Design and Implementation of Women Safety System Based On Iot Technology

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Abstract: ***Today in the current global scenario, women are facing many problems like women harassment.We propose to have a device which is the integration of multiple devices, hardware comprises of awearable "Smart band" that endlessly communicates with sensible phone that has access to the web. This paper covers descriptive details about the design and implementation of "Smart band". The device consists of a trigger,microcontroller(ATmega2560), GSM module (SIM900), GPS module(Neo-6M),IoT module(ESP-12E),Neuro Stimulator, Buzzer and Vibrating Sensor. In this project, when a woman senses danger she has to hold ON the trigger of the device. Once the device is activated, it tracks the current location using GPS(Global Positioning System) and sends emergency message using GSM(Global System for Mobile communication) to the registered mobile number and near by police station.IoT module is used to track the location continuously and update into the webpage. Neuro Stimulator will produce non-lethal electric shock in emergency situations to detect the attacker, buzzer is used as an alarm to alert the nearby people so that they may understand that someone is in need and vibrating sensor will send the last location in case if the device gets defected. The main advantage of this project is that this device can be carried everywhere since it is small.***

Key words: GPS Tracker and GSM Module, IoT module, Neuro Stimulator

I. INTRODUCTION

In Today's World the safety of women is indanger especially in India. The rate of crimes against women is not decreasing but in fact increasing at analarming rate especially harassment, molestation, eve-teasing, rape, kidnapping and domestic violence. Many preventive measures have been taken by the government to stop these misbehaving activities but still has not affected the growing rate of these crimes and has remained unaffected. The problem of sexual harassment in work place is increasingly coming out day-by-day. Sexual harassment at a workplace is unwanted behavior of a person that causes discomfort, offence or distress to the other. Majority of such cases are happened to woman by men working at high position in an organization.Women is getting kidnapped at every 44 minutes, raped at every 47 minutes, 17 dowry deaths every day[1].The fear of harassment against women is not only the condition at outside but it may also happen at homes, Women are not so physically fit as compared to men so in case of a need a helping hand would be a boon for them[2].

Revised Manuscript Received on March 25, 2019.

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Students face incidents like child trafficking and kidnapping, when they are waiting to embark or disembark a school bus[5]. Loaded with security apps for women, your smart phone can help you send emergency alerts to chosen people and also let people know about your whereabouts if anything goes wrong[7].Sometimes here might be a situation that when women had an accident in the late night and there are no one to help them, In such situations the person will not be able to tell the situation that he/she facing. And they do not know the basic first-aid details and to know the person where the incident has happened[9].Nowadays though there are many apps and devices evolved for women safety via smart phone which can be activated only by a touch or one click or shake the mobile[11].

II. EXISTING SYSTEM

This work[1] had proposedthat it will intimate the parents and police about the current location of the women. A GPS system is employed to trace the present position of the victim and a GSM is employed to send the messageto the pre-defined numbers. This work[2] had proposedaboutthat anytime a woman senses danger, so she has to turn ON the device. Once the device is activated, it tracks the current location of the women using GPS and sends emergency messages using GSM, to already registered mobile number and the police control room. The pulse sensor checks the pulse of victim and in abnormal health situation the device also sends current GPS location to ambulance at every 10 sec in form of SMS. This work[3] had proposed about the violence against women (VAW) and also different health issues of women. We have designed and presented a skeleton of a user friendly mobile application named Women Empowerment which can contain totally different laws associated with VAW and additionally containsdifferent health tips for women, which can facilitatewill help the rural as well as urban women. It includes emergency system, which will be active by the victim woman once they area unit in peril.This work[4] had proposed about new model for women security, Once the switch is pressed the current location of women is collected and sends through GMS to the numbers registered in the Arduino, L293D is used to drive dc motor, buzzer and shock system also used in this device.This work[5] had proposedIn order to track the location and find theidentity of the child a GPS module and a RFID card is used inthe proposed system. The system uses Arduino Mega 2560 as mainmicrocontroller. This work also had proposed safety systems such asdrunk and drive prevention system by using an alcohol sensor(MQ-3), accident alert with location by using piezovibrationsensor, detecting objects in front of vehicle wheels by using pingsensors and detection of human movements on the footboardby using IR proximity sensors.

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This work[6] had proposed about thatwhen the device is activated, tracks the location of the victim using GPSand sends emergency messagesusing GSM, tothree emergency contacts and the police control room. Thesystem additionally incorporates a screaming alarm that uses realtimeclock, to decision out for facilitate and additionally generates an electrical shock to injure the assaulter for self defence.

