

Design of Smart Safety Device for Women using IOT

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Abstract - The world is becoming unsafe for women in all aspects. The crime against women is increasing at a higher rate. The employed women are feeling unsafe due to increasing crimes. This paper proposes a quick responding mechanism that helps women during trouble. When someone is going to harass, she can just press the button and the location information is sent as an SMS alert to few pre-defined numbers in terms of latitude and longitude. The controller used is ATMEGA328P. It is interfaced with a push button, a GPS module, a GSM modem and a LCD Display (16x2). If the switch is pressed, the controller take the current location information from the GPS module and send those data to the predefined no. using a GSM modem. The program is developed in 'C' language. The proposed work aims at designing an IoT based safety device that relies on providing security to women by fingerprint-based method of connectivity to the device and alerting nearby people and police when a women is not safe. A mobile app is designed for women safety where safe locations from victim's current location will be shown on the map

Key Words: Women Safety System, GSM, GPS, Fingerprint Sensor, Arduino.

1. INTRODUCTION

As we know the present era is with equal rights, where in both men and women are taking equal responsibility in their respective works. Hence women are giving equal competition next to men in all fields; they are assigned works in both the even and odd shift. Every single day women and young girls from all walks of life are being assaulted, molested, and raped. The streets, public transport, public spaces in particular have become the territory of the hunters'. Because of these reasons women can't step out of their house. The only thought haunting in every women's mind is when they will be able to move freely on the streets even in odd hours without worrying about their security. In critical situations the women will not feel insecure or helpless if they have some kind of safety device with them. We propose to have a device which is the integration of multiple devices, hardware comprises of a wearable "Smart gadget" which continuously communicates with Smart phone that has access to the internet. The complete gadget also ensures to provide self-defense application which helps her to escape critical situations.

This system can be used at places like bus stops, railway stations, offices, footpaths, shopping malls, markets,

etc. The implementation of the smart gadget is basically split into two sections the first part ensures to capture the image of the Culprit the device get automatically triggered when there is a suspected motion in front of the camera, the device captures the image of the culprit and send it as an attachment to the concerned E-mail Id along with the location of the Victim. The captured image serves as the valid proof against the one who has committed the crime. The second section deals with defense application as we tend concentrate more on providing self-defense for the women in danger. By making self- defense as the first priority we make sure that occurrence of the critical situations are eliminated. The self-defense feature is capable of working in any of the circumstances either it may be with Internet as a Smart Pendant with LED flash that makes an alert call to the family, relatives via the cloud and also glows the led flash on the eyes of the culprit to make the vision blur when the attacker is at the shorter distance. Whereas Self-defense without Internet consists of Electric shock gloves, that is used to provide the electric shocks that diverts the mind of the culprit and reduce his excited state to commit the crime on women. These two factors form the combined self-defense application and help the victim to escape from the danger.

1.2. LITERATURE REVIEW

This section discusses the various works on designing safety devices for women.

Suraksha[2] is a stand-alone device which can be triggered in three ways either voice, switch, and shock/ force. Voice is the voice of victim. The device will recognize it and automatically send distress messages. Switch is a simple on/off trigger, and shock/force- whenever this device is thrown it will use force sensor to start functioning by giving the information of the location of the victim to her members of family and friends.

Poonam et al. [5] developed a safety device that uses an ATmega 328 microcontroller without any android application which makes it a stand-alone device. It uses GPS and GSM modules to track the location and then send it to the family members and friend, alerting them about the current location of the woman A self-defence women safety system [7] is proposed whichwhen triggered by a switch, automatically sends the location of the victim to their concerned one. In addition, the device will also play a prerecorded message using speech circuit to alert the surroundings.

The device (FEMME) [4] proposed by the authors has an android application. Its basic functionality is to send an SOS message, record audio and video of the whole incident as

evidence. It also has a module which detects hidden cameras using a radio frequency receiver, which collects/ detects electromagnetic waves that are emitted from the spy camera. Kumar et al.

