Kavach
(A Safety Device For Women)

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Abstract: Women are the epitome of strength, love, sacrifice and courage. Over the years they have attained immense success and are now marching side by side with men in every walk of life. At the same time the violence against women has increased by many folds due to the greater exposure of women in every field. Women are subjected to unethical physical harassment. This paper presents an idea to make a system which can be used to provide security for women. The system consists of two modules. The first module consists of a voice module which can be embedded into the accessories of women such as bracelet, ring or watch. The voice module will be used to send the location to registered mobile numbers and to contact the nearby police station. The second module consists of a pendant which can be worn over neck. This pendant contains camera module which can be used to capture images and to record the video. Other tools such as Arduino, GPS, GSM, and heart beat sensor will also be used

Keywords: Women safety, Voice control, IOT, GPS, GSM, Kavach

1. Introduction

Women have the right to be free from violence and harassment. Women are not safe anywhere and are most vulnerable when traveling alone into lonely roads and deserted places. According to the survey done by NCRB the total number of crimes against women crossed 4 lakhs cases in 2019.As compared to 2010, the number has

gone up by nearly 53%. In order to provide security to the women there is a need of a device which is easy to carry and easy to operate in dangerous situations. While keeping this in mind we propose a system Kavach that has dual feature. The first module of the system has a voice module embedded inside the accessories worn by women such as bracelet, ring or watch. This module will trigger other tools present inside the system such GSM, GPS and heartbeat sensor.

The whole system will work on the voice commands given as the input to the module. This will be useful for women in the situations where she may not get a chance to press the button. Once she screams the command alert messages will be sent to the registered mobile numbers and to the nearby police station along with the location of the person. Other module consists of a camera which can be embedded inside a pendant or neck piece worn by women. This module will be used to capture the images of the criminals and record the video. These images and videos can be used as an evidence to punish the criminal. This device will be very useful in saving lives as well as preventing evils against women. The other tools included in the system are GPS (Global Positioning System) to receive the location and GSM (Global system for mobile communication) to send the alert messages to pre-registered mobile numbers. In emergency situation this system can connect to the phone easily and provide self-security when people momentarily tend to panic.

This system is easy to operate and with this device one can move freely without any fear.

2. Literature Survey

Women Safety Jacket

It is a smart jacket which can be connected to user mobile phone. When a woman feels unsafe, she can press the buzzer embedded in her jacket. It will send distress signal to the user mobile using Bluetooth. The mobile application which was installed on the user phone will pick up this signal and sends a SOS message along with the location of user to the mobile number which was stored in the app. It also contains a shocker circuit and an alarm which are activated on pressing the buzzer. The alarm produces a beep sound continuously and the shocker circuit generates a shock that will be enabled on the outer side of the jacket and the inner side of the jacket is insulated to protect the user. There is an alternative way in case if the user can't press the button, she can activate the system by stretching the wire. This device requires a mobile phone and a mobile application to work.

Instantaneous feedback pedometer with emergency GPS tracker

This device is a wearable fitness band that has pedometer and cardiac applications. It has a pedometer which can be used to count the each step a person takes. It also has a heart rate monitoring system along with a GPS module and a Bluetooth module. This device is connected to user mobile phone using a mobile app and Bluetooth. This android app is developed using MIT app inventor. SIF the user experiences a sudden cardiac arrest it sends an SMS alert and also a call is made to the mobile number which is stored in the app.

The alert message consists of user location in latitude and longitude form which is obtained by the mobile app using the GPS module on the mobile. This device mainly focuses to let other people know when there is a cardiac emergency for the user.

3. System Architecture

This paper present and idea to make a voice controlled based compact and convenient safety device. This focuses on instant security alerts and proof collection which enables to detect criminals easily. The System make use of various devices such as voice recognition module, RF-Camera, GSM, GPS, Arduino and heart beat sensor.

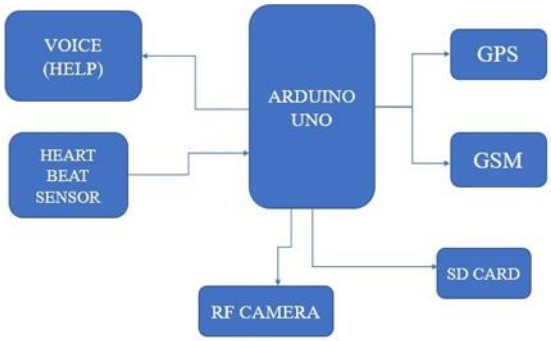

Fig 1: System Block Diagram

The idea of the project is to build a device which can be controlled by voice command of the individual person and will perform the actions based on the input command. This is an easy and more reliable way to ensure one's safety, instead of remembering to press buttons, naturally when the individual scream for help an alert message along with latitude and longitude position will be send to emergency contacts and to nearby police stations, even more if the victim gives the command such as "Record" the camera module will be triggered and video of the criminals will be recorded without their knowledge. Fig 1

shows the block diagram used for the system.

The system is making use Arduino uno as microcontroller. All the modules are connected to Arduino and are initiated with respective voice commands. It is supplied with external power of 8V - 12V whereas an external power supply of 3.5V – 4.5V is given to GSM module. The system is making use of Cellular IoT connection which enables the individual to use the device even without internet connection. The main reason to use cellular IoT connection over Wi-Fi connection which enables the device to connect with smart phone is that if in some scenario if the smart phone is lost or are stolen, then in that case it leaves the victim helpless.

