

EMBEDDED BASED WOMAN SAFETY INFORMATION SYSTEM

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ABSTRACT-- Women are the assets of the nation. Women Safety is the major concern all over the World. Safety for women has become mandatory for all womanhood right from children to adults. Safety is necessary both inside and outside the home. Even though the world is heading towards modernization and equity of men and women, still there are many crimes against women. Nowadays, crimes against women especially physical abuse cases are getting high in range. We all know Delhi Gang rape and murder case was one of the most brutal case not only in India but also in the world. These cases are still happening all over the world and women are facing insecurity when it comes to harassment. This project “Embedded based women safety information system” proposes a quick responding mechanism that helps women during trouble. This project focuses on the security for women so that they will never feel helpless. This device is a wired control system equipped with an electronic weapon which is used to activate an electric shock to the attacker. The device consists of a band which carries the Arduino microcontroller and it is activated when the woman is in trouble. When a stranger is going to attack a woman or physically abuse her, a touch signal will be sent to the microcontroller and simultaneously a voice keyword from the woman is sent to the microcontroller. Once the two inputs are received, the microcontroller gets ready to produce the outputs. An emergency message is given to the nearby police station along with an alarm buzzer ringing. Also, an electric shock signal is generated to the attacker thereby ensuring immediate safety to the innocent woman. Thus this device would be of great use to the women society and serves as a tool when she is in danger.

Key Words--Arduino, Touch signal, Voice keyword, GSM module, Electric shock

I. INTRODUCTION

Women Harassment is the fourth most common crime against women in India. According to National Crime Records Bureau (NCRB) 2013 annual report, 24,923 harassment cases were reported across India in 2012. Apart from this, most of the cases were unreported because the victims fear retaliation and humiliation both in India and throughout the world. Thus an idea is presented about design of women antiharassment device that prevents or deterring harassment (i.e) physical abuse against women. Women safety is [4] a very important issue due to rising crimes against women these days. To resolve this issue, we propose a GPS based women safety system that has dual security feature. This device consists of a system that ensures dual alerts in case a woman is harassed. The system can be turned on by a woman when she is in trouble. It is useful because once an incident occurs with a woman she may or may not get the chance to press the emergency button. In a button press alerting system, in case

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a woman is hit on the head from behind, she may never get the chance to press panic button and no one will know she is in trouble. In this, the woman authenticated [2] to the devices can start the system by touching the touch sensor. The system now sends her location to the authorized personnel number through SMS as a security measure and also sounds a buzzer continuously so that nearby people may realize the situation. In this case even if someone hits the woman or the woman falls down and get unconscious, this device will prove to be very useful in saving lives as well as preventing atrocities against women.

In the proposed system we are developing a device that is used as a weapon for women in danger. The main purpose of this device is to take an immediate first base safety action that protects the women from danger. Thus an electronic shock is generated to attack the attacker and protect the woman[1] in danger at first base itself. The device consists of 3 steps:

- Alarm Buzzer
- Message To Rescuer
- Electronic Shock Generator

This device is set up in a band which is mobile. The project is done using Arduino micro controller. Arduino UNO Atmega328 is the heart of the project. The inputs are the touch from the touch sensor TTP223B and voice signal from the voice Bluetooth module HC-05. The outputs are the electric pulse from electric pulse emitter producing 30 mA. Along with that, a buzzer is fitted to produce alarming sound to the neighbors' and then a message signal is sent to the helper nearby.

1.1 Block Diagram of the proposed system

The device consists of several components which have been explained in the following block diagram.

