IoT Based Self-Automated Women Safety Device

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ABSTRACT: The world is becoming so much more unsafe for women. Social evils like molestations, dowry, crime against women, worst among all is rape is on the rise in many countries. Incidents of crime against women have been increasing at an alarming pace in Indian cities, most common incidents being rape, kidnapping, sexual harassment and eve teasing. All they need is a device that can be carried around easily and worn whenever the woman feels unsafe. In this project suggests a new perspective to use technology to protect women. The system resembles a smart belt as a prototype which when activated, tracks the location of the victim using GPS (Global Positioning System) and sends emergency messages using WI-FI (Global System for Mobile communication), to two emergency contacts and the police control room. The system also incorporates a screaming alarm to call out for help from the public.

KEYWORDS: IoT, Sensors, GPS, GSM, Embedded system, shock unit.

I. INTRODUCTION

Internet of Things (IoT) is a new revolution of the Internet .It makes objects themselves recognizable , obtain intelligence, communicate information about themselves and they can access information that has been aggregated by other things. The Internet of Things allows people and things to be connected Anytime, Anyplace, with Anything and Anyone.

In this project suggests and new perspective to use technology to protect women. The women safety is a very big concern in a country like INDIA where women are playing an outstanding role in each and every field. India is a peace loving country and one of the safe destination for the tourists across the world. However, a few incidents in recent past brings to attention that there is a need for women safety. Many women's in developed countries still fear to go outside alone due to number of cases of violence against women. To make women safety safer many attempts have been made but, still a safer and secure system is needed that can ensure safety during public transport and in general.

This, paper presents a system that is capable of providing more security and safety. The status of women in India has gone through many great changes over the past. From equal status with men in ancient times through the low points of the medieval period to the promotion of equal rights by many reformers, the history of women in India has been eventful. In modern India, women have adorned a high offices in India. However, women in India continue to face the social challenges and are often victims of abuse and violent crimes. Women's security is a critical issue in today's world and it is very much needed for every individual to be acting over an issue. Many unfortunate incidents have been taking place in women's case.

According to IEEE Internet of Things journal, An IoT system is a network of networks where, typically, a massive number of objects/things/sensors/devices are connected through communications and information infrastructure to provide value- added services via intelligent data processing an

The Internet of Things (IoT) is a computing concept that describes a future where everyday physical objects will be connected to the internet and will be able to identify themselves to other device. According to The Internet of

Things European Research Cluster (IERC) definition states that IoT is a dynamic global network infrastructure with self-configuring capabilities based on standard and

interoperable communication protocols where physical and virtual "things" have identities, physical attributes and virtual personalities and use intelligent interfaces and are seamlessly integrated into the information network.

Safety is an important aspect of human development. A city promising a safe and secure Environment is one of the important yardsticks of its overall growth and progress. However women safety and security has emerged as a key concern for the country over the recent years. Women from various walks of life face situations that make them feel threatened in different environments. Sixty six percent of women have reported sexual harassment in the year 2014 in New Delhi. As per the survey, majority of women respondents (65%) are dependent on public transport to commute to their destinations comprising 45% of them traveling by metro followed by 30%commuting by bus and remaining 25% by auto. Whereas remaining women respondents (35%) said that they opt for private mode of transportation to reach to their destinations which consist of mainly four wheelers (38%) and two wheelers (22%) and remaining 40%commute by transportation services provided by their organizations/colleges/institutions etc.

This paper suggests new perspective to use technology to protect women. The system resembles a smart belt as a prototype which when activated, tracks the location of the victim using GPS (Global Positioning System) and sends emergency messages using WI-FI (Global System for Mobile communication), to two emergency contacts and the police control room. The system also incorporates a screaming alarm to call out for help from the public.

The paper is organized as follows. Section II describes the related works which are available from the literature.

II. RELATED WORKS

2.1.CHILDGUARD:A Child-Safety Monitoring System

Zhigana Gao,et.al., suggested that the Child Guard system exploit mobile devices to monitor the real time movement of unsupervised children. It also sends remainders and alarms to children and notifies guardians of abnormalities in a child's routine. It requires frequent monitoring of children and operation to be done manually which is quite difficult.

2.2. Smart Gadget for Women's Safety

Akanksha Chandoskar,et.al., focused on Women's Safety Gadget which is helpful for women's in need of help. This system can send live tracking location to parent, guardian and nearby police station at every three seconds. This system uses sensors such as GPS and GSM. It has demerits over providing the clarity of location based services.

