ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

An ISO 3297: 2007 Certified Organization *Vol. 5, Special Issue 3, March 2016*

National Conference on Recent Advances in Electrical & Electronics Engineering (NCREEE'16)

Organized by

Dept. of EEE, Mar Baselios Institute of Technology & Science (MBITS), Kothamangalam, Kerala-686693, India

On 17th & 18th March 2016

Bluetooth Aided Safety Band for Women

Alisha George Ambal[1], Harikrishnan T[2], Helen Jacob[3], Hewin Babu[4], Thomas George[5]

B.Tech, Dept. of EEE, Mar Baselios Institute of Technology and Science, Nellimattom, Kerala, India[1,2,3,4]

Assistant Professor, Dept. of EEE, Mar Baselios Institute of Technology and Science, Nellimattom, Kerala, India[5]

ABSTRACT: Personal safety is one of the most important concerns for women, as crime against women has not decreased. Nowadays,various devices are available in markets which claim to protect women in many ways. Still there arises the need of a protective device which acts as a guardian at time of an attack. This fuels a new thought of aBluetooth Aided Safety Band for Women. This paper aims to create a wearable band with provision of connecting with smart phone via Bluetooth. If an emergency occur, the smart phone will produce a high volume alarm and it also sends alert messages to predefined numbers with current location of the device. The device also incorporates a self defensive mechanism by giving an electric shock to the molester. The main advantage of this band is its convenience and easiness of operation.

KEYWORDS: Women Safety, Bluetooth, Wearable band, Electric shock circuit , Android application

I.INTRODUCTION

The status of women in India has been subject to many great changes over the past few millennia. In modern India, Women are treated on equal grounds with men. They have become Independent and are keeping pace with the changing trends. However, in some parts women still continue to face discrimination and other social challenges and are often victims of abuse and violent crimes. Due to these reasons it has become very important for females to stay alert and tackle all such situations efficiently when they are alone.It is high time that we equip ourselves to deal with such daunting situations. Neither women nor their families need to worry about the time or places when they go out. All they need is a device that can be carried around easily and worn whenever the woman feels unsafe.
Here we introduce a wearable device which normally works as an ordinary watch [6]. It also incorporates a Bluetooth unit that will help the victim to communicate with their family or police at the first sign of trouble. It also activates an alarm from the phone which is connected via Bluetooth. This enables to gain attention of others to the scenario. A shock circuit is also incorporated to give a non lethal shock if any kind of assault is initiated. This band also helps the owner to locate his phone, if lost or misplaced.

The band is intended to work as a location tracker and will also to screech the alarm, if necessary. This demands the need of additional hardware which results in increased size and weight [7]. All these flaws can be rectified by using the Bluetooth technology so that the functions like tracking, messaging and alert alarm can be performed with the help of a smart phone on receiving the command. The alarm will get activated and alert message with location will be sent to a predefined number.

II.RELATED WORKS

Many devices are now available in the market which are meant for the safety of women and some of which are still in the development stage. "Suraksha"-A Women Safety device[3] is a security system specially designed for women in distress. The basic purpose of the system is to intimidate instant location and a distress message is send to the cops or to registered numbers, so that unfortunate incidents would be averted and will also provide real time evidence for swift action against the perpetrators of crime against woman. It is capable of location tracking and screeches an alarm when blood pressure of wearer exceeds a limit. The size of the system is more and the pressure sensors used are usually too expensive. Also the device is bulky and the system needs a receiver transmitter system with wireless module and GSM module for communication. Smart Girls Security System[4] is a device which resembles to a normal belt, but is capable of performing location tracking. But it is rarely available.SHE (Society Harnessing Equipment) is a garment designed

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

An ISO 3297: 2007 Certified Organization *Vol. 5, Special Issue 3, March 2016*

National Conference on Recent Advances in Electrical & Electronics Engineering (NCREEE'16)

Organized by

Dept. of EEE, Mar Baselios Institute of Technology & Science (MBITS), Kothamangalam, Kerala-686693, India

On 17th & 18th March 2016

by three engineers from Chennai. This garment has an electric circuit that can generate 3800kV of current which can help the victim to escape. In case of multiple attacks it can send up to 82 electric shocks. Since the fabric is bilayer, the user is not affected. . It can also send emergency messagesusing GPS and GSM modules. The device needs to be more compact and is uncomfortable to wear. It seems risky as it is not well covered. So if any damage occurs the wearer herself may get shocked. Guardian Angel is another device which can be worn as either a pendant or a bracelet, and works via Bluetooth with an application on your smart phone. When stuck in an unsafe situation, you push a small button and your cell phone will ring immediately, creating a distraction. If pushed for longer than three seconds, the device will go a step further and send an emergency alert, along with your location, to a contact you've pre-programmed. But these are rarely available in the Indian market and are costly. All these devices leave some scope for improvement either in case of cost or size.

