Women's Safety Device Using Nodemcu And Gps

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***Abstract* — Women's security has become a major social problem in today's world. We all recognize the need of women's safety, but we also need to think about how they should be safeguarded. This paper focuses on a security system that is solely meant to provide security to women in order for them to never feel helpless when faced with such social challenges. As a result, in this paper, we give a new perspective on how to use technology to protect women. It is critical to have some type of device that can be easily accessed and to associate women in difficult situations with trustworthy contacts such as family, friends, and police. We're designing a wearable smart band with a basic push button that, when pressed, sends an alert to the primary contacts via notification in an emergency. This band is made up of an ESP8266 microcontroller that is linked to a Wi-Fi network. Proteus and Blynk are the apps that were used in this project. To track the device's location, the system uses a Neo-6 GPS module with antenna as a GPS tracker. The main controller that connects the GPS tracker and push button to the Blynk app is NodeMCU which is replaced by Arduino Uno.**

When a person is in an emergency, they press the device's switch, which causes the buzzer to sound, acting as an alarm system. The Blynk app is used to track a user's location and send a blynk notification to the registered contacts.

Keywords -Women Security, WIFI, IoT, NodeMCU, Arduino, Blynk, GPS tracker, Buzzer

I. INTRODUCTION

Women's safety in today's world, particularly in India, is in jeopardy. C rimes, such as harassment, molestation, eve-teasing, rape, kidnapping, and domestic violence, are not declining but rather increasing at an alarming rate. To develop the best solution to this situation, proper measures should be taken. This project proposes a smart wearable for women's safety that is based on the Internet of Things. We can conclude that the device we require should be wearable and accessible 24*7 because we never know what obstacles will arise. Because we use bands in our daily lives, an IoT-based band is one of the best choices. The band includes an emergency button, for which we selected the ESP8266 microcontroller. If a person feels unsafe in their surroundings, they can press the button right away. The band activates when the button is pressed, and it takes an action. This project includes features such as: the buzzer emits a loud sound within seconds, alerting people nearby and alert notifications will be delivered to the contacts that have been pre-defined (like parents, friends, etc.)

II. RELATED WORKS

A. *Problem Statement*

To develop a device for the safety and protection of women and girls. Today in the current global scenario, women feel less secure to go outside. They are facing so many consequences in this independent world. Here, we are focusing on a scenario where the women walking alone in the road faces harassment during day or night time.

B. *Research Contributions*

Using the existing technology, we can build much effective and cost-efficient device for the safety of women. From the literature survey, it is observed that the researches have focused on designing safety devices that cannot be physically worn and fail to track the real time location.

In [1] this paper, they have created a device containing three push buttons are used to define the different sorts of accident victims. A PIC16F887A microcontroller is used to control the entire system. Because it is a 40-pin IC, the device increases in size, making it difficult for women and children to carry all of the time. In [2] this paper proposes a jacket which has an electronic system built in it. Though they used Raspberry Pi 3, GPS, GSM and buzzer but practically it is not feasible to wear an electronic jacket. It will be heavy to wear and the most important factor is that even if it says the jacket is safe to wear still there are chances of getting electrocuted if it has contact with water or the circuit fails due to some technical reason. This system is unsafe to wear all the time. In [3] this paper, they have created a device where they use a voice recorder which has a pre-recorded sentence "Help I am in danger" by the user. The drawback is that the GPS and GSM can only be activated if the exact sentence is matched and clearly heard. This can create an obstacle. In [4] this paper, the authors have created an android app named "Attack App". Though this app will inform about her situation to her emergency contacts, it can only be triggered when the victim unlocks her phone, opens the app and clicks the panic button. This process is too long in the case of an emergency which cannot be beneficial for the victim.

III. METHODOLOGY

As per the problem statement mentioned in the previous section, a wearable Smart band is designed. The initial process started with selecting the components for the safety band, keeping in mind that it should be cost-effective and easy to wear. We also kept in mind that device easy to wear all the time. Accordingly, microcontroller, GPS and Buzzer were finalized. Testing of individual components was carried out, and then it was assembled as a wearable band.