2.3. Smart Security solution for Women and Children Safety Based on GPS using IoT

In this paper, **AsmitaPawar, et.al.,** proposed that when the victim press the kit button, the application will capture the image by using Raspberry Pi camera and collects user information to send notification to registered phone numbers and with the link of captured image. And also for children transportation security, this system propose speed monitoring and location tracking facility using GPS,GPRS,GSM. It consumes time while processing is carried out.

2.4. IoT Based unified Approach for Women and Children Security Using Wireless and GPS

Ms.Deepali,et.al., proposed that system intends to a device wireless technique in the form of embedded device namely Arduino for women that will serve the purpose of alerts and way of communicating with secure channels and it captures the image using electronic camera. The system has been developed on web based data driven application that provides the useful information.

2.5. Women's safety using IoT

Prof.R.A.Jain ,et.al., recommended a model which will help to continuously monitor values of different sensors like heartbeat sensor, temperature sensor and accelerometer sensor. It uses GPS which will detect location of the device and GSM is used to send alert messages to guardians, relatives and police station. It probably requires network facility at end user.

2.6. IoT for Women Safety

Krishna Priyanka, et.al., modelled a device which is the integration of multiple devices, hardware comprises of a wearable "Smart band" which communicates with smart phones. This application is programmed and loaded with all the required data which includes Human behaviour and reactions to different situations like anger, fear and anxiety. This generates signal which is transmitted to the smart phone. It consumes power and overheads the communication.

2.7. Women Safety Device and Application-FEMME

In this paper, **Monisha,et.al.,** designed an ARM controller and android application is used in both the device and in smartphone synchronized using Bluetooth, hence both can be triggered independently. Audio can be recorded for further investigation and can give an alert call and message to the pre-set contacts with the instant location every 2 minutes and can be tracked live using FEMME.

2.8. IoT Based Women Safety Device using ARM7

The paper by **Shubham Sharma, et.al.,** is to provide security for woman, in case of emergency situations woman will press an emergency button which will activate the G PS for tracking the location and then SMS is been send to the police and family members of woman along with time. It requires constant monitoring of the victim's location which is quite tedious.
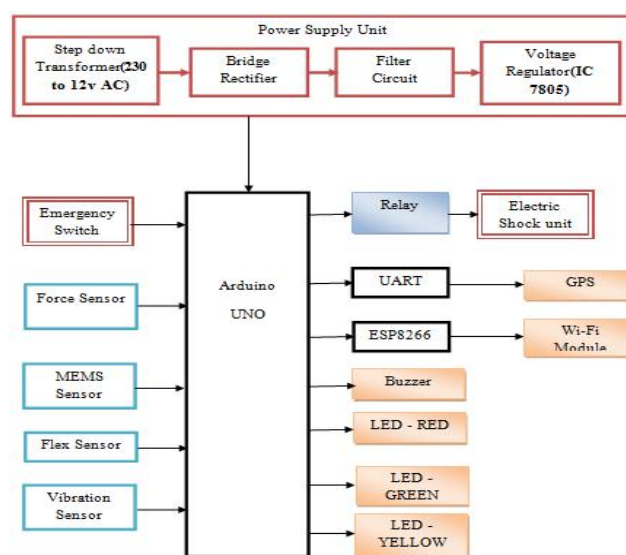
III. PROPOSED MODULE

3.1 SYSTEM ARCHITECTURE

Fig1: Block diagram of the device.

3.2 WORKING PRINCIPLE

The block diagram shown in Fig 1 consists of Power supply, Microcontroller, Electric shock unit, various Sensors and Emergency switch. The microcontroller will help to join the each and every information and produce alert when it's needed. The women sensor will help to find the women direction , that means if the women is normally walk or sit, the direction should be in X or Y axis , if the women is fall down means the direction of the sensor should be in Z axis. At that time the microcontroller will produce alert with the help of buzzer. The force sensor is the one which help to identify if any another person apply force on the particular women. If any abnormality occurs then the microcontroller send alert message to the uploaded contacts. For the purpose of self-defence, the device supply optimum voltage electric shock from the power supply unit to the intruder. Then the values of sensor can also be monitored in the web page.