[3] have proposed a device which is in a form of a wristwatch and works on the concept of GEOFENCE, which is a virtual boundary that triggers the application when the person is in a particular area. It also has the feature of two-way talk so that the victim may be able to contact her family or friends. The device also allows the woman to trigger a loud buzzer on the receiving side of the message even if their device is in silent mode.

SMARISA [6] is a portable device for women safety. It comprises of hardware components such as Raspberry Pi Zero, Raspberry Pi camera, buzzer and button to activate the services. It is activated by the victim by clicking the button. Upon clicking, the current location of the victim is fetched and the camera captures the image of the attacker which is then sent to police or predefined emergency contact numbers via the victim's smart phone.

A smart band safety device [1] that gets activated by tapping on the screen twice. Once activated, it sends the GPS location to the predefined contacts and police control rooms. It also has pulse rate sensor and temperature sensor to measure the pulse rate and body temperature of the person. The force sensor gets activated when the device is thrown and it sends the current location of the victim. A Piezo buzzer siren also gets activated. The two metal points on the top of the band screen emits electric current thus generating shock. Almost every existing hand held safety device for women requires human intervention for activating the device such as pressing the button or shake the device etc after sensing the danger. However, the proposed device relies on fingerprint-based method of connectivity to the device. The idea is that if there is no fingerprint verification on the IOT based device for a minute, then it will automatically alert nearby people and police.

2. PROPOSED SYSTEM

The fingerprint of the woman must be registered initially and it is used to activate the device. As soon as the device is activated by the woman, it starts caning the fingerprint of the woman for every minute. The time when no fingerprint is sensed by the scanner, the device will be triggered setting off a buzzer to alert the nearby public. As the device starts scanning the fingerprint only during emergency i.e., only when the woman sense some danger, the quality of the device is not affected. Moreover, the latitude and longitude data which is received by the GPS is delivered to both the LCD and the GSM modem which will forward the message to the woman's family/friends. Thus, even if she is knocked down from behind and is not able to trigger an alert, the device will automatically send an emergency message to all the contacts listed by the woman as ICE contacts (In Case of Emergency contact) regarding the current location of the woman. The design also encompasses an android application that provides an additional safety features as listed.

1. Group messages will be sent from the device as well as from the victims' phone using this application.

2. An audio recording will be done so that the victim can use it as proof against the perpetrator.

3. Safe locations from victim's current location will be shown on the map using mobile app so that women can reach to safe place from her current location.

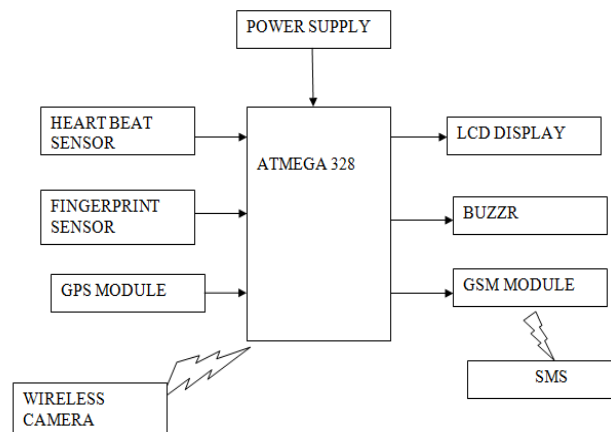


Fig -1: Block Diagram

2.1 Arduino UNO:

It is a microcontroller board developed by Arduino.cc and based on Atmega328. Arduino is an open-source prototyping platform in electronics based on easy-to-use hardware and software. Subtly speaking, Arduino is a microcontroller based prototyping board which can be used in developing digital devices that can read inputs like finger on a button, touch on a screen, light on a sensor etc. and turning it in to output like switching on an LED, rotating a motor, playing songs through a speaker etc.