A. Component Selection

As per the women safety device design and other system requirements the hardware and software components are finalized as follows-

Hardware Components –

1) *Node-MCU ESP8266 IoT Module*: The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network.

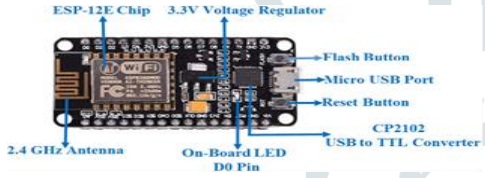

Fig 1. Node MCU

2) NEO-6MV2 GPS: A u-blox NEO-6M GPS chip is at the heart of the module. It can track up to 22 satellites on 50 channels and reaches the highest level of sensitivity in the industry that is -161 dB tracking, while consuming only 45 milliamps mA from the power source. Unlike other GPS modules, it can update its location up to 5 times per second, with a horizontal position precision of 2.5 m.

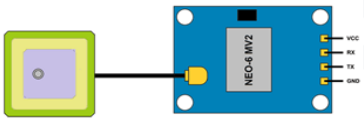

Fig 2. GPS

3) Active Buzzer Module: Active Buzzer Arduino module produces a single-tone sound when signal is high. The Active Buzzer module consists of a piezoelectric buzzer with a built-in oscillator. It generates a sound of approximately 2.5 kHz when signal is high. Operating voltage is 3.3V-5V.

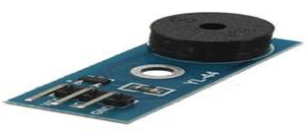

Fig 3. Buzzer

4) Push Button: The mechanism of the push button is that two points are touched when the button is pressed which activates the alert mechanism.

Fig 4. Push Button

Software Components –

1) Since the aim is to demonstrate the working of the system on a small-scale and it should be cost-effective. We have used the Blynk App, which allows quick and user-friendly interfaces to build, control and monitor a hardware system from any iOS and Android device.

2) Proteus Simulation Software is being used for the purpose of testing the sensors before actually testing it on the hardware.

3) Arduino IDE is being used for the code development of Node MCU & GPS. Before interfacing with Blynk App to Node MCU, they were tested with Arduino.

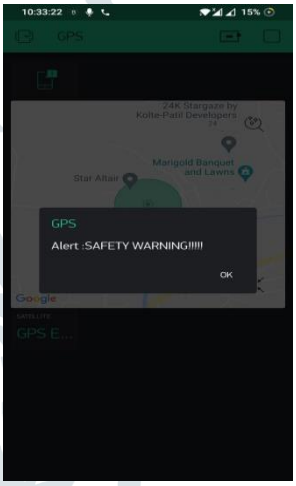

Fig 5. Blynk App

B. System Architecture

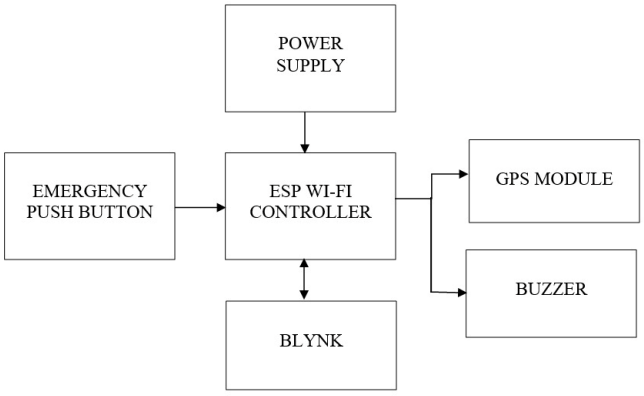

Fig 6. Block Diagram

The system consists of a buzzer, a push button, an ESP8266 Wi-Fi module, a GPS Module and a power supply. According to this safety device when a woman is in danger or in need of help then she will press the push button. When the push button is pressed, the device will get activated and then the two features will get on at a time first the notification will be sent with live location of current latitude and longitude of the women to her concerned emergency contacts through Blynk app and second the buzzer will get activated to alert the neighbors or nearby persons.

