



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirccce.com

Vol. 5, Issue 5, May 2017

Automated Security System for Girls Safety Using ARM7

Sangeetha V¹, Nuzhath Zaiba², Poojashree K.P.², Reetu T², Shashwathi N. Bhat²

Associate Professor, Dept. of Computer Science and Engineering, K.S. Institute of Technology, Bengaluru, India¹

B.E Student, Dept. of Computer Science and Engineering, K.S. Institute of Technology, Bengaluru, India²

ABSTRACT: According to the reports of WHO, NCRB-social-government organization 35% Women all over the world are facing a lot of unethical physical harassment in public places such as railway-bus stands, foot paths etc. Illiteracy or security is not a major reason behind such assaults but reasons are the unawareness about self-protection and inefficient self-protection weapons like Ninja key chain, pepper spray, handgun etc. This paper tries to resolve the above problem by developing a prototype and which has Microcontroller, LCD, GSM, GPS, Audio Playback Circuit, Speaker as its components. The system when activated tracks the location of the victim using GPS and sends emergency messages using GSM to nearby police station and emergency contact. The system also incorporates audio processing unit to callout for help. By using this system, safety of women will be just a click away.

KEYWORDS: GPS, GSM, APC, LCD.

I. INTRODUCTION

Today in the current global scenario, the prime question in every girl's mind, taking into account the ever rising increase of issues on women harassment in recent past, is only about her safety and security. The only thought haunting every girl is when they will be able to move freely on the streets even in odd hours without worrying about their security. This paper proposes a model to protect women. When system is activated, tracks the location of the victim using GPS (Global Positioning System) and sends emergency messages using GSM (Global System for Mobile communication) to stored contacts. The system also incorporates a panic switch to intimate the women got some emergency situation, to call out for help [1]. This paper proceeds as follows. Section 2 present the study of several existing systems with its functionality. Section 3 presents the proposed model. Section 4 discusses the Working of Prototype developed. In section 5 results of proposed prototype are shown. Section 6 the future scope of the proposed system is discussed. And finally in section 6 presents the conclusions of this paper.

II. LITERATURE SURVEY

There are many pre-existing safety weapons for women available in market. Given below are some of them which generally used for self-protection.

1. NINJA SPIKE KEY CHAIN (kubotan) :

Ninja Spike Keychain is basically a normal keychain which is with Ninja Spike. Ninja Spike is sharp pencil size device which can be used by women under attack to harm person attacking. This keychain fits perfect in between our finger as to make a fist, but not easy to use. This keychain comes under self-defense weapon for women. Honeycomb Hairbrush is another similar kind of weapon in which 3 1/2" dagger is hidden under comb. Dagger is meant for stabbing, so you need to have enough strength to thrust this into an attacker. It is easy to carry and use. Also it is dangerous weapon which sometimes used against law[1].

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017



Fig. 1. Ninja Spike Key chain

2. HANDGUN:

The Handgun is introduced by Indian government. It is lightweight handgun designed for women to protect themselves from situations such as rape and sexual assault. This 32-caliber pistol is named “Nirbheek”, a synonym for “Nirbhaya”[1]. Special titanium alloy body, the wooden handle. The six-shot bullet gun is easy to handle and it can hit its target accurately up to 15 meters [49 feet] But this is very costly weapon which can't make available to all– the gun is priced at 122,360 rupees (about \$2,000).



Fig 2. Handgun

3. SAFETY ELECTRIC SANDAL:

Sandals that deliver electric shock after hitting with it. Such safety devices that don't need to be carried separately. The moment you hit someone with this sandal. It will also give a current shock to the criminals and immobilize them for a few seconds as small battery is fitted in sandal for this purpose [1].



