MUST - Multi Utility Safety Tool

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Abstract: **Individual well-being is one of the most significant concerns for women, as crime against them has not been diminished. Nowadays, various gadgets are available in business sectors which claim to protect women in many ways. Still there emerges the need of a defensive device which acts as a guardian at time of an assault. This fuels a new thought of a Bluetooth aided safety band for women. This paper intends to create a wearable band with provision of interfacing with smart phones via Bluetooth. If an emergency occurs, the smart phone sends alert messages to predefined numbers with the current location of the device; an emergency call is made to a nearby police station. In addition, Taser is composed along with it as a safety measure instrument for women who are at risk. Daylight based boards are worked with it for charging reasons. The main advantage of this band is its convenience and ease of operation.**

Keywords: **Android application, Bluetooth, Location, Solar panel, Taser, Women safety.**

1. Introduction

In the present world, women security is an issue of developing concern. We have read about many unfortunate incidents happening in this world like land slide, coal mining deaths etc. New inventions lead to overcome these disasters and saved the life of people [1]. Women these days are working and globalization has made us aware of gender equality. Earlier the women were restricted only to the household chores. With the changing scenario, women are competing with men in all fields. We can see women going to great success levels in all fields; it may be corporate, scientific, education, business or any other field. Safety of women matters a great whether at home, outside the home or working spot. Last few crimes against women, especially the case in Delhi, were very dreadful and fearful.

Because of such crimes, women safety has become a major topic. According to the statistics, it is found that every two out of three women have suffered trauma in the most recent year. As per the survey of women, it is found that women are losing their certainty in light of such incidents. By the overview of Delhi government's women and child development department, around 80% of the women in the national capital have dread in regards to their safety. Many preventive measures have been taken by the government to stop these misbehaving activities but still it have not changed the growing rate of these crimes and has remained unaffected.

A. Scope of the Project

As an independent nation, we must ensure respect and security of women and we cannot deny them this basic right.

It is now time to initiate action to eradicate the menace of security issues with women. Violence against women remains embedded in our societies, both as a daily reality and difficult situations [6]. Gender justice is unthinkable in our current reality where at least one in three women faces brutality in the course of their life, regardless of her culture, religion, financial class, or education level. Our country can be a true democracy only when all women have the security and freedom from violence. Women should face the difficulties in our society with courage. This project gives mental support and belief to each of them.

B. Advantages

Advantages compared to existing methods are as follows
- Small in size hence it is easy to carry and trigger
- Low power consumption
- Cost efficient

2. Existing System

Mobile application projects like VithUapp, Nirbhaya, Spot N Save Feel Secure applications were developed lately [3]. But, the vast majority of them had numerous disservices over points of interest.

VithU mobile application - In this application when the client faces any difficulties, alert messages are sent to the recorded contacts, which can be spared prior itself. The message is sent along with their physical location to the effectively spared contact. But the disadvantage of this application is that we have to tap the power button for 2 times continuously, which is unimaginable in all circumstances.

Spot N Save Feel Secure application - It is a convenient portable smart band which works alongside with the app. It works by clicking on the button in the band twice to convey a signal to the guardian network. Signals will be refreshed every 2 minutes. This application isn't pertinent in all circumstances since for an unnoticed circumstance or erratic time, clients can't make alert beforehand by clicking it twice.

Till somebody rescues us, we have to guard ourselves. In order to protect from the outsiders we don't have any defensive instruments.

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"Security alert and tracking system for ladies by utilizing arduino" was made with the goal of safety at homes could be provided from all over the world utilizing GSM modem connected to mobile phones. This venture utilizes GPS navigation and transmits an SMS alerting to the predefined owner's number.

The GPS navigation and GSM based women home security framework using an arduino microcontroller is unquestionably an exclusive project that may provide to safeguard women [4]. This undertaking utilizes controlled 3.7V, 370mA power. Bridge type full wave rectifier can be utilized to rectify the ac creation of auxiliary 230/12V step lower transformer. The drawback right now, power consumption should be looked after consistently.

In our paper, the gadget can be carried while travelling since it is small in size. Alert message notification and calling choice is accessible in this mobile application. The message is sent to both the emergency contacts as well as the closest police station along with the exact location details. This mobile application also gives an extra facility of cancel option. The device comprises a safety instrument, Taser for assaulting the strangers which will make the individual's nerves go numb [2].