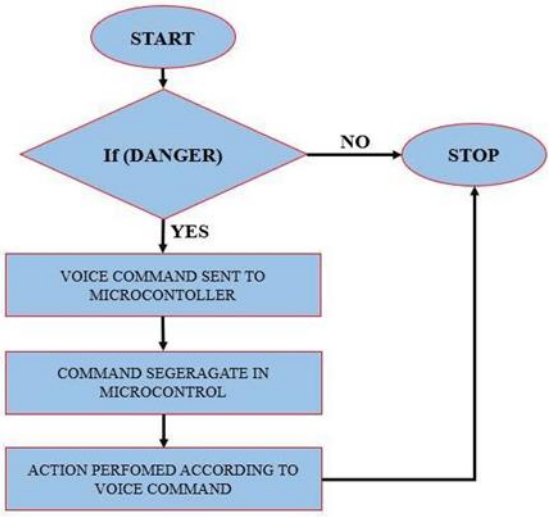

Fig 2: Work Flow of System

Fig 2 shows the basic work flow of the designed system. If someone feels that they are in some situation where they need help or situation for which they want proof but without alarming the other person, then they can switch on the system. As soon as system is powered then voice recognition module will be ready to record the commands. The individual will then provide

the voice module with the voice command. The command provide in the system are capable of performing the following actions which can be divided as into three cases as described below.

Case 1: Sending location and Alert Message:

When the command given by individual is "HELP" the Arduino activates the GSM and GPS module simultaneously and an alert message will be sent to all the contacts in emergency list by using GSM 900A module. Simultaneously the GPS module will calibrate the location and longitude and latitude position will be sent along with the message. To ensure that the person who is receiving victim's location don't ignore the alert messages a call will be made to the respective numbers. The System will be further developed in such a way that even the nearby police stations can receive the victim's location.

Case 2: Recording crime scene

When the command given is "Record" the Arduino activates the camera module which then starts the recording. The camera will be in a pendent of locket which is positioned in such a way that it can seamlessly record the face of the criminal which will make it very easy for cops to identify and catch criminals.

Case 3: Heart Beat Monitoring

The idea is to build a safety device which will not be only helpful in cases like eve teasing or attempt to rape but to also help the individual in medical cases. So, when the command is given as "Heart" the pulse of the individual is measured and the readings are sent to the individuals device via SMS.

4. Hardware Discription

A. Arduino

Arduino UNO is an open-source micro- controller developed by Arduino.cc. It is based on the Microchip ATmega328P. This device has a 14 digital I/O pins and 6 Analog I/O pins. It accepts voltage 7V and 20V. It can be powered by an external battery or a USB. The word "UNO" in Arduino UNO means "one" in Italian. Arduino UNO communicates using the original STK500 protocol which provides serial communication and available on digital pins (RX and TX). It has a flash memory of 32KB out of which 0.5KB is used by the bootloader.

B. SIM900A

It is an ultra-compact wireless module which can be used for SMS and Phone calls. This is a dual band GSM/GPRS solution in a SMT module. It delivers GSM/GPRS performance on 900/1800MHz with low energy consumption. The SIM900A module consumes only about 1.5mA while on sleep mode and it also has an operating temperature -40°C to +85 °C. This module has 6 pins in which two pins are used for VCC and GND and the rest are used for 3VR&3VT and 5VR&5VT.

C. GPS

It is also known as Global Positioning System is a satellite-based radio navigation system. GPS is owned by United States Government. It was invented by Roger L. Easton of the Naval Research Laboratory, Ivan A. Getting of The Aerospace Corporation, and Bradford Parkinson of the Applied Physics Laboratory. To determine its position on earth it makes uses of signals sent by the satellites on space and ground

stations on earth. We use NEO-6M GPS module. It consists of four pins: VCC, GND, TX, RX and it communicates with Arduino via serial communication using RX and TX pins.

D. V3 Voice Recognition module

V3 can store a maximum of 8 commands. This device records the voice commands and compare with already recorded set of voices. It has no language barrier which means we can record in any language. V3 has an input voltage range of 4.5V to 5V and current less than 40mA. It has a 99% recognition accuracy when there is less noise. It has four pins: VCC, GND, RXD, TXD.

5. Conclusion And Future Scope

Kavach a safety device for women is a very handy and easy to use device which can be easily controlled using voice command. If anything goes wrong or any tragedy occurs, the system provides an effective solution for proof collection. In difficult times women don't have to press button for help. The device is making use of satellite connection hence women don't have to worry even in case of lost or stolen mobile. Women won't feel helpless no more.

In future, the device can be loaded with more medical features and even can be used as a medical assisting device. A separate mobile or computer application can be developed for providing an easy interface with the device. Using nano technology and VLSI technology this device can be embedded into a locket and wrist band

References

https://karam.in/role-women-todays-world/
https://blog.vantagecircle.com/women-in-the-workplace/
https://www.unilever.com/sustainable-living/enhancing-livelihoods/opportunities-for-women/promoting-safety-for-women/
https://www.freepressjournal.in/indore/indore-crime-against-women-biggest-blot-in-indias-reputation
https://timesofindia.indiatimes.com/blogs/th e-rock-bottom/women-safety-in-india