

WOMEN SAFETY DEVICE

(SAFETY USING GPS, GSM, SHOCK, SIREN AND LED)

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ABSTRACT

India which sees itself as a promising super power and an economic hub, is still trapped in the clutches of various patriarchal evils like molestations, dowry, crime against women, worst among all is rape. In today's world, women safety has become a major issue as they can't step out of their house at any given time due to fear of physical/sexual abuse and violence. So, in an attempt to curb this menace, the atrocities against the women can be now brought to an end with the help of a Women Safety Device. This safety device consists of a microcontroller, a temperature sensor, a heartbeat sensor and an emergency pushbutton switch. On sensing the emergency situation, this device fetches the current location of woman and sends it to emergency contacts via Global System for Mobile (GSM) module. The safety device also includes a bright Light Emitting Diode(LED) flash, a hooter or siren, and a shock giver circuit which is intended to hurt the attacking or abusing person, due to which there is a chance for the women to escape. The heartbeat rate and temperature are also displayed on an interfaced Liquid Crystal Display (LCD) display.

Keywords: Women Safety, Emergency, Alerting, Self-defense.

I. INTRODUCTION

This women safety device is a microcontroller based system. An ATmega8 microcontroller is one of the series AVR microcontrollers, one of the oldest yet commonly used microcontrollers. It has the less complex features than other microcontrollers and it is also easily available and cheap in comparison of other microcontrollers.

The implementation of women safety system was done on AVR microcontroller via GSM modem and the interfacing is done through MAX-RS 232.

Communication of alarming situation & prevention of incident has achieved by GPS, GSM technology, and defensive system respectively. This is the aim of our system. As a result the design is separated into two parts.

A) Message of the offense throughout wireless

B) Prevention of the crime.

1) The women wearing a watch or band when finds that someone is going to harass, she presses a switch that is located on the watch or band, which is accompanied by a condition check by temperature and heartbeat sensor. The signal gets transmitted to GSM module which then decodes the received information (either some code or name) and then activates the AVR microcontroller in which contacts of 4 people and message "HELP" is stored in memory is sent to the destination through GSM.

2) This safety device works for self-defense and prevention of crime as well. As soon as the emergency situation is detected, a bright flash light as well as a loud siren are turned on which alert the people nearby about the woman in danger. In panic, if a woman is not able to shout out, this device can easily indicate about her dangerous situation to people surrounding by. Also, for self-defense, this device includes a shock generator which a woman can use against an attacker in case of emergency. This shock is intense enough to scare the attacker away.

II. VIEWS ON WOMEN SAFETY

As we all know that India is a most famous country all over the world for its great tradition and culture where women are given most respected place in the society from the ancient time. It is the country where women are considered as safer and most respected. Women are given the place of Goddess Lakshmi in the Indian society. Indian women are found working in all fields like aeronautics, space, politics, banks, schools, sports, businesses, army, police, and many more. We cannot say that this country has no any women concern however we cannot ignore positive points for women in India. If we remember our history, we found that there was PanchaaliPratha in which a single woman (Draupadi) was allowed to get married to five men (Pandavas). It was all that what we see from our open eyes however if we see behind the curtain we will found all the crimes against women at home, offices, streets, etc. By seeing last few crimes against women in India such as rape cases, acid attacks, etc, the safety of women has been in doubt. Safety of women matters a lot whether at home, outside the home or working place. Last few crimes against women especially rape cases were very dread and fearful. Because of such crimes, women safety in India has become a doubtful topic. According to the statistics of National Crime Records Bureau, highest rate of crime against women was recorded in the Chennai in 2000 (around 4,037 incidences). Chennai is the capital of southern state of Tamil Nadu however has been marked as city with high rate of crimes against women. However, it was seen some decrease in the crime rate against women in the subsequent years (around 838 by 2013). It has been recorded as the largest fall in the crime rate than other cities in India. It was just opposite in the capital of India, Delhi. Crime rate against women in Delhi was 17.6/100,000 females in 2000 (2,122 incidents) and 151.13/100,000 females in 2013 (11,449 incidents).

Some of the most common crimes against women are rape, dowry deaths, sexual harassment at home or work place, kidnapping and abduction, cruelty by husband, relatives, assault on a woman and sex trafficking.

Our primary goal of this project is to ensure every woman in our society to feel safe and secured. According to the survey in India 53% of working women are not feeling safe - Women is working in night shift (Bangalore-56%, Chennai-28%, Hyderabad-35%, Mumbai-26%). Overall 86% of working women in India, women facing hurdles are high in Delhi, Mumbai, Hyderabad, Kolkata and Pune comparatively to other places. Women Safety Device can play a major role by providing women a safe environment in all situations for example (detecting hidden camera, physically 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 can be used as a small wearable device like watch, pendent etc.