Another one is a software application called as VithU, which is an emergency application created by a popular Indian crime television series "Gumrah" aired on Channel [V]. In this app when the power button of the Smartphone is pressed twice consecutively, it will send alert messages, with a link to the location of the user at every two minutes. Amrita Personal Safety System (APSS) [5], a new technology to protect women from potential rapists and sexual offenders. APSS is an inconspicuous, wearable and easy to-operate electronic device that will help women in establishing contact with family and police at the first sign of trouble. The device will remain invisible to the criminals and yet can easily be triggered by the user with multiple options, to ensure steady and secure communication. But the face recognition system used in it may go wrong and is not fool proof.

III. BLOCK DIAGRAM

This prototype is developed with the hope that it would be capable of providing better safety to women than many devices that are available nowadays. This system consists of a microcontroller, Bluetooth module, Display, Power supply, additional protection circuit, and a smart phone. The GPS tracking [1], messaging and the alarm facility of the smart phone are also utilized.

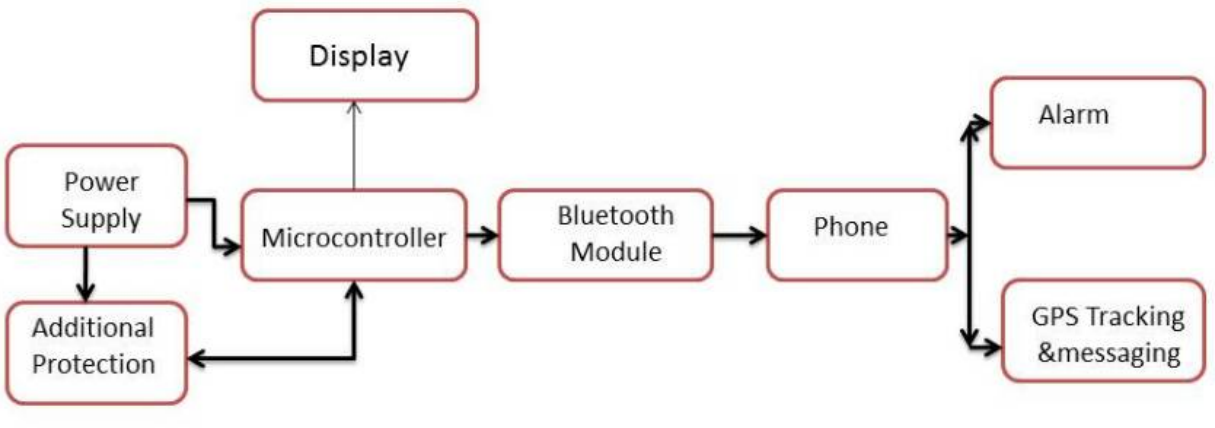

Fig 1. Block Diagram

Here we are using a power supply of 9V. A 5 V to the microcontroller is given after regulation. Hardware is paired with the smart phone via Bluetooth. During normal operation, the time is displayed in the seven segment displays. If a switch is pressed then simply the location will be sent to one or more predefined numbers. Another switch is used to spot the phone if lost or misplaced. It is also equipped with a charge pump circuit as an additional protection circuit. It gets activated when the switch is openand willgive an electrical shock through a physical contact which is non lethal but will be pain inflicting. This helps the victim to tackle the distressing situation.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

An ISO 3297: 2007 Certified Organization *Vol. 5, Special Issue 3, March 2016*

National Conference on Recent Advances in Electrical & Electronics Engineering (NCREEE'16)

Organized by

Dept. of EEE, Mar Baselios Institute of Technology & Science (MBITS), Kothamangalam, Kerala-686693, India