3.3 SENSORS USED

3.3.1 Force sensor

A Force Sensor is defined as a transducer that converts an input mechanical force into an electrical output signal. Force sensors are commonly known as Force Transducers. A force transducer always converts the applied force and load to a measurable but small electrical voltage output signal. It works by its underlying material which is the strain gauge (a force sensing resistor) undergoing a comprehensive, tensile or bending force.

Fig 2: Force Sensor.

3.3.2 Vibration Sensor

Vibration sensors are sensors for measuring, displaying, and analyzing linear velocity, displacement and proximity, or acceleration. Vibration sensor designs feature sensing crystals attached between a center post and a seismic mass. Under acceleration, the mass causes a shear stress to be applied to the sensing crystals. This stress results in a proportional electrical output by the piezoelectric material.

Fig 3:Vibration Sensor.

3.3.3 Flex sensor

A flex sensor is a sensor that measures the amount of deflection or bending. It is in strips which can be affixed on the hardware component. One side of flex sensor is printed with a polymer ink which has a conductive particles embedded in it. When the sensor is straight, the particles give the ink a resistance of about 30k ohms. When sensor is bent away from the ink, the conductive particles move further apart, increasing this resistance to approximately 70k ohms. This sudden increase in resistance causes variations in voltage, triggering the output device, which the flex is connected with.
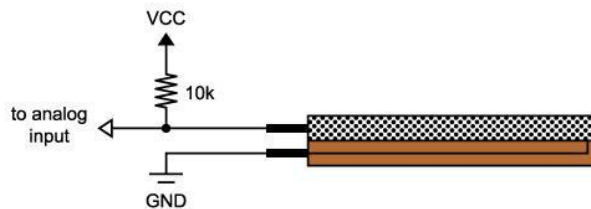

Fig 4: Flex Sensor.

3.3.4 MEMS Sensor

Micro-Electro-Mechanical Systems, or MEMS, is a technology that in its most general form can be defined as miniaturized mechanical and electro-mechanical elements (i.e., devices and structures) that are made using the techniques of micro fabrication. The critical physical dimensions of MEMS devices can vary from well below one micron on the lower end of the dimensional spectrum, all the way to several millimeters. Likewise, the types of MEMS devices can vary from relatively simple structures having no moving elements, to extremely complex electromechanical systems with multiple moving elements under the control of integrated microelectronics.

Fig 5: MEMS Sensor.

Reads the values from hardware components, converts them into software and uploads in web page.

SENSOR	THRESHOLD VALUE
Force	500
Flex	300
Vibration	600
MEMS	700

3.3.5 GPS Sensor

A GPS navigation system is a GPS receiver and audio/video(AV) components designed for a specific purpose such as car-based or hand-held device or Smartphone app. The GPS is a 24-satellite navigation system that uses multiple satellite signals to find a receiver's position on earth.GPS sensors are receivers with antenna that receive signals from the satellites and calculate the distance between the device and the satellite based on the long distance that the signal travel.

Fig 5:GPS Sensor

IV. MODULE DESCRIPTION

4.1 .IOT MODULE

In this module, coding is written for login, registration and for reading the values from the sensors when it violates the threshold value. Meanwhile, the message is sent to the uploaded contacts and location is tracked by the guardian. The data are collected from the user and registered in the web page.

4.2 EMBEDDED OPEN SOURCE MODULE

This module developed by Arduino Software IDE(Integrated Development Environment) which is a cross-platform application that is written in the programming language Java. It consists of both physical programmable circuit board (microcontroller) and a piece of software, or IDE that runs on the computer, used to write and upload computer code to the physical board. Microcontroller commands are integrated by Arduino IDE. It connects Arduino and genuino hardware to upload commands and communicate with them.

4.2.1 HARDWARE SETUP:

Power supply circuits are used to regulate the high voltage ADC from battery power source to low voltage ADC suitable for the microcontroller system.

Here power supply of 5v is been given to the controller. It keeps the flow of power in the equal form. We use 7805IC for regulation purpose where it converts the 230v supply into 5v as our system requirement is only 5v.

4.2.2 COLLECT DATA:

The data gathered is converted to a digital form and is processed at high speed. The data is subsequently retrieved from the objects by using this sensor.

Force Sensor is a sensor which intimates about the force applied on it. So that if any force applied beyond the threshold level it will send an alert and similarly for flex and vibration sensor. MEMS sensor sense is there any angle deviation. As microcontroller has inbuilt ADC, it will convert that signal in digital form and proceed further.

