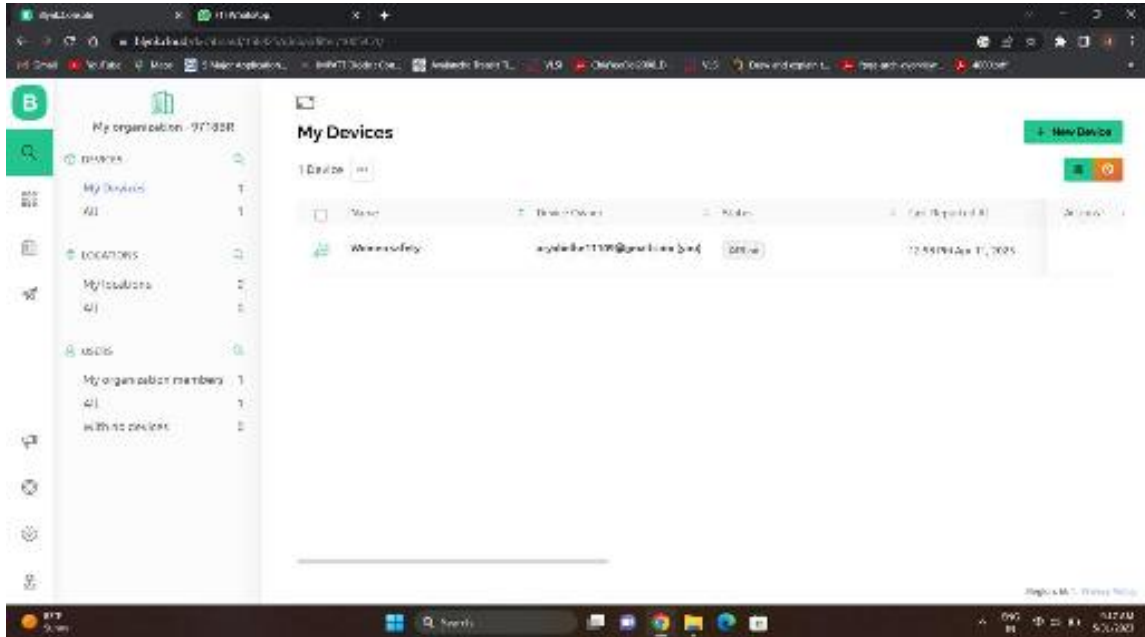


Figure . 5 Blank Result

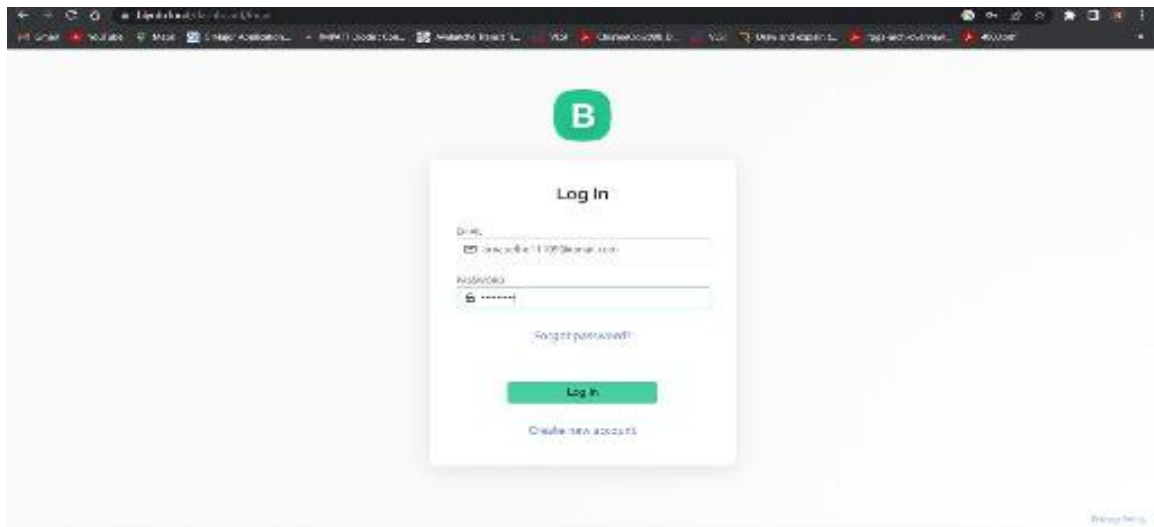


Figure 6. Login page

## V. CONCLUSION

The proposed design will help the girl when she is in the danger zone. She can defend herself in dangerous situations. And this circuit will be used by the girl to remove or reduce her tension when she walks alone at night, so that she never feels helpless in any situation and can protect her on her own. And the faces of the criminals will be captured by the camera so that the police can catch them easily. The proposed system is shown in Fig.2. The system circuitry is housed behind the jacket and the heating coil is placed outside. The ESP8266 microcontroller, GPS module and battery were placed on the back of the jacket to make the jacket more comfortable for the user to wear as shown in Figure 2. The circuitry is also protected from direct sunlight, user sweat and water as it is contained in the back of the jacket. A heating coil mechanism connected to the microcontroller through wires placed in the sleeves of the jacket. The heating coil mechanism is neatly and securely placed to prevent electric shock to the user when the jacket's safety mechanism is enabled. A button can be quickly pressed by the user to activate the system in case of a sudden attack. Once activated the gloves deliver a 230 V shock for 5 seconds



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