On 17th & 18th March 2016

IV. CIRCUIT DIAGRAM AND DESCRIPTION

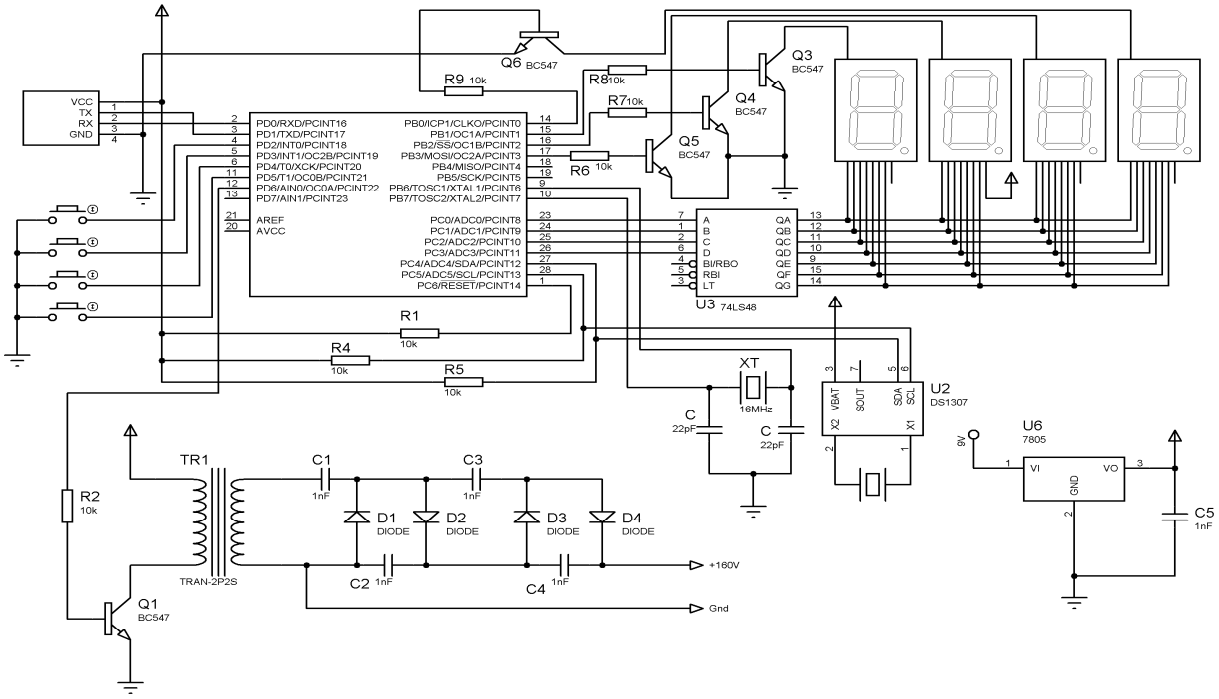

Fig 2. Circuit Diagram

The circuit consists of a ATmega328 microcontroller,HC-05 Bluetooth module, seven segment displays, DS1307 real time clock, and a voltage regulator IC 7805.

A common alternative to the ATmega328 is the "picoPower" ATmega328P**.** By executing powerful instructions in a single clock cycle, the ATmega328P achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed.It is now commonly used in many projects and also in autonomous systems where a simple, low-powered, low-cost micro-controller is the major concern.

Bluetooth is a wireless technology standard for exchanging data over short distances from fixed and mobile devices and building personal area networks (PANs). It was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. Bluetooth is managed by the Bluetooth Special Interest Group (SIG), which has more than 25,000 member companies in the areas of telecommunication, computing, networking, and consumer electronics. When two Bluetooth devices want to talk to each other, they need to pair. Communication between Bluetooth devices happens over short-range, and uses ad hoc networks known as piconets. A piconet is a network of devices connected using Bluetooth technology. The network ranges from two to eight connected devices. When a network is established, one device takes the role of the master while all the other devices act as slaves. Piconets are established dynamically and automatically as Bluetooth devices enter and leave radio proximity. Here HC-05 module is an easy to use Bluetooth module, designed for transparent wireless serial connection setup.

The DS1307 Serial Real-Time Clock is a low-power, full binary-coded decimal (BCD) clock/calendar. Address and data are transferred serially via a 2-wire, bi-directional bus. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information.The clock operates in either the 24-hour or 12-hour format with AM/PM indicator.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

An ISO 3297: 2007 Certified Organization *Vol. 5, Special Issue 3, March 2016*

National Conference on Recent Advances in Electrical & Electronics Engineering (NCREEE'16)

Organized by

Dept. of EEE, Mar Baselios Institute of Technology & Science (MBITS), Kothamangalam, Kerala-686693, India

On 17th & 18th March 2016

TheDS1307 has a built-in power sense circuit that detects power failures and automatically switches to thebattery supply.