Fig 3. Electric Sandal

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

III. SYSTEM DESIGN COMPONENTS

The components details are as follows:

ARM7 Component:

ARM is a family of instruction set architectures for computer processors based on a reduced instruction set computing (RISC) architecture developed by British company ARM Holdings. A RISC-based computer design approach means ARM processors require significantly fewer transistors than typical CISC x86 processors in most personal computers [4]. This approach reduces costs, heat and power use. These are desirable traits for light, portable, battery-powered devices including smartphones, laptops, tablet and notepad computers, and other embedded systems. A simpler design facilitates more efficient multi-core CPUs and higher core counts at lower cost, providing improved energy efficiency for servers.



Fig. 4 ARM7 microcontroller

The above figure 4 shows ARM7 which uses 32-bit instruction set architecture in terms of quantity produced. The low power consumption of ARM processors has made them very popular: over 50 billion ARM processors have been produced as of 2014, thereof 10 billion in 2013 and "ARM-based chips are found in nearly 60 percent of the world's mobile devices". In 2008, 10 billion chips had been produced. The ARM architecture (32-bit) is the most widely used architecture in mobile devices, and most popular 32-bit one in embedded systems [3]. In 2005, about 98% of all mobile phones sold used at least one ARM processor. According to ARM Holdings, in 2010 alone, producers of chips based on ARM architectures reported shipments of 6.1 billion ARM-based processors, representing 95% of smartphones, 35% of digital televisions and set-top boxes and 10% of computers. The LPC2148 is based on a 32 bit ARM7TDMI-STM CPU with real-time emulation and embedded trace support, together with 128/256 kilobytes (KB) of embedded high speed flash memory. A 128-bit wide internal memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 and 144 pin packages, low power consumption, various 32-bit timers, combination of 4-channel 10-bit ADC and 2/4 advanced CAN channels or 8-channel 10-bit ADC and 2/4 advanced CAN channels (64 and 144 pin packages respectively), and up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. Number of available GPIOs goes up to 46 in 64 pin package. In 144 pin packages number of available GPIOs tops 76 (with external memory in use) through 112 (single-chip application). Being equipped wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications[5].

GSM Component:

GSM is a digital mobile telephony system that is widely used in Europe and other parts of the world. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band[6]. A GSM

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirccce.com

Vol. 5, Issue 5, May 2017

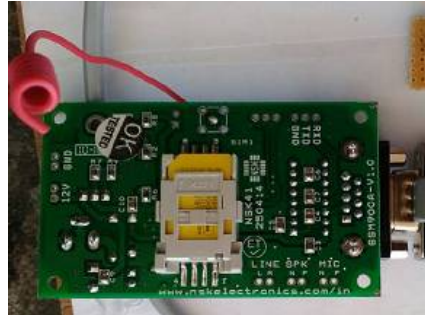


Fig. 5 GSM modem

Modem exposes an interface that allows applications such as now SMS to send and receive messages over the modem interface. GSM modem can be a quick and efficient way to get started with SMS, because a special subscription to an SMS service provider is not required. In most part of the world, GSM modem are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery. It should also be noted that not all phones support the modem interface for sending and receiving SMS message. The GSM/GPS Smart Modem is a multi-functional, ready to use, rugged unit that can be embedded or plugged into any application [3]. The Smart Modem can be controlled and customized to various levels by using the standard AT commands. The modem is fully type-approved, it can speed up the operational time with full range of Voice, Data, Fax and Short Message (Point to point and Cell Broadcast). The logical level of the modem is not compatible with logical states of controller so need have logical conversion from modem to UART port of controller through MAX 232 interface. The standard voltage range on RS-232 pins is -15V to +15V. This voltage range applies to all RS-232 signal pins. The total voltage swing during signal transmission can be as large as 30V. In many cases, RS-232 ports will operate with as low as -5V to +5V [3]. The figure 5 shows the GSM where Cell horizontal radius varies depending on antenna height, antenna gain and propagation conditions from a couple of hundred meters to several tens of kilometres. The longest distance the GSM specification supports in practical use is 35 kilometres (22 mi). GSM networks operate in a number of different carrier frequency ranges. 2G GSM networks operate in these frequency 900 MHz or 1800 MHz bands if these bands were already allocated, the 850 MHz and 1900 MHz bands were used instead. 3G networks in Europe operate in the 2100 MHz frequency band. GSM is divided into timeslots for individual phones to use. It is divided into 8 timeslots and made into TDMA frame. The channel data rate for all 8 channels is 270.833 Kbit/s. The transmission power in the handset is limited to a maximum of 2 watts in GSM850/900 and 1 watt in GSM1800/1900.