This work[7] had proposed that the user can get quick and immediate help in any emergency situation . It make use of GPS technology. The System refers the Global Positioning System to trace out the position of the person and uses the Messaging service to send the message toget the help. All the entire flow of operations are control and manage by the mail Glassfish server.The message is sent to the emergency contacts into the application. This work[8] had proposed when theswitch is pressed the device will get activated.The audio and video recorder can begin to capture the live incident. If the pressure sensing element sense the physical pressure the message are send to contacts with the live recording through GSM. Buzzer is provided within the device, when the device gets activated the buzzer produces high sound in the surrounding. So, that the people in the surrounding may hear the sound and come for rescue. Spy-camera starts functioning when device activates and capture the video of present location and the data is stored in SDcard.This work[9] had proposed the implemented in the form of a partial wearable and partial portable system, the information is passed to RFID readerwhich communicates with PICmicrocontroller and through GSM the "help" message is distributed to predefined contacts. This work[10] had proposed to provide security to working and nonworking Women's, When she press the trigger of this key then at that time the ARM7 start working the first GPS is trace the location of the women and with the assistance of GSM the message will be sent to the registered number that is saved in the SIM. The modification of this system Emergency key is also their whenever women feels she is in danger at that time she presses emergency key then buzzer makes a loud sound.This work[11] had proposed, a smart watch is capable of storing few contact numbers.. The device is activated whenSOS button is clicked for two seconds. It is programmed that when the device is activated, it immediately sends the alert messages like " I am in danger, please help me" with long beep sound with high volume at the receiver side even it is in silent profile along with location using GPRS, it also record the movement, pulse measurement, blood oxygen levels, heart beat rating continuously in the internet. it contains a the secret webcam in the locket captures the culprit photo which is directly uploaded to the server. This work[12] had proposed an Android Application is used to find the location and send the location to the group of people stored in the phone, SOS Message, Track your phone andadditionally we used a technique of clicking the volume button, if the button is pressed on time then message alert, second if button is pressed two times then message and audio and third if the button is pressed long time then calls to police, message and Audio. This work[13] had proposedwhen the Pressure switch is pressed, the device will get activated automatically with in a fraction of milliseconds. Immediately the location of the victim will be tracked and messages will be sent to emergency contacts. The screaming alarm unit will get activated and simultaneously, it produces siren sound to indicate danger. Tear gas is applied to hurt the assaulter which can help the victim to flee. Live Streaming Video will process the situation of the victim employing a most well-liked IP address in order to detect the face of the assaulter along with the surrounding that helps to figure out easily.This work[14] had proposedan experimental model designed for monitoring and checking the health condition of the patients based on sensors. The framework depends on e-health sensor shield related to a cloud platform that gathers the information from the sensors. These sensors measures various parameters, like a glucometer, air flow and patient position that are transmitted via microcontroller by a gateway to a cloud storage platform.The data collected in the cloud platform is accessible for further handling, for the investigation of some correlations amongmeasured parameters and health state of the patients.This work[15] had proposed GPS will track the current location and send it via SMS to the registered emergency contact numbers, it also record audio and video, it also has additional process like making call to the user after receiving the notification, generate electric shock for self defence.

III. PROPOSED SYSTEM

The block diagram of our proposed system is as shown in Fig.3.1:

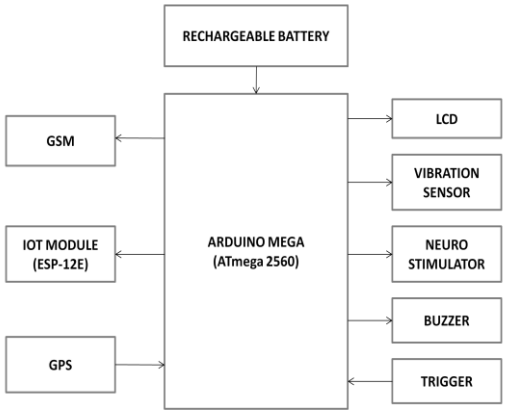

Fig.3.1 Block Diagram

The block diagramconsists of the following blocks.

Battery

12v rechargeable battery is used to power the circuit.

ATmega2560

ATmega2560 is a microcontroller board.It consists of 54 input/output pins, 16 analog pins, 4 UARTs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.. It contains everything that needto support the microcontroller.It is simply connected with a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The ATmega2560 has 256 KB of flash memory for storing the, 8 KB of SRAM and 4 KB of EEPROM.

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GPS Module

The Global Positioning System isa location tracker.It , tracks the current location in the form of longitude and latitude. The GPS Coder Module will use this information to search an exact address of that location as the street name, nearby junction etc. which isdirectly connected to USART of the microcontrollerprovides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth. . In case if GPS is disabled then the system will only send the longitude and latitude through SMS. So, Internet is mandatory.

