

Nir'Bhaya - A Concealed Women's Safety and Security Torch

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ABSTRACT

Due to the socioeconomic changes and degraded ethical standards of society, women's safety has become a major issue which has come to notice of the government as well. Physical and sexual harassment has hindered freedom provided to a woman and also has created a sense of fear even in the minds of an independent woman. Unfortunately, not much action has been taken for their safety; so, we decided to take it into our own hands to make an electronic device that takes a leap towards ensuring their safety and provide them with a sense of security. The best way for a woman to be safe is to be able to defend herself. In our proposed system, we intend to make a product that a person in danger can use to alert and in extreme cases-defend oneself. The product is equipped with features that can be used in such times: Button activated GSM and cloud-based SOS call/SMS, an optional high-lumen light got by a setup of 7 - 900LM LEDs and lenses that can act as a blinder to distract an attacker, a loud siren (120dB) to get attention of surrounding people, a location-tracking system using GPS and a 200kV-400kV taser using a high-voltage electric arc generator, step-up boost converter. All above features are concealed inside a regular looking torch. The prototype has been made with wood and leather for aesthetic purposes and this product can be extended to any people who may have the need to defend themselves; i.e. the elderly against poachers and dogs, children of suitable age and even trekkers and adventure enthusiasts in their survival kit

Keywords: Internet of Things(IoT), TASER, high voltage arc generator, GPRS, GSM, GPS, System on Chip(SoC), SOS

I. INTRODUCTION

The rape case in New Delhi that happened in December 2012 never ceases to make people have second thoughts about how safe our World is; especially cities for women who dream to be independent. With increasing population in cities, women security has become a major concern. It hinders their freedom and a lot of times, makes them hesitant about taking up jobs in areas less known to them.

The idea behind this project is to make a portable torch that comes with a variety of features to ensure

the users safety. The features so discussed are implemented as follows.

The remainder of this paper has been divided as follows. Chapter 2 talks about the methodology involved including the software and the hardware description. The results and discussion of the project have been briefed in Chapter 3 and onwards.

II. METHOD and MATERIAL

To proceed with our proposed model, let us follow the flow chart of implementation of the proposed technique given in figure 1.

The implementation starts when the person senses danger around her. She would have two choices: either she can use the torch and press the button once or she can use the Google Voice Assistant in her smart phone and say “Help” or “I am in danger”. This will activate an alert system - the location tracking with GPS and automated SOS call and messages including a google maps link to her location indicating danger is sent to her loved ones, using the SIM800L GSM/GPRS/GPS module. If the woman is out of danger or if it was not an attacker at all, she can say “False alarm” or “I am out of danger” on her google voice assistant to turn the tracking off and let her beloved know she is safe. If the user feels more threatened, she can press the same button twice to activate the combination of a 120dB siren and a high lumen LED. Siren grabs the attention of the public which acts as a call for help and the LED lights can as a blinder that makes the attacker visually hindered for a short period of time, in which the user can choose to run away from the scene or defend herself with a TASER.

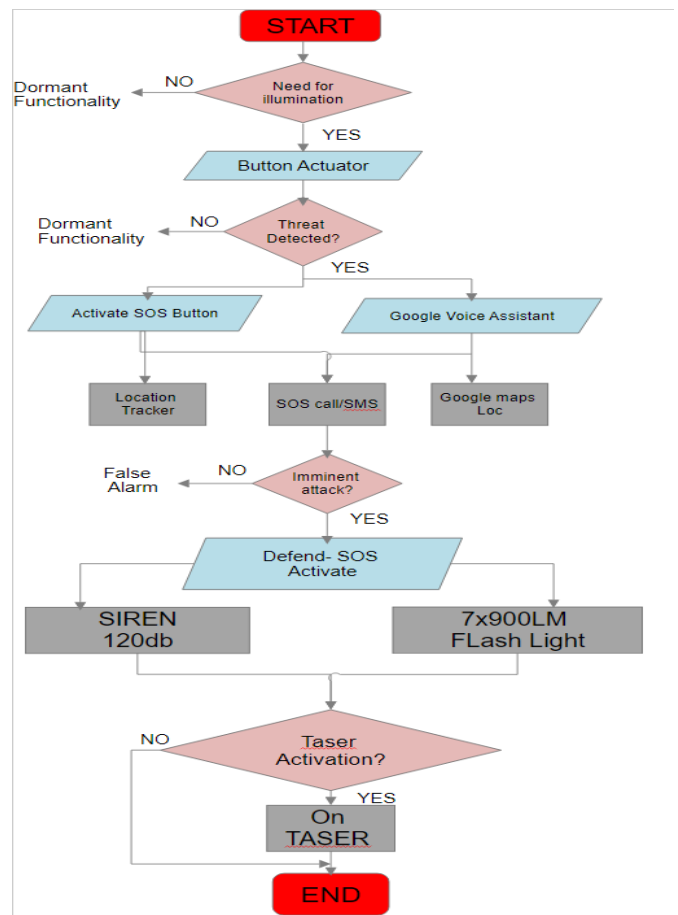


Figure 1. Flow chart

Suppose the attacker continues to approach the user, the user can actuate the taser with an activation trigger which temporarily paralyzes the attacker and inflicts immense pain. A taser is a high voltage and low current device that is non-fatal in the regular use but can inflict a great amount of pain to an attacker due to the high voltage and also paralyse them as the current interferes with the brain signals in the incident area. TASER stands for Thomas A Swift's Electronic Rifle; and is basically a step up boost converter which converts a low DC voltage, typically in the range 3.5-7.2V to a very high voltage in the range 100kV-1000kV a current in the range 3-10mA.