GPS Component:

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver. The GPS project was developed in 1973 to overcome the limitations of previous navigation systems, integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. GPS was created and realized by the U.S. Department of Defence (DoD) and was originally run with 24 satellites [4]. It became fully operational in 1995. Bradford Parkinson, Roger L. Easton, and Ivan A. Getting are credited with inventing it. Advances in technology and new demands on the existing system have now led to efforts to modernize the GPS system and implement the next generation of GPS III satellites and Next Generation Operational Control System (OCX). Announcements from Vice President Al Gore and the White House in 1998 initiated these changes. In 2000, the U.S. Congress authorized the modernization effort, GPS III.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017



Fig. 6 GPS modem

In addition to GPS, other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was developed contemporaneously with GPS, but suffered from incomplete coverage of the globe until the mid-2000s [4]. There are also the planned European Union Galileo positioning system, India's Indian Regional Navigational Satellite System and Chinese Compass navigation system.

IV. IMPLEMENTATION

Based on the critical analysis and the requirements of safety functionality the System Architecture as shown in figure 7.

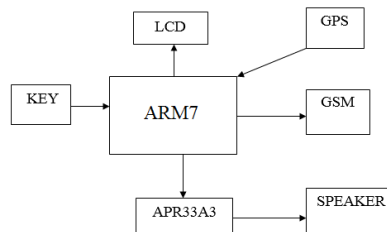


Fig. 7 System Architecture.

The work flow called as flow diagram as shown in figure 8.

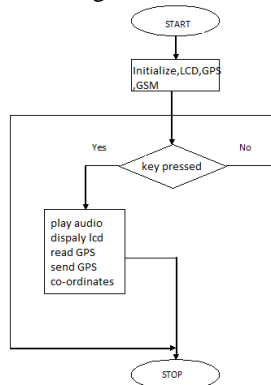


Fig. 8 Flow diagram

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

The working of selected modules is as follows:

Panic Switch Module:

This module has 4 switches, among which 3 are being used as follows :

- i. Audio of police siren heard and a message sent.
- ii. Audio of girl asking for help played and messages sent.
- iii. Audio of ambulance siren played and messages sent.

The SW0 of switch board is connected to P1.19 of ARM7 similarly SW1 to P1.18 and SW2 to P1.17 are connected. One of the pin is connected to ground. When any 1 of these switches are pressed respected switch is activated.

LED Module:

This component has 2 pins and a LED light. One of the pin is connected to P1.16 of ARM7 and the other pin is connected to ground. When panic switch pressed, the LED is glowed.

Audio Playback Module:

This component has 8 channels from M0 to M7 using which 8 different voice clips can be recorded. Here, M0 is connected to P0.10 of ARM7 board. Similarly, other 2 pins are connected. When panic switch pressed respective audio is played with help of a speaker.

GPS and GSM Module:

To track the exact position at least 5 satellites are required. The GPS component RX pin is connected to P0.TXD of ARM7 and TX pin is connected to P0.RXD and a pin is connected to ground. When switch is pressed location is tracked, SMS is sent to predefined numbers using GSM. Here, 3 different numbers are stored i.e., 1 for police station, 1 for personal contact etc. according to the switch pressed respective numbers get message with location.