The additional protection circuit is a kind of a voltage multiplier that uses capacitors as energy storage elements to create either a high voltage power source. Charge pump circuits are capable of high efficiencies, sometimes as high as 90–95% while being electrically simple circuits. Charge pump uses some form of switching device(s) to control the connection of voltages to the capacitor. For instance, a two-stage cycle can be used to generate a higher pulsed voltage from a lower-voltage supply. Here the 9 V supply is given to the charge pump circuit which made of capacitors and diodes. A very high voltage is obtained as the output.
The microcontroller program is burned to the chip using Arduino IDE. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Arduino programs may be written in any programming language with a compiler that produces binary machine code. Atmel provides a development environment for their microcontrollers, AVR Studio and the newer Atmel Studio. The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in Java. It originated from the IDE for the Processing programming language project and the Wiring project. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and provides simple one-click mechanism for compiling and loading programs to an Arduino board. A program written with the IDE for Arduino is called a "sketch". The Arduino IDE supports the C and C++ programming languages using special rules of code organization. The Arduino IDE supplies a software library called "Wiring" from the Wiring project, which provides many common input and output procedures.
Android application [2] is developed using a platform named android studio. Android is an open source operating system (OS) currently developed by Google, based on the Linux kernel and designed primarily for touch screen mobile devices such as smart phones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text input. Android Studio is the official integrated development environment (IDE) for developing for the Android platform. Android Studio is freely available under the Apache License 2.0

V. FEATURES AND FURTHER DEVELOPMENT

This paper is an endeavor to develop an effective self-defense gadget which would provide protection to women in case of any assault or unsolicited contact. The major merit of this product is its simplicity and is also economical and effective handy device for women who travel alone. This gives more confidence to the women about their safety. It can also be used as a digital watch and a phone locator if phone is lost or misplaced. The model is developed with easily available and comparatively low cost components.

This work is of moderate cost, very effective, and productive. But there is always room for improvement. Some improvements can be made so that it expects to enhance the performance without altering the existing design. Presently the application is compatible only to android smart phones. So by making it compatible with any OS can improve the system. It can be modified as a location and warning aid for children, old age persons etc. A small camera can be embedded on the systemwhich would record the crime and serve as identification of the attacker. The system can be further developed by adding few sensors to sense the fear and anxiety and thus automatic response can be obtained. Addition of a voice recognition system for the access will help to improve the performance.

VI.CONCLUSION

Women safety is a critical social issue in today's world. Through this paper we aim to put forward an efficient and handy safety device for women. The proposed design can handle some critical issues faced by women and will help to solve them with technologically sound and simple equipments.It can be concluded that this system helps to improve the gender equality by providing safe environment to women in the society, and allows them to work till late nights. The band helps to get necessary help in any distress and facilitate a means of self defence.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

An ISO 3297: 2007 Certified Organization *Vol. 5, Special Issue 3, March 2016*

National Conference on Recent Advances in Electrical & Electronics Engineering (NCREEE'16)

Organized by

Dept. of EEE, Mar Baselios Institute of Technology & Science (MBITS), Kothamangalam, Kerala-686693, India

On 17th & 18th March 2016

REFERENCES

[1] X. Shu, Z. Du, and R. Chen, Research on mobile location service design based on Android, 5th International Conference on Wireless Communications, Networking and Mobile Computing2009, 24-26 Sept 2009, pp. 1-4.
[2] Kroll, M. W. "Crafting the perfect shock." Spectrum, IEEE 44.12 (2007): 27-31
[3] "SURAKSHA, A Device To Help Women In Distress: An Initiative By A Student Of ITM University, Gurgaon" efytimes.com .2013.http://efytimes.com/e1/118387/SURAKSHA-A-Device-To-Help-Women-In-Distress-An-Initiative-By-A-Student-Of-ITM-University-Gurgaon.
[4]SMART GIRLS SECURITY SYSTEM by Prof. Basavaraj Chougula, Archana Naik, Monika Monu, Priya Patil and Priyanka Das, Volume 3, Issue 4, April 2014, International Journal of Application or Innovation in Engineering & Management.
[5] An Intelligent Security System for Violence against Women in Public Places by Remya George, AnjalyCherian.V, Annet Antony, HarshaSebestian, Mishal Antony, Rosemary Babu.T, Volume-3, Issue-4,April 2014International Journal of Engineering and Advanced Technology (IJEAT)
[6] Design of Electric Shock Antenna Watch with Automated SMS Facilities for Women Safety in India under Government License by S Mohamed Ashiq, C Manivelprabhu Volume 3, Issue 3, March 2013, International Journal of Emerging Technology and Advanced Engineering
[7] DESIGN AND IMPLEMENTATION OFSMART WRIST-BAND FOR SAFETYMEASURES IN EMERGENCY by Vivek P N, Sushma S, Suhas R C, Reshma B S, Raksha Ramakrishna, Roopa J, JUNE 2013 Proceedings of National Conference on Wireless Communication, Signal Processing, Embedded Systems- WISE *2013*