GSM Module

GSM module is used to establish communication between a computer and a GSM-G\PRS system. Global System for Mobile Communication(GSM) SIM card is inserted within the mobile device to send and receive the messages victimisationGPRS.The GSM SIM card number is registered with the system. With increasing usage of GSM, network services square measure expanded on the far side speech to include several alternative custom applications, machine automation and machine to machine communication. It operates at either the 900MHz-1800MHz frequency band.

IoTModule(ESP-12E)

The Internet of things(IoT) has evolved due to convergence of multiple technologies,real-time analytics, machine learning, commodity sensors, and embedded systems the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit.IoT is that the network of the physical devices, vehicles, buildings and alternative things embedded with physics, software, sensors, actuators and network property that modify to gather and exchange information.TheIoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration.

Neuro Stimulator

Neuro Stimulator is the purposeful modulation of the nervous system's activity using invasive or non-invasive means. Neurostimulation technology will improve the life quality of these United Nations agency square measure severely unfit or littered with profound losses to numerous sense organs in addition as for permanent reduction of severe, chronic pain which might would otherwise need constant (around-the-clock), high-dose opioid medical aid. In this electric shock generator is an electronic device that produces voltage around 1200mv & current of 3microamp. It consists of AC to DC converter, generator and a web or grid. These devices provide neurologists new ways that to treat patients with a good vary of disorders. Now- a-days medical device companies are coming out with dynamic neural stimulators that have a bit of “brain” themselves.

Vibration Sensor

Vibration sensors square measure sensors for activity, displaying, and analyzing linear speed, displacement and proximity, or acceleration. Vibration but delicate and neglected by human senses could be telltale sign of machine condition. Abnormal vibration indicative of issues with associate degree industrial machine are of detected early and repaired before the event of machine failure. Vibration analysis is employed as a tool to seeinstrumentation condition similarly because specific location and sort of issues.

Buzzer

A Buzzer or electronic device an audio signalling device, which can be mechanical, mechanical device or electricity. Usually piezospeakers(buzzers) are used "piezi buzzer" is basically a tiny speaker that you can connect directly to an Arduino. The piezo buzzer produce sound based on reverse of the piezoelectric effect. These buzzers can be used to alert a user of an event corresponding to a switching action, counter signal or sensor input.

LCD

Liquid Crystal Display screen is associated in nursing electronic display module. A 16x2 LCD display is basic module and it is commonly used in various devices and circuits. These modules areaunit most popular over seven sections and different multi segment LEDs.LCDs area uniteconomical; simply programmable and don't have any limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.The command register will stores the command instructions given to the LCD. A command is an instruction given to LCD will do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc.

IV METHODOLOGY

System Architecture

This work develop a women's safety system which provides the current location details of the women in danger using GPS and GSM modules. IoT module will track the current location of the victim and update in the webpage. In addition to location tracking it also provides some safety and security to women like giving electric shock to the attacker. The proposed system of this project is shown in Fig.1.

Workflow of the proposed System

The workflow of the women safety and security is explained in this section. The flow chart of the proposed system is illustrated in Fig.4.2.1.

Step 1: Start.

Step 2: Switch ON the 12 Volt power supply.

Step 3: Emergency button is pressed.

Step 4: If GPS receives 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 GSM module.

Step 5: If any vibrations detected by vibration sensor, get the last location from GPS and send to GSM module.

Step 6: IoT module tracks the last location of the victim and that location is updated in the Webpage.

Step 7: Neuro stimulator is turned ON,to apply shock to the attacker.

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Step 8: Buzzer is turned ON to alert the people in the surrounding.

Step 9: Stop.