3. Proposed System

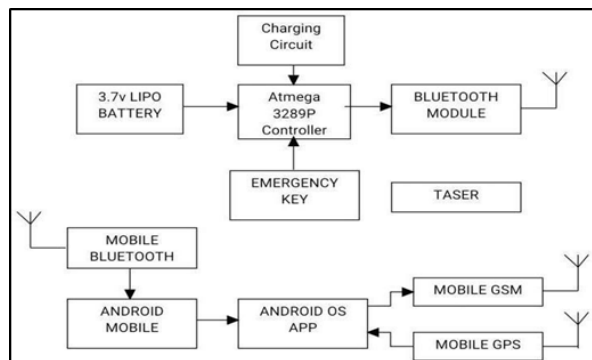The proposed block diagram of our project is shown below in fig. 1.

Fig. 1. Block diagram of the proposed system

A. 3.7V Lipo Battery

Lithium particle polymer (otherwise called 'lipo' or 'lipoly') batteries are thin, light and ground - breaking. The output yield ranges from 4.2V when totally charged to 3.7V. This battery has a limit of 2000mAh. If you need a larger battery, we have a full range of Li Poly batteries come pre-appended with an authentic 2 - pin JST - PH connector as and incorporate the essential protection circuitry. The included security hardware shields the battery voltage from going excessively high or low which implies that the battery will remove when completely dead at 3.0V.

B. AT mega 328P Controller

AT mega 328P is an elite, low power controller from microchip. AT mega 328P is an 8 - bit microcontroller

dependent on AVR RISC design. It is the most notable one of all AVR controllers.
Communication interface incorporates:
- Master/Slave SPI serial interface (17, 18, 19 PINS)
- Programmable serial USART (2, 3 PINS)
- Two-wire serial interface (27, 28 PINS)
- Timer module:
  - Two 8-bit counters with separate prescaler and analyze mode.
  - One 16-bit counter with separate prescaler, compare mode and capture mode

C. Charging Circuit

The energy from solar cells is used to charge, and boosts the voltage to 5V which is used by arduino. The CSE power technologies 40W solar photovoltaic panel is a 12V electrical solar panel rated for 40W under standard operating conditions (1000W/m2, temperature of 25ºC).
- Voltage at PMAX: 17.5V
- Current at PMAX: 2.29A
- Output Tolerance: +/- 3%

Solar photovoltaic panel converts sunlight energy into electrical energy, and is used in conjunction with the sun force 7A charge controller, the 12 battery, and the power bright 200W inverter to create an off - grid solar PV array.

D. Bluetooth

HC - 05 is a Bluetooth module which is intended for wireless communication. It is an open wireless innovation standard for transmitting fixed and portable electronic gadget information over short distances. The Bluetooth module is used as a UART RS232 serial converter module. It can easily move the UART information through the wireless Bluetooth, without complex piece format or profound information in the Bluetooth programming stack; it can also interface with devices such as MCU, ARM or DSP systems, GPS or GSM, Sensor modules, SOC systems.

E. Android Mobile OS

An android phone is a powerful, innovative smart phone that runs on the android OS created by Google and is utilized by an assortment of mobile phone manufacturers. A flexible OS is programming that permits cell phones, tablet PCs and various devices to run applications and projects. OS regularly fires up when a gadget controls on, giving a screen with icons or tiles that present data and give application access. Instances of android mobile OS includes Apple iOS, Google android, research in motion's Black Berry OS, Nokia's Symbian, Hewlett-Packard's web OS (In the past Palm OS) and Microsoft's Windows phone OS.

F. Mobile GPS

Mobile phones with GPS receivers communicate with units from among the 30 worldwide situating satellites in the GPS framework. GPS can determine your location by performing a

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count dependent on the convergence purpose of covering circles controlled by the satellites and your phone's GPS collector. In basic terms, trilateration utilizes the separation between the satellites and the recipient to make covering "circles" that meet around. The convergence is your area on the ground.

G. Mobile GSM

GSM is a computerized portable system that is broadly utilized by cell phone clients in different places of the world. GSM utilizes a variety of time division multiple access (TDMA) and is the most generally utilized of the three computerized remote communication advancements: TDMA, GSM and code-division multiple access (CDMA). GSM digitizes and packs information, at that point sends it down a channel with two different floods of client information, each time permitting space.

H. Taser

An electroshock weapon is a debilitating weapon. It conveys an electric shock focused on incidentally disrupting muscle capacities or potentially delivering pain without causing huge injury. Numerous sorts of these gadgets exist. Immobilizers, batons (or prods), and belts oversee an electric shock by direct contact, while Tasers (LED electrical weapons) shoot shots that regulate the shock through flexible adaptable wires. It can cause some solid disturbance, however it requires 3-5 seconds of direct contact by disrupting voluntary muscular control through the nervous system.

