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Smart Safety Device for Women Using IoT

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Abstract - Women safety has always been an issue even in these modern times with so much advancement in Technology. Women come across many situations that make them feel unsafe. Women from various walks of life face situations that make them feel threatened in different environments. In such situations, the aid of a safety device that will inform the victim's family members or the authorities (in severe situations) may help women feel safer, confident and reduce the chances of harassment. Though there are a few Smartphones based solutions for the same, it might not be possible for the victim to reach for her phone in some situations without the knowledge of the perpetrator. In this project we are going to design a smart safety device using Node MCU, GSM and GPS modules to provide security to women so that they never feel helpless while facing such social challenges.

Keywords: Node MCU, GSM, GPS, Women safety.

1. INTRODUCTION

Women safety is always being an issue even in these modern times with so much advancement in technology women is not safe anywhere and are most vulnerable when travelling in to lonely roads and deserted places [1]. This system proposes a IoT based solution to address the problem of women safety and that overcome the shortcoming of existing devices [2].

Embedded means something that is attached to another thing and a system is an arrangement in which all its unit assemble work together according to a set of rules [3]. It can also be defined as a way of working, organizing or doing one or many tasks according to a fixed plan. An embedded system can be thought of as a computer hardware system having software embedded in it. An embedded system can be an independent system or it can be a part of a large system. An embedded system is a microcontroller or microprocessor-based system which is designed to perform a specific task [4]. For example, a fire alarm is an embedded system; it will sense only smoke.

The definition of the Internet of Things has evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity

sensors and embedded systems. Traditional fields of embedded systems, wireless sensor networks, control systems, automation and others all contribute to enabling the Internet of Things. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency and accuracy [5].

2. OBJECTIVE

The main objective of the Smart safety device for women is to provide security for women whenever she is out of her protected zone [6].

3. LITERATURE SURVEY

Safety device system is necessary to provide safety for the women. Many authors have worked on the safety device sending the data to the raspberry pi. With the suggested system, protection will be very high [7].

4 DESCRIPTIONS OF PROJECT PROPOSED SYSTEM

This is a system that is providing security for women.The building system has the security tools that can help women in trouble.By pressing the switch, the entire system will be activated then immediately the signals are sent to the NodeMCU ESP8266. It processes the signals and immediately the information is sent to the user.A GSM modem is interfaced to the NodeMCU ESP8266. The GSM modem

sends and SMS & CALL to the predefined mobile number with location of the victim using GPS and GSM [8]. The victim's place will be followed by GPS tracking to nearby family numbers and police stations [9].
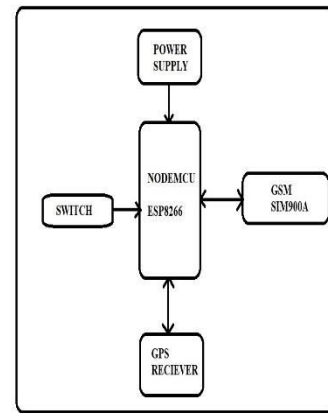

Fig: -System Architecture

HARDWARE REQUIREMENTS
NODE MCU ESP8266

NodeMCU was created shortly after theESP8266came out. On **December 30, 2013**,**Espressif Systems** began production of the ESP8266. NodeMCU started on 13 Oct 2014, when Hong committed the first file of NodeMCU - firmware to GitHub [10]. Two months later, the project expanded to include an open-hardware platform when developer Huang R committed the Gerber ile of an ESP8266 board, named devkit v0.9.

As Arduino. ccbegan developing new MCU boards based on non-AVRprocessors like the ARM/SAM