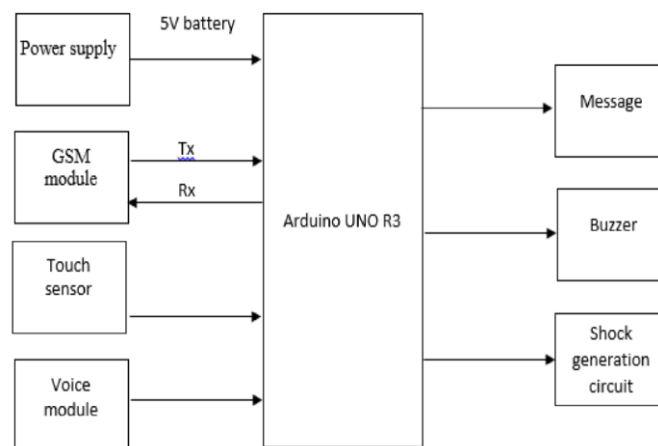


Fig 1.1: Block diagram of the proposed system

The heart of this device is the Arduino microcontroller because the operations taken are performed and controlled by the Arduino. The Arduino used in this device is the Tmega328 UNO R3 which is the basic model and widely used type of Arduino board. A battery of 5 V is given to the Arduino as a source of power supply. The sensor used to sense the touch signal is the touch sensor TTP223. The voice keyword is recognized with the help of Android application and a Bluetooth voice module HC- 05 is present in the device to link with the Android

application. The GSM module with a sim GSM Sim900A is used in this device for the purpose of passing the message along with GPRS facility. A buzzer is fixed which is used to alert the environment through alarming. An electronic shock generator is fixed to the device which acts as main output of the device. The blocks stated in the block diagram Figure 1.1 are further explained in detail.

1.2 ARDUINO

Arduino[5] is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs light on a sensor, a finger on a button, or a Twitter message and turn it into an output activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

Advantages of using Arduino:

It is simple and easily accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy to use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and physics principles, or to get started with programming and robotics. Designers and architects build interactive prototypes, musicians and artists use it for installations and to experiment with new musical instruments. Makers, of course, use it to build many of the projects exhibited at the Maker Faire, for example. Arduino is

a key tool to learn new things. Anyone children, hobbyists, artists and programmers can start tinkering just following the step by step instructions of a kit, or sharing ideas online with other members of the Arduino community.

1.2.1 ARDUINO UNO R3

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

1.2.2 SPECIFICATIONS

Microcontroller[5] ATmega328P

Operating Voltage 5V

Input Voltage (recommended) 7-12V

Input Voltage (limit) 6-20V

Digital I/O Pins 14 (of which 6 provide PWM output)

PWM Digital I/O Pins 6

Analog Input Pins 6

DC Current per I/O Pin 20 mA

DC Current for 3.3V Pin 50 mA

Flash Memory 32 KB (ATmega328P) of which 0.5 KB used by boot loader

SRAM 2 KB (ATmega328P)

EEPROM 1 KB (ATmega328P)

Clock Speed 16 MHz

LED_BUILTIN 13

Length 68.6 mm

Width 53.4 mm

Weight 25 g

Specifications of Arduino

1.2.3 TOUCH SENSOR (TTP223)

The TTP223 is a touch pad detector IC which offers 1 touch key. The touching detection IC is designed for replacing traditional direct button key with diverse pad size. Low power consumption and wide operating voltage are the contact key features for DC or AC application.

II. FEATURES

- Operating voltage 2.0V~5.5V
- Operating current @VDD=3V, no load, SLRFTB=1 At low power mode typical 1.5uA, maximum 3.0uA
- At fast mode typical 3.5uA, maximum 7.0uA
- @VDD=3V, no load, SLRFTB=0
- At low power mode typical 2.0uA, maximum 4.0uA
- At fast mode typical 6.5uA, maximum 13.0uA
- The response time max about 60mS at fast mode, 220mS at low power mode @VDD=3V
- Sensitivity can adjust by the capacitance (0~50pF) outside
- Have two kinds of sampling length by pad option (SLRFTB pin)
- Stable touching detection of human body for replacing traditional direct switch key 34
- Provides Fast mode and Low Power mode selection by pad option (LPMB pin)
- Provides direct mode toggle mode by pad option (TOG pin)
- Open drain mode by bonding option, OPDO pin is open drain output
- Q pin is CMOS output
- All output modes can be selected active high or active low by pad option(AHLB pin)
- Have the maximum on time 100sec by pad option (MOTB pin)
- Have external power on reset pin (RST pin)
- After power-on have about 0.5sec stable-time, during the time do not touch the key pad
- And the function is disabled

- Auto calibration for life
- And the re-calibration period is about 4.0sec, when key has not be touched