4. Methodology

In this system we are introducing an additional hardware device along with the software for added security benefits, so the user can trigger the device with a single press in case of a threat. This work builds a women security framework which provides the details such as the current location of the women endangered using the GPS and GSM module in the mobile. An application installed on the device will track the current location of the victim and update the information to the police station and also the stored number to be contacted in case of emergency will receive a message upon activation. In addition to the location tracking device which only acts as an alert system gives some assurance, self - defense is still required and thus we have introduced a solar powered Taser to stun the assailant [5].

Initially, by using Bluetooth pair the device with your mobile. Then the contacts are needed to be saved for sending the alert message during emergency situation. By using the mobile application open update contact to store the number to send message. Open add message and type the message to be sent when the emergency button is pressed.

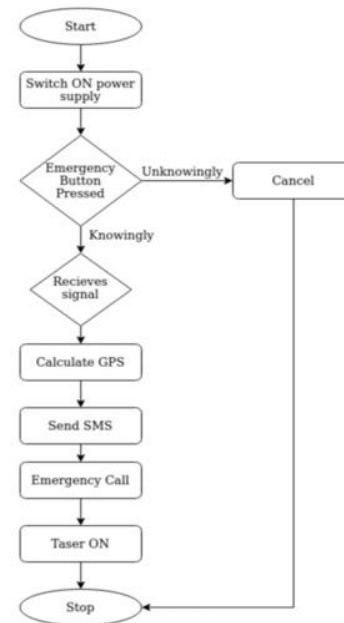The flow chart for the proposed system is shown below in fig. 2.

Fig. 2. Flow chart

A. Work Flow of the Proposed System

The work flow of the MUST is explained in this section.
Step 1:
Start.
Step 2:
Emergency button is pressed.
Step 3:
If a mobile app receives a signal, GPS will start calculating the current latitude and longitude values of the victim and send it as SMS to the registered mobile number using mobile GSM in it.
Step 4:
There is a cancel option in the application to avoid the emergency message if activated unknowingly.
Step 5:
An emergency call is made if the person didn't press the cancel button within 1min.
Step 6:
The Taser is turned ON, to attack the stranger for protection.
Step 7:
Stop.
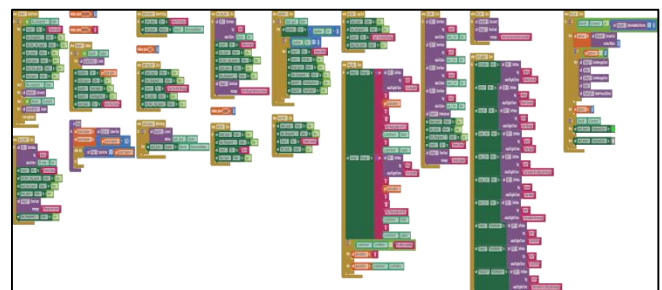The sample coding for the proposed system is shown in fig. 3.

Fig. 3. Sample Coding

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5. Results and Discussion

The primary motive of this system is to provide safety and security to women who are endangered. The emergency button is pressed to activate by the person threatened when she feels insecure. Once activated, the microcontroller sends the commands to the app and the mobile GPS will calculate the current latitude and longitude values of the victim [7]. Mobile GSM will send the SMS which contains latitude and longitude values to the numbers already stored in the app and nearby police station. GSM will then send SMS to the registered mobile numbers for every 5 seconds. The SMS sent to the registered mobile numbers. Once the Taser button is pressed it will emit high voltage that would electrify the assailant.

The hardware components are shown below in fig. 4.
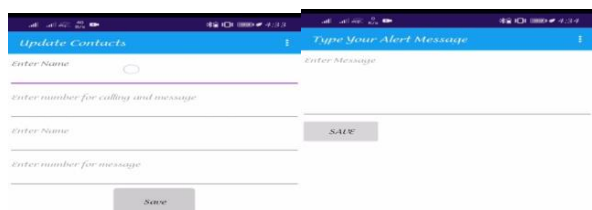

Fig. 4. Hardware Components

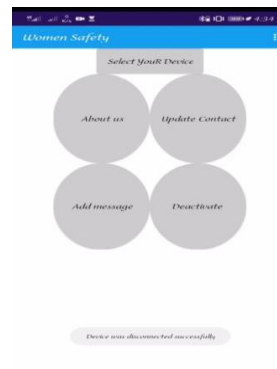The mobile applications UI is shown below in fig. 5.

(a) Home   (b) Device Selection

(c) Add Contacts   (d) Alert Message

(e) Disconnection
Fig. 5. User Interface of APK

6. Conclusion

The proposed design will deal with the critical issues faced that are faced by women and will assist with unraveling them with innovatively sound equipment and ideas. The merit of this work is it not only provides safety but it likewise gives security and implies a self-defense mechanism. The crime against the women can be presently finished with the help of real system implementation of the proposed model.

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