4.2.3 DATA TRANSCEIVING

The Serial Peripheral Interface (SPI) bus is a synchronous serial communication interface specification used for short distance communication, primarily in embedded systems. An Arduino is actually a microcontroller based kit which is basically used in communications and in controlling or operating many devices. The processed data is sent to SERVER via Ethernet. Accordingly, real-time data can be stored and monitored at Cloud servers.

4.3 PROTEUS

Proteus (Processes and Transactions Editable by Users) is a simulation software to Simulate components and is capable of drawing desired circuit. It is being used for fast check up of code written in microcontroller. It is ahead in simulating the circuits containing the microcontroller where we can simulate the circuit by uploading the hex code to the microcontroller.

Proteus has huge list of components and many libraries available which can be added to include more components. It includes hundreds of functions for accessing file system, sorting data, manipulating data and strings, interacting with the user, calculating logical and mathematical expressions.

V. EXPERIMENTAL SETUP

NETBEANS**:**

In this paper, we used Netbeans software to write the codes in java. It is an integrated development environment for java. The Netbeans platform allows applications to be developed from the set of modular software components called modules. The Netbeans team actively supports the product and seeks feature suggestions from the wider community.

PROTEUS:

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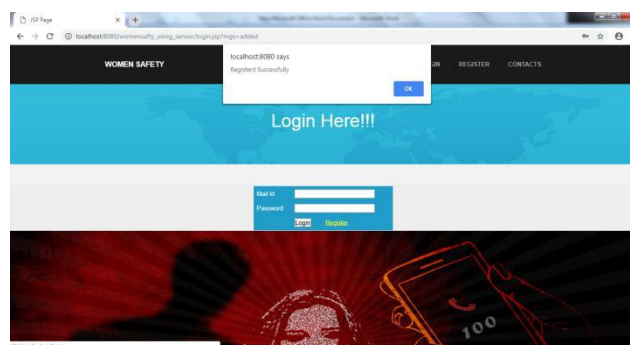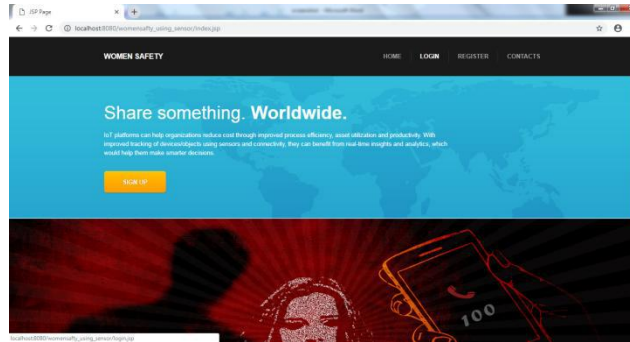
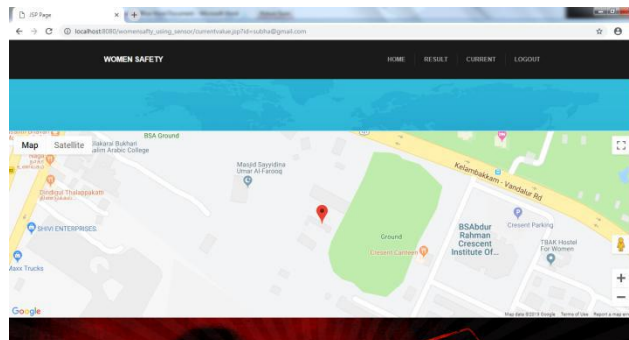### 5.1. RESULT

Fig 7. Login page

Fig 8. Sign up page.

The user details are registered in the register page. Once the user can view the registered successfully notification, login page opens and login is done using the password.

Fig 9. Start connection page.

This page reads the value from the sensors. Then it compare the obtained value with the threshold value and send the alert message to the contacts as soon as the victim faces the situation.

VI. CONCLUSION

In this paper we demonstrated that how a woman can safe-guard herself with the self automated woman safety device. Women safety monitoring system implemented with the influence of embedded system. The sensors were helped to monitor the safety and it can send the messages to the user.

The women safety system helps to improve the safety of women. Monitoring of force by using force sensors in the embedded system is creating the new way of security and also the MEMS sensor adds much more security for women. In future, image capturing device can be integrated with the hardware setup. By using hardware component, wearable devices can be modelled like smart belt, smart jacket, etc.

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