IV. IMPLEMENTATION OF THE SYSTEM

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A. *Flowchart*

The flowchart describes the control flow of designed system.

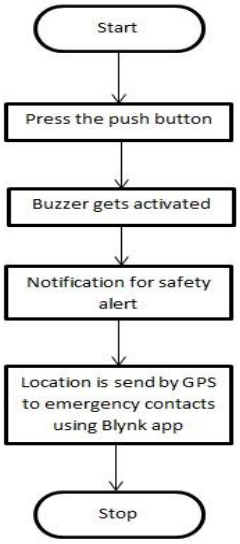

Fig 7. FlowChart

B. *Working*

This project creates a women's safety system that uses GPS module to provide current location details of women in danger. The victim's current location will be tracked by the device and updated in the Blynk app.

The device communicates with the phone via specifically created software that serves as an interface between the both. As seen in the block diagram, the device will be connected to smartphone and the information will be sent from CLOUD to the user.

The software directs the smart phone to conduct the following things in an emergency:

i. Sends a notification along with the live location to the emergency contacts. When the user moves from one location to another, it sends continuous location information.

ii. The buzzer makes a noise to catch nearby people's attention.

The victim must press the band's button. The hardware as well as software is set up in such a way that the GPS is used to detect the co-ordinates and monitor movement for easy tracking. This functionality is implemented by utilizing the user's phone's internet connectivity. The Control Unit gathers data from the software unit and the GPS receiver. The device will then deliver all of this data from the CLOUD to the user.

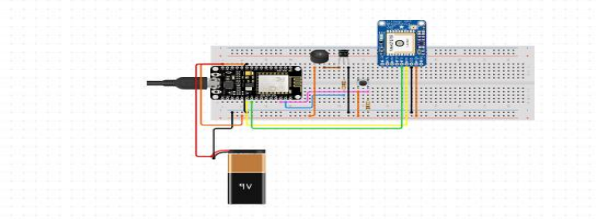

Fig 8. Circuit Diagram

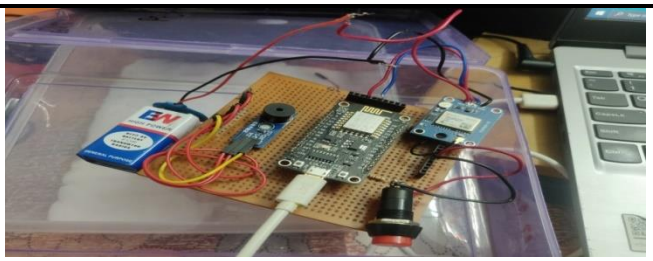

Fig 9. Actual Device

V. RESULTS & CONCLUSION

This project proposed the system for security of women. With the help of the safety band, they will be able to communicate and alert to the predefined contacts. When the button is pressed information of the user is collected by the sensors and then information will send to the predefined number along with calling. This system will helpful for speed up the monitoring for women safety by using the GPS tracking Mechanism. SMS will be sent to the pre-programmed numbers, and this will help to save the time and victim gets help without any loss of time.

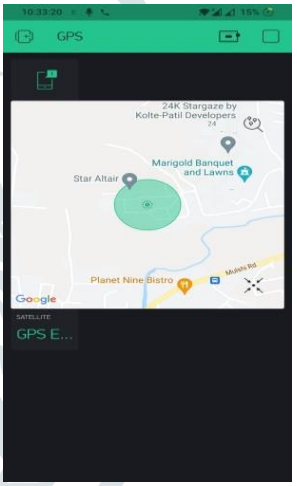

Fig 10. GPS Location on Map

VI. FUTURE SCOPE

The proposed system can be further developed with capabilities like recording audio, video of the culprit when the alert mechanism is activated which can be produced as a piece of evidence in the court. Future improvement includes direct contact to local authorities representative and allows access of device location for immediate action by police and related departments.

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