UNO is based on ATmega328P microcontroller. There are two variants of the Arduino UNO: one which consists of through – hole microcontroller connection and other with surface mount type. Through-hole model will be beneficial as we can take the chip out in case of any problem and swap in with a new one. Arduino UNO comes with different features and capabilities. As mentioned earlier, the microcontroller used in UNO is ATmega328P, which is an 8-bit microcontroller based on the AVR architecture.

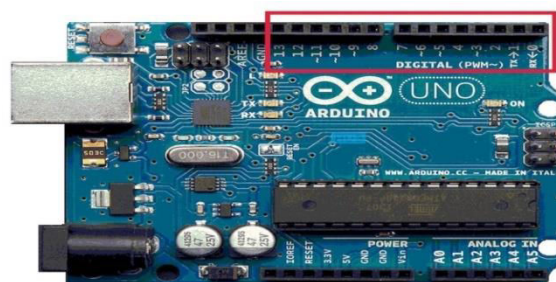


Fig -2: Arduino UNO

2.2 Fingerprint Sensor:

This is a fingerprints sensor module with TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with 3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC serial port. Optical biometric fingerprint reader with great features and can be embedded into a variety of end products, such as: access control, attendance, safety deposit box, car door locks

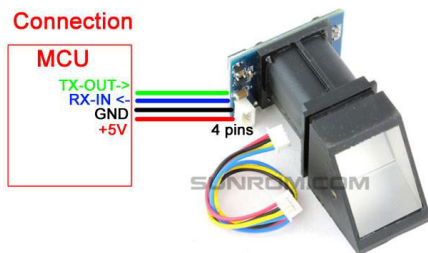


Fig -3: Fingerprint Sensor

2.3 GPS Module:

This is New Version (V2) of our famous GPS Receiver with Antenna (5VTTL Serial) , with 4pin 2.54mm pitch Berg strip connector option. It is made with third generation POT (Patch Antenna on Top) GPS module. The on board 3V3 to 5V level convertor enables us to directly interface with normal 5V Microcontrollers. Its low pin count (4Pin) will make it easy to interface and it is bread board friendly with 2.54mm (0.1") Pitch connector pads. The 4 Pins are 5V, TXD, RXD and GND. Yes, there is no setting required, just plug in to the power (5v), your raw data (NMEA0183) is ready at TX pin!. This is a standalone 5V GPS Module and requires no external components .It is built with internal RTC Back up battery. It can be directly connected to Microcontroller's USART.



Fig -4: GPS Module

2.4. GSM Module:

This GSM modem has a SIM800A chip and RS232 interface while enables easy connection with the computer or laptop

using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manager of the USB to Serial Adapter. Then you can open Putty or any other terminal software and open an connection to that COM port at 9600 baud rate, which is the default baud rate of this modem. Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands.



Fig -5: GSM Module

2.5. LCD display:

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

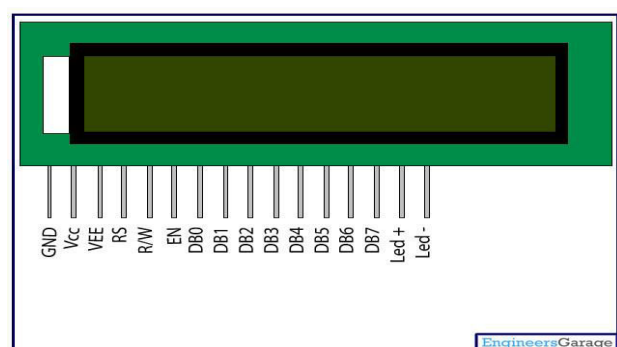


Fig -6: LCD Display

2.6. SOFTWARE REQUIREMENTS:

A. ARDUINO IDE: It is a product, which is utilized for Arduino uno board associations into a framework and furthermore it is like a programming compiler like devcpp and Geany which is utilized for check, investigate coding and

furthermore it has an uncommon component of transfer your code into an associated board.

B. EMBEDDED C: Most contraptions currently offer choices for changing the compiler improvement. Likewise, using C extends convenience, since C code can be amassed for different sorts of processors.