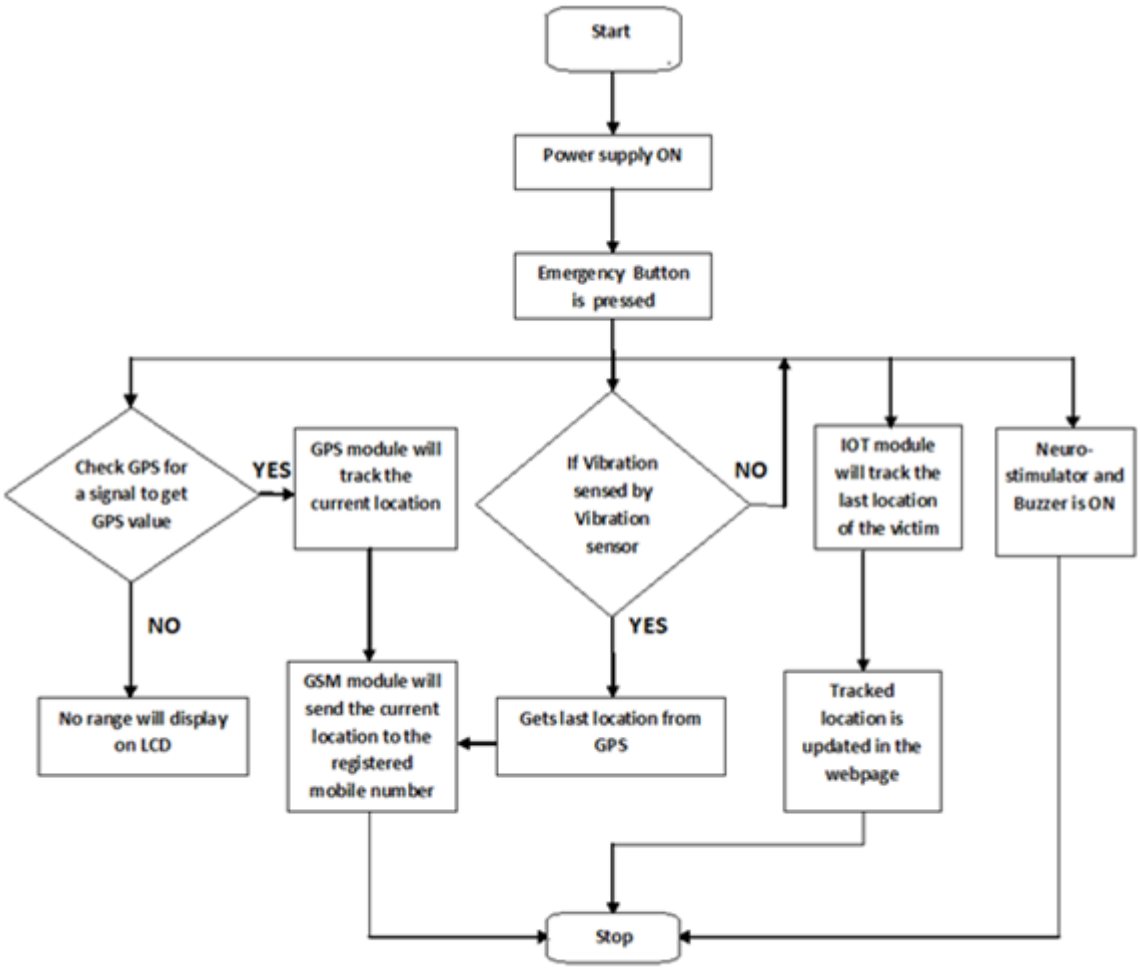

Fig.4.2.1 Flow Chart of the Proposed System

V. RESULTS AND DISCUSION

The main purpose of the work is to provide safety and security to the women in dangersituation.The button is pressed by a women when she feels insecure. Once the button is ON, the microcontroller gets the commands and the GPS will calculate the current latitude and longitude values of the victim.The calculated values are shown in Fig.5.1.GSM module will send SMS which contains latitude and longitude values to the numbers already stored in the microcontroller and nearby police station. GSM will send SMS to the registered mobile numbers for every 1second.The SMS send to the registered mobile numbers are shown in Fig.5.2. And display message on the LCD is shown in Fig.5.3. IoT module will track the current location of the victim and it will update the location on the webpage.The microcontroller will switch ON the buzzer in the device, so that nearby people may come to know that someone is in danger and they will come to rescue. The microcontroller also turnON the neuro-simulatorthat apply electric shock to the attacker.

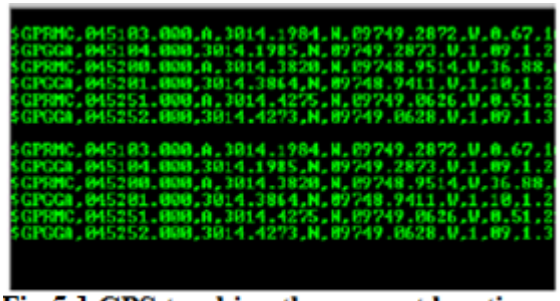

Fig.5.1 GPS tracking the current location

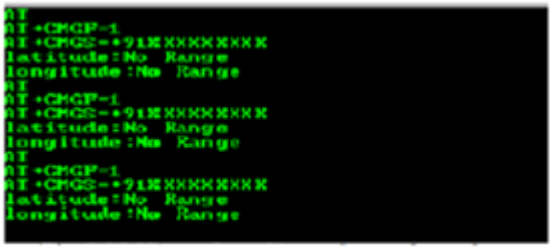

Fig.5.2 SMS send to the registered numbers

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Fig.5.3 Location detected on LCD

VI. 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 it not only provides safety and it 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.

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