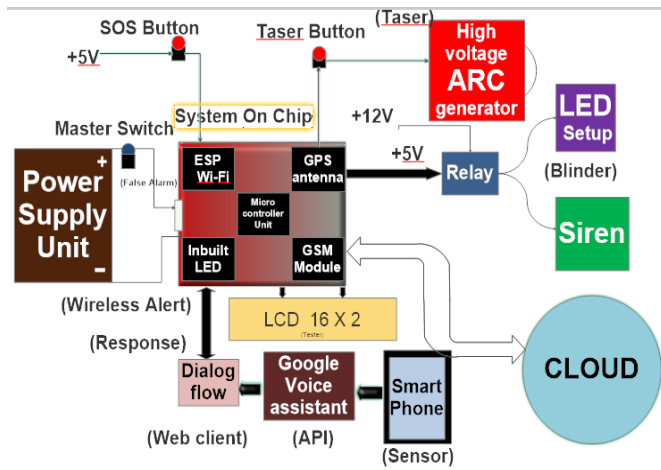


Figure 2. Block diagram

2.2 Methodological constraints

There are certain constraints that have to be abided by, to ensure the expected results.

The user must say “Help” or “I am in danger” to the Google Voice Assistant to activate SOS calls and location tracking. Saying other triggers-words would not be understood by the application, though it can be incorporated if desired. The same goes for “False alarm” and “I am out of danger”.

With the current materials and components, there might be a slight delay in sending of message and there is always the uncertainty whether or not the message/ call has been delivered.

2.3 Requirements

2.3 a) HARDWARE REQUIREMENTS

- ATmega 32
- GPS/Glonass module
- GSM SIM module
- WIFI module esp8266
- Siren
- Batteries
- Level shifter IC's
- Relay
- LM357 comparator IC
- And general hardware components such as jumpers and voltage regulators

(1) Microcontroller ATmega32:-

The Atmel ATmega32 is an 8 bit, low power, microcontroller with upgraded RISC architecture. It operates on a voltage between 2.7 - 5.5 V. It works on a frequency of 16 MHz. ATmega32 can even handle analog inputs. Three inbuilt timers/counters, two 8 bit and one 16 bit timers. It includes one successive approximation type ADC in which total 8 single channels are selectable. It has a selectable reference. Either an internal 2.56v reference voltage can be used or any external reference.

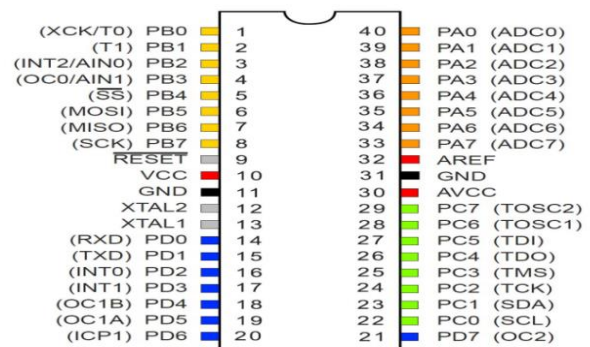


Figure 3. ATmega32

We are using the ATmega32 microcontroller as a processing engine and a cloud gateway. The output values from the filter stages is read by the ADC port of the board and are averaged to get an optimum reading. Then the finalized pulse rate and SpO2 values are uploaded to the cloud using a Wi-Fi module connected to the board.

(2) Esp8266:-

ESP8266 is a highly integrated chip designed for the needs of a new connected world. It offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor.

ESP8266 has powerful on-board processing and storage capabilities that allow it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime.

ESP8266 Interfacing

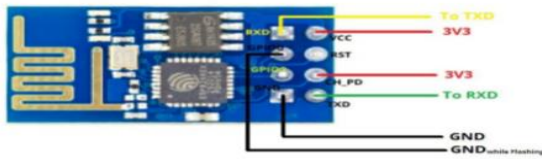


Figure 4.ESP8266 Wi-Fi module pin config.

III. APPLICATION

The product can be used as a preventive and safety measure in the following situations:

- i. Stalkers while walking
- ii. Unsafe neighbours
- iii. Attempted physical or sexual assault
- iv. Domestic violence
- v. Essential backpack for adventure enthusiasts
- vi. Safety and security of the elderly against dogs and malicious people
- vii. Making a wearable security device having a few of the modules of this project

(3) GSM:-

A GSM modem is a device which can be either a mobile phone which can be used to make a processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection.

IV. FUTURE SCOPE



Figure 5. SIM800L GSM/GPRS/GPS module

- i. With better and smaller components, the product can be made a lot more compact to fit into something as small as a lipstick or jewellery which makes it a lot more portable.
- ii. The device can be equipped with a video-camera, recordings of which is stored in memory card or USB. that can be enabled simultaneously with the siren-LED combination. This can be used to collect proof against the criminal.
- iii. A part of the device can be coated with rape-drug sensing chemical, rohypnol that changes colour when such a chemical comes in contact with it. This can alert the user.
- iv. The product can also be equipped with a hidden camera detector that helps the user be alerted.

(4) GPRS:-

GPRS (General Packet Radio Service) is a service within the GSM network, just like the two most popular services SMS and voice connections. GPRS is used for transmitting data in the GSM network in from of packets

V. CONCLUSION

2.3 b) SOFTWARE REQUIREMENTS:

1. HTML for designing web page
2. Programmer's notepad as a C-code compiler
3. ATX flasher to create and dump the HEX file into the microcontroller
4. Dialogflow web client
5. Google voice assistant on smart phone

It is known that crimes can never be completely ended but the best that can be done is to keep oneself safe and our product promises to do so. Not only does it help the user and her beloved be alert about their safety in various types situations, it can also help her save herself as discussed.

VI. ACKNOWLEDGMENT

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