

Design and Implementation of Node MCU - Based Women's Safety Devices using GPS & GSM Modem

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Abstract— Though we are moving towards 21st century, still we are facing the critical issues on women harassment. So it is much needed to implement security systems for ladies. Various security systems has been implemented with variety of devices, till now. This paper discusses not only the real time issues happened about harassment of ladies but also explains how it can be overcome effectively. This systems consist of GPS, GSM & Node MCU. In which when any woman is critical condition then she will press the key and at that time Node MCU microcontroller start working. GPS trace the location of woman and with the help of GSM message will be send to the number which we are already registered in SIM. The proposed design will deal with critical issues faced by women in the near past and will help to solve them with technologically sound equipment and ideas. This paper may be used as supportive material for implementation of women safety system.

Keywords: GPS, GSM, Node MCU

I. INTRODUCTION

Women's safety is a very important issue due to rising crimes against women these days. To help resolve this issue we propose a GPS based women's safety system that has dual security feature. This device consists of a system that ensures dual alerts in case a woman is harassed or she thinks she is in trouble. This system can be turned on by a woman in case she even thinks she would be in trouble. It is useful because once an incident occurs with a woman she may or may not get the chance to press the emergency button. In a button press alerting system, in case a woman is hit on the head from behind, she may never get the chance to press panic button and no one will know she is in trouble. Here we are introducing an intelligent women security system to inform about an emergency situation faced by women to the authorized people. We are using the GSM technology for the intimation to allocate the women. A GSM modem is used to send the position of the women from a remote place. This security system can be provided to the women. A manual switch called the emergency switch is attached with our system. During an emergency situation the women can press this switch. If the emergency switch is pressed, the microcontroller controls the function of the GSM modem for the intimation to the concerned person via SMS. MCU takes the value of latitude and longitude from the GPS receiver and transfer it to the pre-programmed mobile number via SMS through GSM modem. GPS module trace the position of mobile number from which SMS was send. Our system solves this problem. This device is to be turned on in advance by a woman in case she is walking on a lonely road or some dark alley or any remote area. Only the woman authenticated to the devices can start the system by fingerprint scan. Once started the devices requires the woman to constantly scan her

finger on the system every 1 minute, else the system now sends her location to the authorized personnel number through SMS message as a security measure and also sounds a buzzer continuously so that nearby people may realize the situation. In this case even if someone hits the woman or the woman falls down and get unconscious, she does not need to do anything, the system does not get her finger scan in 1 minute and it automatically starts the dual security feature. This device will prove to be very useful in saving lives as well as preventing atrocities against women. Women all over the world are facing much unethical physical harassment. Women and girls experience and fear various types of sexual violence in public spaces, from sexual harassment to sexual assault including rape and feticide. It happens on streets, public transport and parks, in and around schools and workplaces, in public sanitation facilities and water and food distribution sites, or in their own neighbourhoods. This acquires a fast pace due to lack of a suitable surveillance system. So that our project is use to resolve this problem. The systems consist of GPS, GSM & Node MCU. In which when any woman is critical condition then she press the key and at that time Node MCU microcontroller start working GPS trace the location of woman and with the help of GSM message will be send to the number which we are already registered in SIM. We really believe that this endeavour will make a difference in the life of many and dream about seeing this world with individuals walking fearlessly. Security and safety are similar in concept; security in the organization is one of the most persistent problems that organization needs to address. Major consideration for security management is the organization's policy. GSM and GPS based tracking system will provide effective, real time person location, and reporting. This system works as the person having the tracking system which comprises of GPS technology, GSM technology and battery which is compatible for this system, also having the SIM with GPRS enabled facility from the person who wants their position would be able to see on Google earth live moving with the help of GPS technology and GSM technology.

The proposed design will deal with critical issues faced by women in the near past and will help to solve them with technologically sound equipment and ideas. While the society may or may not change for the enhanced, the power to be autonomous, self-assured and truly free can come with arming oneself with the best possible device.

II. BLOCK DIAGRAM WITH SUBSYSTEMS

The Block Diagram shows the complete working of the women's safety device using GSM & GPS Modem.

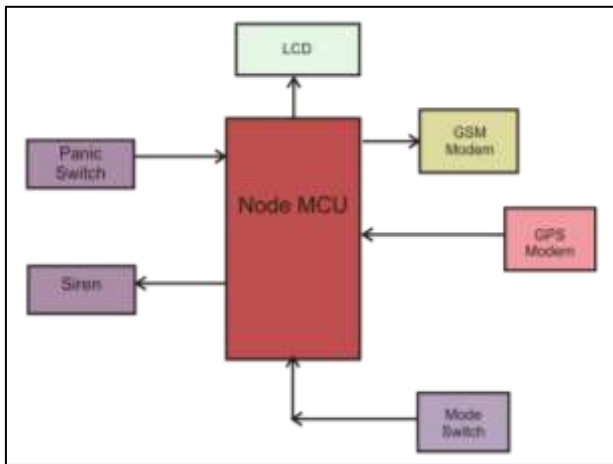


Fig. 1.1: Block Diagram

A. Node MCU:

Node MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi Sock from Empress if Systems, and hardware which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the Lau scripting language. It is based on the eLua project, and built on the Express if Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS.

B. GSM module

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.