3. RESULT:

Here we successfully implemented smart safety device for women using IOT .we need 12v power supply for the GSM by using external power supply adapter for powering up the whole circuit to work properly. The entire process is implemented and it is shown in Fig:7

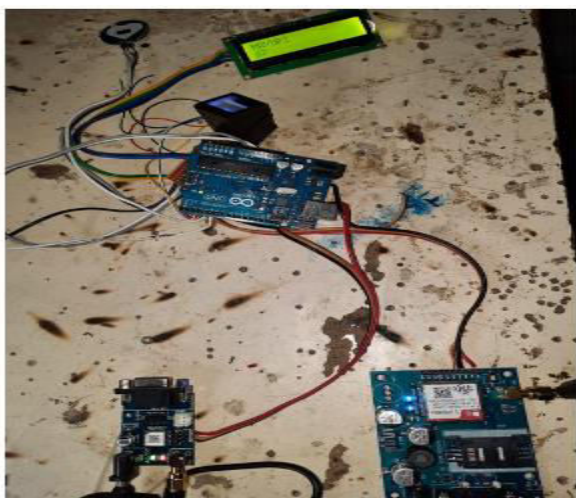


Fig -7: LCD Display

When the GPS is turned on the location of the woman is pinned and through GSM module, the message is sent from the microcontroller to the victims authorized group stating “Women insecure” with current location of women.

3. CONCLUSIONS

The proposed women safety device aims at proving complete security to women in current scenarios. The fingerprint is used as unique identifier for the user so that no one can generate a false alarm and also to ensure that alert is raised only in stress situations. To provide comprehensive security, buzzer is included in the design, so that any nearby person gets alerted about the mis-happening. Sending text messages ensure that close relatives and police gets alerted with the current location of victim. In case women feels need of self-defense she can make use of shockwave generator to temporarily incapacitate the perpetrator. Besides, the hardware based design; an android application is developed to provide additional safety features like sending group messages, audio recording and identifying nearby safe location in map. The paper presents the prototype of a smart device for women safety, performance metrics have to be considered for further analysis to prove its efficiency.

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REFERENCES

- [1] Ahir, S., Kapadia, S., Chauhan, J., & Sanghavi, N. (2018, January). The Personal Stun-A Smart Device For Women's Safety. In 2018 International Conference on Smart City and Emerging Technology (ICSCET) (pp. 1-3). IEEE.
- [2] Bhardwaj, N., & Aggarwal, N. (2014). Design and Development of “Suraksha”-A Women Safety Device. International Journal of Information & Computational Technology, 4(8), 787-792.
- [3] Kumar, N. V., & Vahini, S. (2017). EFFICIENT TRACKING FOR WOMEN SAFETY AND SECURITY USING IOT. International Journal of Advanced Research in Computer Science, 8(9).
- [4] Monisha, D. G., Monisha, M., Pavithra, G., & Subhashini, R. (2016). Women safety device and application-FEMME. Indian Journal of Science and Technology, 9(10).
- [5] Poonam Bhilare, Akshay Mohite, Dhanashri Kamble, Swapnil Makode and Rasika Kahane, “Women Employee Security System using GPS And GSM Based Vehicle Tracking”, Department of Computer Engineering Vishwakarma IOT Savitribai Phule Pune University India, E-ISSN:-2349- 7610 INTERNATIONAL JOURNAL FOR RESEARCH IN EMERGING SCIENCE AND TECHNOLOGY, Volume-2, ISSUE-1, JAN-2015.
- [6] Sogi, N. R., Chatterjee, P., Nethra, U., & Suma, V. (2018, July). SMARISA: A Raspberry Pi Based Smart Ring for Women Safety Using IoT. In 2018 International Conference on Inventive Research in Computing Applications (ICIRCA) (pp. 451-454). IEEE.
- [7] Vijaylaxmi, B., Renuka, S., Chennur, P., & Patil, S. (2015). Self defense system for women safety with location tracking and SMS alerting through GSM network. International Journal of Research in Engineering and Technology (IJRET), 4(5)