MCU and used in the Arduino Due, they needed to modify theArduino IDEso that it would be relatively easy to change the IDE to upport alternate toolchains to allow Arduino C/C++ to be compiled for these new processors. They did this with the introduction of the Board Manager and the SAM Core [11]. A "core" is the collection of software components required by the Board Manager and the Arduino IDE to compile an Arduino C/C++ source file for the target MCU's machine language [12]. Some ESP8266 enthusiasts developed an Arduino core for the ESP8266 Wi-Fi SoC, popularly called the "ESP8266 Core for the Arduino IDE". This has become a leading software development platform for the various ESP8266-based modules and development boards, including NodeMCU.
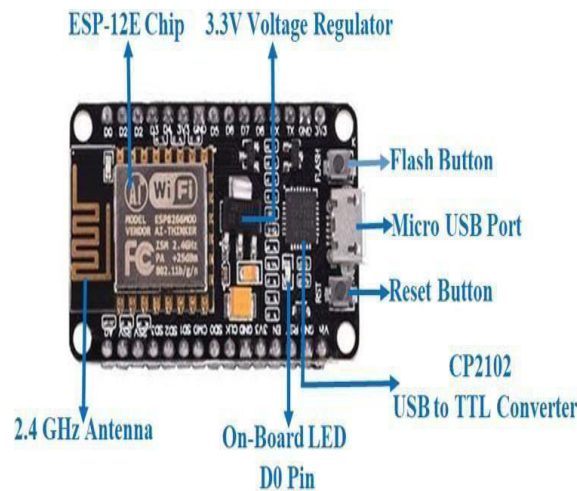

Fig: - NODE MCU

GSM MODULE

SIM900A GSM Module is the smallest and cheapest module for GPRS/GSM communication. It is common with Arduino and microcontroller in most of embedded systems.the module offers GPRS/GSMtechnology for communication with the uses of a mobile sim. It uses a 900 and 1800MHz frequency band and allows users to receive/send mobile calls and SMS. The keypad and display interface allows the developers to make the customize application with it. Furthermore, it also has modes, command mode and data mode. In every country the GPRS/GSM and different protocols/frequencies to operate. Command mode helps the developers to change the default setting according to their requirements.

Fig:- GSM MODULE

GPS

GPS receivers are generally used in smartphones, fleet management system, military etc. for tracking or finding location. Global Positioning System (GPS) is a satellite-based system that uses satellites and ground stations to measure and compute its position on

Earth. GPS is also known as Navigation System with Time and Ranging (NAVSTAR) GPS.GPS receiver needs to receive data from at least 4 satellites for accuracy purpose. GPS receiver does not transmit any information to the satellites. This GPS receiver is used in many applications like smartphones, Cabs, Fleet management etc.

GPS receiver uses a constellation of satellites and ground stations to calculate accurate location wherever it is located.These GPS satellites transmit information signal over radio frequency (1.1 to 1.5 GHz) to the receiver. With the help of this received information, a ground station or GPS module can compute its position and time.

Fig:- GPS MODULE

Push Button

A push-button is simply button is a simple switch mechanism to control

some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.

The "push-button" has been utilized in calculators, push-button telephones, kitchen appliances, and various other mechanical and electronic devices, home and commercial.

Fig:- Switches

**SOFTWARE REQUIREMENTS
ARDUINO IDE**

The Arduino Integrated Development Environment - or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

FIREBASE

Firebase is a Backend-as-a-Service (Baas). It provides developers with a variety of tools and services to help them develop quality apps, grow their user base, and earn profit. It is built on Google's infrastructure.

Firebase is categorized as a NoSQL database program, which stores data in JSON-like documents.

Firebase evolved from Envolve, a prior start-up founded by James Tamplin and Andrew Lee in 2011. Envolve provided developers an API that enables the integration of online chat functionality into their websites. After releasing the chat service, Tamplin and Lee found that it was being used to pass application data that weren't chat messages. Developers were using Envolve to sync application data such as game state in real time across their users. Tamplin and Lee decided to separate the chat system and the real-time architecture that powered it.Firebase's first product was the Firebase Real-time Database, an API that synchronizes application data across iOS, Android, and Web devices, and