III. IDEAS & TECHNOLOGIES IMPLEMENTED IN WOMEN SAFETY DEVICE

3.1 Sensing Units

The women safety device senses the emergency situation with the help of sensing unit that consists of three elements:

- 1) Heartbeat Sensor – Working on the principle of IR reflection by blood, this sensor keeps a count of woman's heartbeat. Fig. 1 shows the heartbeat sensor.
- 2) Temperature Sensor – This sensor keeps a track of woman's body temperature and sends the generated analog data to controller.
- 3) Push Button – It's a simple Dual Port Double Throw (DPDT) switch that the woman presses when she is in an emergency situation and needs help.



Fig 1. Heartbeat Sensing Unit

3.2 Controller Unit

ATmega8L is an 8-bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. ATmega8L is based on enhanced RISC architecture with 130 powerful instructions. Most of the instructions execute in one machine cycle. ATmega8L can work on a maximum frequency of 16MHz. ATmega8L devices are available in 28-pin as shown in Fig. 2.

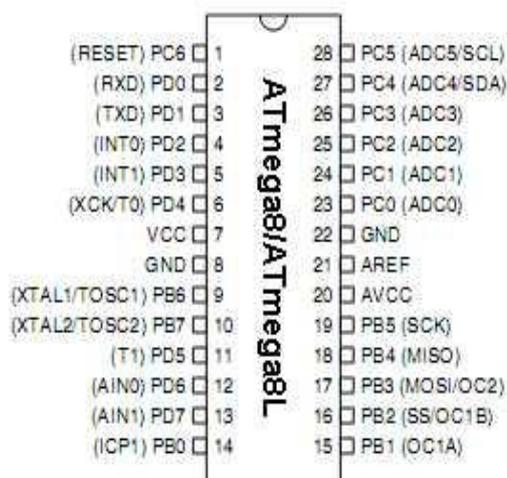


Fig 2. ATmega8/ATmega8L

3.3 Location Tracking Unit

Current location of woman is fetched by this unit with the help of GPS module. GPS Module comes with a POT (Patch on Top) ceramic antenna which makes it a small and complete solution for enabling GPS navigation to various embedded devices and robots. Module comes with a standard 2mm DIP pin headers which provides easy interface to your device and is shown in Fig. 3.



Fig 3. Location Tracking Unit

3.4 Cellular Messaging Unit

Location of women along with an emergency Short Message Service (SMS) is sent to police and relatives by GSM module. GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile (GSM) is an architecture used for mobile communication in most of the countries. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer as shown in Fig. 4.



Fig 4. Cellular Messaging Unit

3.5. Display Unit

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3.6 Alerting Unit

A simple, but powerful and effective way to raise an alarm is through a loud siren and bright lights. And this is achieved with the help of a bright LED flash light and an electronic siren. Thus, when the women safety device senses the emergency situation of a woman, it triggers its alerting unit which alerts the nearby people about the crime by loud noises and bright flashes of lights.

3.7 Self-Defense Unit

In a situation where less or no people are nearby, a woman must be able to protect and defend herself as well as create some trouble for the abuser by some very easy means. The self-defense unit consists of a shock generator devices that produces an instant electric shock which when used by the woman can immobilize and hurt the attacker as shown in Fig. 5.

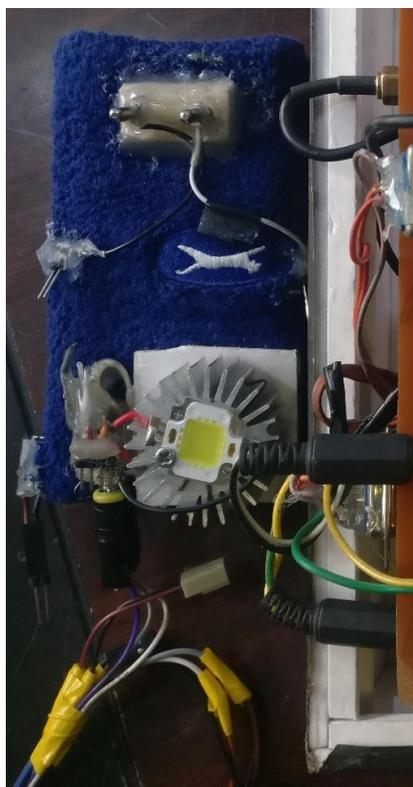


Fig 5. Self Defense Unit

Some other ideas that can be implemented in device are –

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 and working efficiently, new modules which enhance the system functionality can be added without any major changes to the entire system. By keeping this ability of the product in mind, an incremental process model has been used to design and develop the system. Among the various modules few are identified, which couldn't be included in the last increment due to time constraints. These are as follows:

3.8 Primary School Children Safety

As the school children safety are major concerns for parents as well as school management due to the recent incidents of child crimes like children missing, abuse etc. This module can be used to monitor the child safety when they are travelling in school buses. Once they have reached the school they press button and message is sent to the parents that, “the child reaches the school safely”.

The device can further be extended as capability of audio recording when activated that can be listened by the parents or authorized person.