V. RESULTS

When panic switch pressed, audio is played, the location is tracked using GPS and SMS is sent to predefined numbers using GSM with latitude and longitude values, which is also displayed on LCD display. The resultant output is as follows:



Fig. 9 Latitude and longitude displayed on LCD board

The figure 9 shows latitude and longitude position of current location of victim displayed on LCD display when a switch is pressed.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

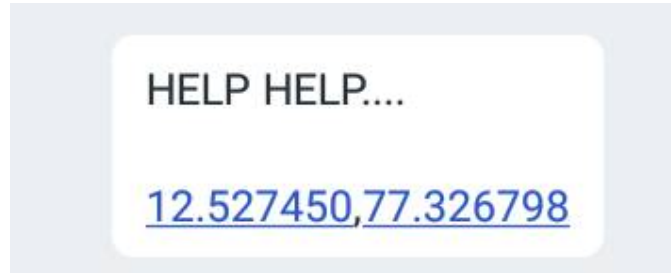


Fig. 10 Message sent with latitude and longitude information.

The figure 10 shows a message with help and information about longitude and longitude position of current location of victim sent to predefined numbers when a switch is pressed.

VI. FUTURE ENHANCEMENT

As the technological changes or new requirement from user to enhance the functionality of product may requires new version to introduce. Although the System is complete, new modules which enhance the system functionality can be added without any major changes to the entire system. Camera Module: Using hidden camera we can click pictures of culprit and that can be sent to the predefined numbers. This way we can catch culprit easily. Electric Shock Module: The LED in the proposed paper can be replaced by an electrical component which generates shock.

VII. CONCLUSION

As stated earlier in our proposed system we overcome many restrictions and drawbacks of currently available safety weapons in market. It can be manufactured and sold at very cheap rate; therefore it will become a revolutionary and innovative device in reducing crimes against women in our society. It is seen that in 98% cases women are assaulted from someone who is close to them like neighbour or relative, where police can't help. This weapon can make considerable contribution in controlling such cases. As well as to secure other valuable things also, this device can be implemented by making physical changes in structure of it. This is very effective system if exploited judiciously.

ACKNOWLEDGMENT

The Authors would like to thank VGST(Vision Group on Science and Technology), Government of Karnataka, India for providing infrastructure facilities through the K-FIST Level I project at KSIT, CSE R&D Department, Bengaluru.

REFERENCES

- [1] Geetha pratyusha Miriyala, P.V.V.N.D.P Sunil, Ramya Sree Yadla palli, Vasantha Rama Lakshmi Pasam, TejaswiKondapalli and Anusha miriyala, "Smart Intelligent Security System for Women",IJECET,Volume-7,Issue-2,March 2016,PP.41- 46.
- [2] Dongare Uma, Vyavahare Vishakha and Raut Ravina, "An Android Application for Women Safety Based on Voice Recognition", Department of Computer Sciences BSIOTR wagholi, Savitribai Phule Pune University India, ISSN 2320-088X International Journal of Computer Science and Mobile Computing (IJCSMC) online at www.ijcsmc.com,Vol.4 Issue.3, pg. 216-220, March- 2015.
- [3] Sainath B Gadhe, Ganesh Chinchansure, Amar Kumar, Mritunjay Ojha," Women Anti-Rape Belt", International Journal of Advanced Computer Technology,Volume-IV, Issue-IV, April-2015.
- [4] Ashlesha Wankhede, Ashwini Velankar,Priyanka Shinde,"Portable Device For Women Security", IJRET, Vol.-04, Issue-03, March 2015.
- [5] Abhijit Paradkar, Deepak Sharma, "All in one Intelligent Safety System For Women Security",IJCA, Vol-130, November 2015.
- [6] MAGESH KUMAR.S and RAJ KUMAR.M, "IPROB – EMERGENCY APPLICATION FOR WOMEN", Department of Computer science Sree Krishna College of Engineering Unai village Vellore (TN) India, ISSN 2250-3153 International Journal of Scientific and Research Publications, online at the link www.ijrsrp.org , Volume 4, Issue 3, March 2014.