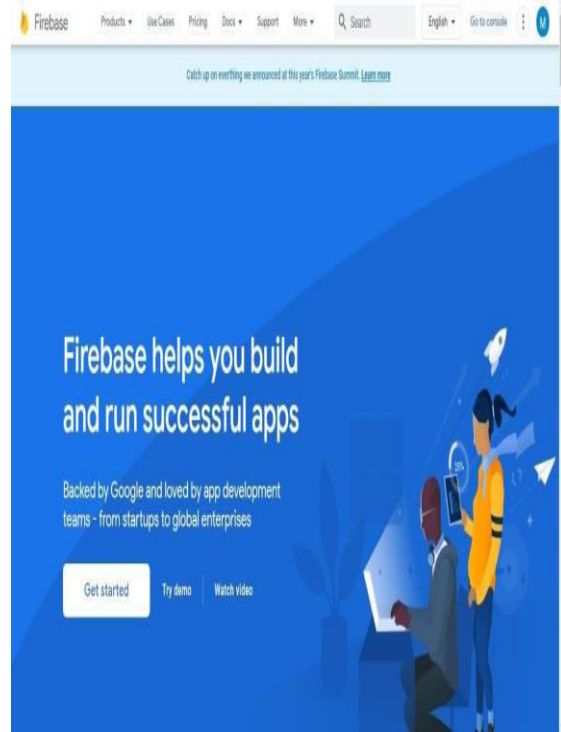stores it on Firebase's cloud. The product assists software developers in building.
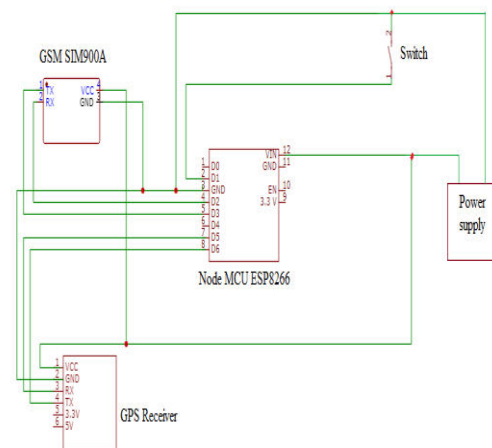

Fig:- Firebase

4.3 IMPLEMENTATION OF PROJECT

Fig :- Schematic Diagram

This is a system that is providing security for women.The building system

has the security tools that can help women in trouble.By pressing the switch, the entire system will be activated then immediately the signals are sent to the NodeMCU ESP8266. It processes the signals and immediately the information is sent to the user.A GSM modem is interfaced to the NodeMCU ESP8266. The GSM modem sends and SMS & CALL to the predefined mobile number with location of the victim using GPS and GSM. The victim's place will be followed by GPS tracking to nearby family numbers and police stations.

RESULT

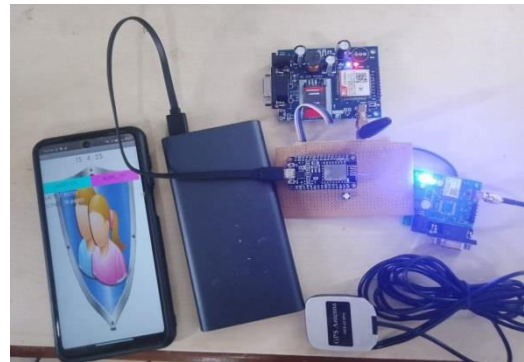Fig:- Device connected to Internet

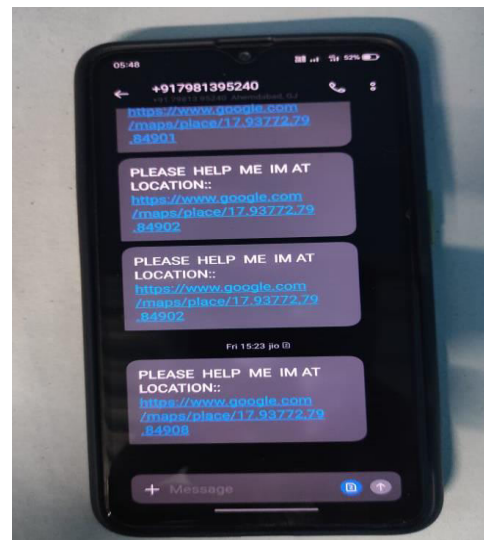Fig:- App Interface

Fig:- Power supply

Fig:- location of Victim

Fig:- Call from Victim

CONCLUSION

The proposed design will deal with critical issues faced by women and will help to solve them with technologically sound equipment and ideas.

The merit of this work is not only providing safety and is also provides security by means of self-defense mechanism.

The crime against the women can be now brought to an end with the help of real system implementation of the proposed model.

ADVANTAGES

➢ Sophisticated security
➢ Monitors all hazards and threats
➢ It can be used to prevent incidents
➢ Mobile number can be changed at any time

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