2.1 BLUETOOTH VOICE MODULE

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC. HC-05 Bluetooth module provides switching mode between master and slave mode which means it able to use neither receiving nor transmitting data

2.1.1 Specification:

- Model: HC-05
- Input Voltage: DC 5V
- Communication Method: Serial Communication
- Master and slave mode can be switched

III. CONNECTING THE SMART PHONE TO HC-05

Pair the devices and the default password of the HC-05 module is 1234. After we have paired the devices we need an application for controlling the Arduino. There are many applications in the Play Store for this purpose which will work with the Arduino code that we wrote. However, I made my own custom application for this tutorial using the MIT App Inventor online application. This is a great and easy to use application for building Android application and in my next tutorial you can find a detailed step by step guide how to build your own custom Android application for your Arduino Project. With the connect button we will connect the smart phone to the Bluetooth module and the status text below the button will tell us whether we have successfully connected. Using the “Turn ON” and “Turn OFF” buttons we can turn on and off the LED. The text above the buttons is the one that the Arduino is sending back to the smart phone when a particular button is pressed.

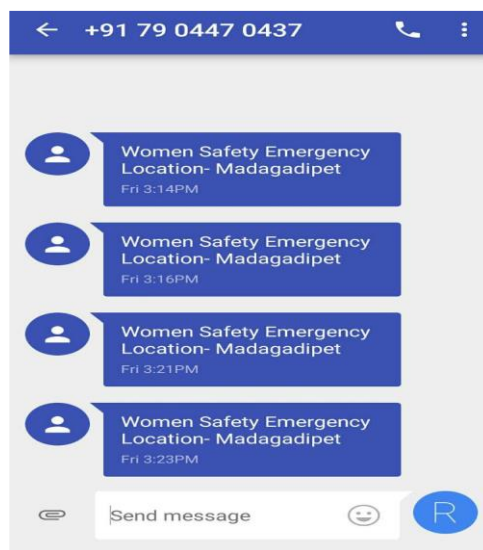
IV. GSM SIM 900A

GSM/GPRS[9] Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/1800 MHz. The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 hip(MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply. Using this modem, you can make audio calls, SMS, Read SMS, attend the incoming calls and internet etc through simple AT commands.

Working of the proposed system

The main objective of this device is to provide base protection to the women in danger. In the proposed work, the protection mechanism is done by providing an electric shock to the attacker. The device works based on two inputs and three outputs.

The input signals are the touch signal and the voice keyword. The output signals are the buzzer ringing, message passing and providing electric shock to the attacker. When the attacker attacks the woman, the touch sensor placed in the pelvic region of the body gets sensed and then the signal is sent to the Arduino micro controller. Simultaneously, the voice keyword “help” is also generated by the woman. The voice keyword is identified by the Android application “Android Voice Control” and then sent to the Arduino through the Bluetooth voice module. The Arduino receives both the inputs and gets ready to perform the output action. The buzzer starts ringing and the message signal is sent to the emergency people. The message that is sent is “Women Safety Emergency” along with the



GPS

Received Message to the pre-determined numbers

location tracking. The electronic shock generator generates 30 mA to the attacker which is the main output signal. Thus the proposed prototype works in an efficient manner.

V. CONCLUSION

In our project we developed a device providing alarm buzzer, message to rescuer and electronic pulse emitter where the whole set up is consider as mobility device after getting the input that is get touched by the attacker through touch sensor, voice signal is being received immediately output emergency message is given to the nearby police station along with buzzer alarm an electric pulse over 30mA result in tissue damage and may trigger fibrillation of the heart or cardiac arrest , any of which may ultimately be fatal the attacker. Mean time she can able to safe herself from the attack, get escaped. Thereby the ensuring immediate safety to the innocent[8] woman thus

the device would be great use to the women society and serves as a great tool when women in danger as it pays token of love to the future womanhood.

Our project can play a major role by providing women a safe environment in all situations for example (detecting hidden camera, physical threatened, harassed, robbery, stalked). Implementing real time application and a device, we can solve the problems to an extent. With further research and innovation, this project is used as a small wearable device like watch, pendent, safety foot wear, arm band etc.

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