C. Node MCU with GSM Interface:

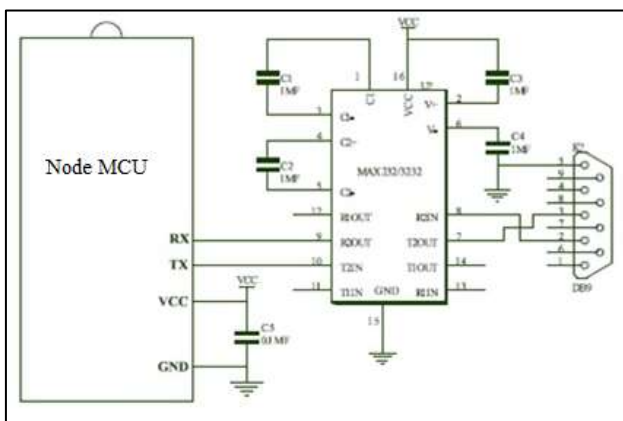


Fig. 1.2: Node MCU Interfacing with GSM

The interfacing of Node MCU with GSM module has been shown in above figure.

D. GPS Satellite

The GPS satellites transmit signals to a GPS receiver. These receivers passively receive satellite signals; they do not transmit and require an unobstructed view of the sky, so they can only be used effectively outdoors. Early receivers did not perform well within forested areas or near tall buildings but

later receiver designs such as SiRFStarIII, MTK etc have overcome this and improved performance and sensitivity markedly. GPS operations depend on a very accurate time reference, which is provided by atomic clocks on board the satellites. Each GPS satellite transmits data that indicates its location and the current time. All GPS satellites synchronize operations so that these repeating signals are transmitted at the same instant. The signals, moving at the speed of light, arrive at a GPS receiver at slightly different times because some satellites are further away than others.

E. GPS receiver

A GPS receiver is a device that is capable of receiving information from GPS satellites and then to accurately calculate its geographical location. A GPS receiver can retrieve from the GPS system location and time information in all weather conditions, anywhere on or near the Earth.

F. How Position Is Determined?

A GPS receiver "knows" the location of the satellites because that information is included in the transmitted Ephemeris data. By estimating how far away a satellite is, the receiver also "knows" it is located somewhere on the surface of an imaginary sphere centered at the satellite. It then determines the sizes of several spheres, one for each satellite and therefore knows the receiver is located where these spheres intersect.

G. How is the signal timed?

All GPS satellites have several atomic clocks. The signal that is sent out is a random sequence, each part of which is different from every other, called pseudo-random code. This random sequence is repeated continuously. All GPS receivers know this sequence and repeat it internally. Therefore, satellites and the receivers must be in synch. The receiver picks up the satellite's transmission and compares the incoming signal to its own internal signal. By comparing how much the satellite signal is lagging, the travel time becomes known.

H. Reset Switch:

A push-button or simply button is a simple switch mechanism for controlling 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, though even many un-biased buttons (due to their physical nature) require a spring to return to their un-pushed state. Different people use different terms for the "pushing" of the button, such as press, depress, mash, hit, and punch.

III. IMPLEMENTATION

By knowing various sub systems of this safety system, we are going to see how it can be implemented. A Node MCU which is heart of this system is kept with respective ladies in her bag or wallet. This Node MCU is having interfacing with GPS so as to detect accurate location. In addition with this, A GSM module is also interfaced to respective Node MCU. A switch is placed on cover side of Bag or wallet which is connected to Node MCU. The predefined phone numbers have been

already stored in the memory of Node MCU with the help of GSM module.

Once a Victim is feeling insecure she will immediately press the switch. A Node MCU is continuously monitoring whether the switch is on or off. Once ON position of switch is observed by Node MCU, it will make connection with stored Mobile number. A stored mobile will receive a message from respective lady that she is in trouble or feeling insecure. On the other hand Node MCU in accordance with GPS will deliver another message which contains exact location of respective victim. In this way by simply pressing a switch in trouble condition, exact location of victim can be identified. So she can be free from any type of trouble or insecure atmosphere.

IV. CONCLUSION:

The problem of the women safety is increased rapidly in this environment, so we have proposed as an effective Android application to prevent such type of the suspicious or natural disaster, by alerting the concern authorities using the android mobile phone which helps to stop such type of illegal activities and to trace the concern.

In this work implementation smart electronic system has been implanted using Node MCU, GPS, GSM etc. This electronic security system can be used as a tracking device to ensure women safety during travelling in various public transport vehicles such as cabs, taxi, auto rickshaw etc. This system can overcome the fear that scares every woman in the country about her safety and security.

REFERENCES

- [1] WOMEN SECURITY SYSTEM USING GSM AND GPS Ms.Sonali S. Kumbhar, Ms.Sonal K.Jadhav, Ms. Prajakta A.Nalawade ,Ms. Tamanna Y.Mutawalli in International Research Journal of Engineering and Technology (IRJET) Volume: 05 Issue: 03 | Mar-2018
- [2] Design and Implementation of Women Safety System Based On Iot Technology B. Sathyasri, U. Jaishree Vidhya, G. V. K. Jothi Sree, T. Pratheeba, K. Ragapriya in International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7 Issue-6S3 April, 2019
- [3] Women Employee security system using gps and gsm based person tracking by D.amala devi b.veeraswami nayak in international journal of professional engineering studies Volume VIII /Issue 4 / JUN 2017
- [4] One Touch Alarm for Women's Safety Using Arduino C. Priya, Ramya C, Befy D, Harini G, Shilpa S, SivaniKiruthiga B International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-6S, April 2019
- [5] Smart Security Device for Women Safety Manasa K.C , SubbaLakshmi SV, Sneha G, Sowmya SM, Shilpashreeyadav GC in International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS) Volume VII, Issue IV, April 2018.