3.9. Vehicle Safety System Module

The safety of four and two wheeler car is also a major concern in the society due to the increase in the crime rate of stolen car. The location tracking and sensing module can be modified according to the requirement of vehicle safety system module.

3.10 Mobile and other valuables Safety System Module

The missing rate of mobiles is high while travelling from bus, train or crowded public area. The area zone module functionality further enhances to provide safety. A small device needed to keep either in same pocket or within the range of few centimeters. As you kept the mobile and forget to pick up or someone has stolen it then for small range the siren of mobile as well as device gets ON for user attention. Also the same device can attach to our luggage, hence in case of forgetting to pick back or tried to be stolen by someone can be easily noticed by the module and make the attention of user through the siren alarm.

Apart from this in future this module can be moulded in form of a jewellery piece like pendent or earring, which will be unknown to others, having it more fashionable appearance. Wristwatch can also be realised using this. A shot gun can be added as a future defense mechanism.

Further an Android app can be developed for woman safety and security purpose. Hence, the advanced technology makes the system more robust and reliable. As the new modules provide the functionality which enhance the safety and security.

IV .BLOCK DIAGRAM AND FLOW CHART OF OPERATION OF THE WOMAN SAFETY DEVICE

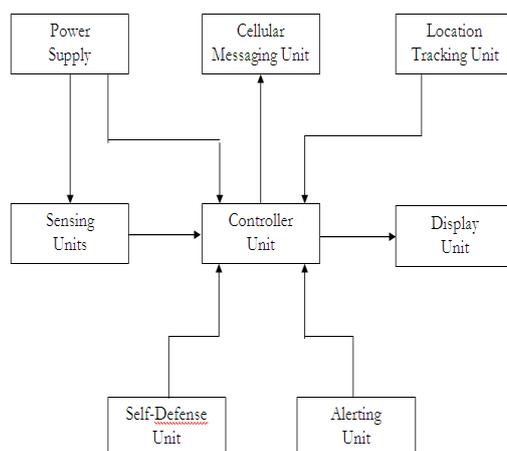


Fig6. Block Diagram of Women Safety Device

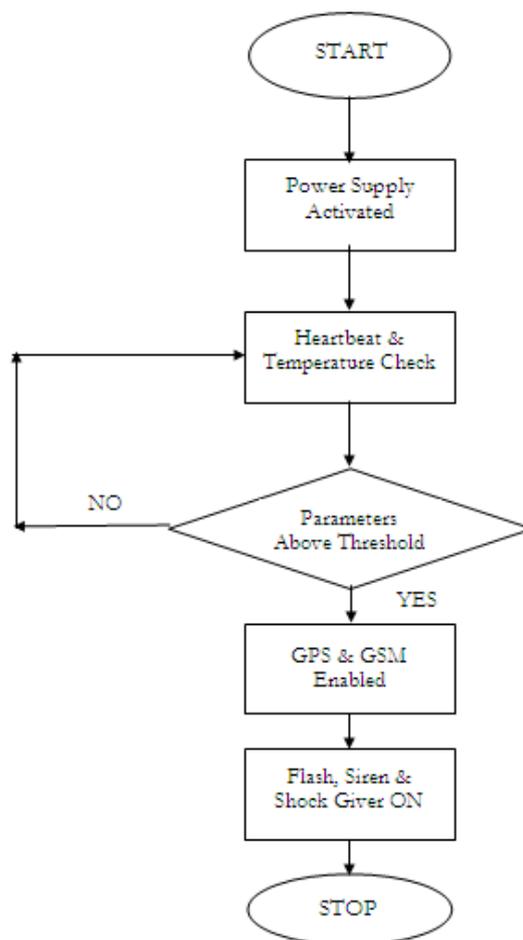


Fig7.Flow Chart of Women Safety Device

V.CONCLUSION

In conclusion, the Women Safety Device was successfully able to fetch heartbeat and temperature readings of a woman's body. A threshold condition of 100 beats per minute and 38°C was set above which the buzzer would turn on, after turning on, it sent the message to the police and known relatives via GSM messaging module. The sent message includes the current position of the woman which is fetched by the location tracking GPS module.

When the device was turned on, readings displayed on the LCD screen were zero beats and room temperature respectively. When the device came into contact with the body, it started showing woman's heartbeat and temperature readings on the LCD screen.

As the emergency situation arises, when the heartbeat as well as body temperature rise above the set threshold, the conditioned is checked by the microcontroller and when found true, it turns on the alerting unit that includes a bright LED flash light and an electronic siren. The LED flash light alerts the nearby people by starting to flicker and the electronic buzzer starts to produce loud noises. These are clearly an indicative of the further safety features such as Shock giver etc.

So, the device achieved what it was aiming. The location of the woman was successfully tracked down and with the help of GSM, appropriate help can be sent on time and the suspect can also be tracked down ensuring complete safety and security of the woman.

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