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Communication Protocol aimed at the Protection of Mistreated Women

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***Abstract*- The main objective of this paper is to present a promising approach to develop a useful wearable device in order to provide a communication protocol which is aimed at the protection of women under risk situations, including cases of misbehaviour or physical assault. This paper produces an integral solution designed for improving the protection of mistreated and at-risk people by means of the integration of shock wave generator, wireless camera, buzzer, Global System for Mobile communication (GSM), and Global Positioning Systems (GPS) technologies. A security alert message is sent to the police and the caretaker along with the victim's location, further the assailant's image is also sent. On using voice commands, the buzzer and the shock wave generator turns on. The hardware implementation has been done and tested.**

***Index Terms*- Buzzer, GPS, GSM, Shock Wave generator, Wireless camera.**

I. INTRODUCTION

According to the National crime records bureau, the total number of rape cases in India were 228,650 and Delhi, the national capital accounted for 5234 of those and in 2011 according to Ministry of Home Affairs, a total of 24,193 cases were reported. This is just the tip of the iceberg. Rape is a notoriously under-reported crime, thanks to its social stigma. A woman is raped every 21 minutes in India and every 18 hrs in Delhi. It is shameful for the whole world. The primary reasons behind such shocking statistics is the society which is prejudiced against the girl child, lack of proper policing, ineffective laws etc. While the long term solutions should aim to correct the above factors. Now there is a requirement of some change.

By observing such pathetic conditions of women in the world, we introduce "Smart Watch for Women". This proposed system has the potential to help women by the technologies that are embedded in it. The upcoming system provides a prototype for a customised digital watch and this watch is specially designed for women safety. It has a button that will be used by the women to inform the nearby police when they feel danger. This prototype directly gets connected to the satellite through Global Positioning Systems (GPS) when activated. The location is transferred through the Global System for Mobile communication (GSM) and this prototype is also provided with a voice recognition system where the user can assert voice commands on danger and activate the shock wave generator system that produces 60 shockwaves in 1 second in emergency situations. This prototype also comprises of a wireless camera that captures the image of the assailant, which is sent to the police station. A buzzer system through a relay will be provided which will alert the surrounding area with an increasing alarming tone indicating threat.

II. LITERATURE SURVEY

With reference to [1], battered intervention programs were opened for psycho-educational intervention of men that used the violence toward their partner or ex-partner. This was proposed in Spain, Costa Rica and Chile.
With reference to [2], a facial expression analyzing system was developed to report the threat based on facial expressions of danger. The camera captured images of the people and instantaneously the expressions of the people captured in those images were analysed. On detection of the expressions which showed fear, a threat report was filed. This system was proposed to be installed in railway stations, bus stations, shopping centres etc.
With reference to [3], a self defence system was developed with GPRS (General Packet Radio Service) location tracking and Short Message Service (SMS) alerting through GSM networks. In this system the SMS contained information only about the victim location and the body posture of the victim. These messages will be sent to the predefined emergency numbers. In case if the caretaker wants to know the present location of the user, he/she can do so by sending a SMS to the SIM(Subscriber Identity Module) number of the lady which contains a secret password.

III. EXISTING SYSTEM

Various methods are existing for women security like pepper spray canisters, the Stun Rings, the Ultrasonic Dog Repellent, the Stun Gun, the Tear Gas Spray . There are also mobile phone based apps that can send an alert message using GSM networks and GPS locating tracking systems. There are various approaches towards wearable devices with only a SMS based alert and tracking of the victim using GSM and GPRS systems.

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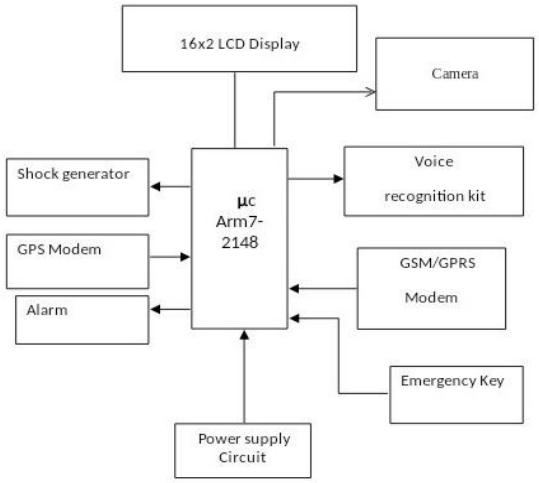
IV. PROPOSED SYSTEM



Fig(a): Block Diagram

The block diagram of the conceptual system is shown in above figure. The microcontroller acts as an embedded computing system and controls the activities of all the subsystems. It is interfaced with Emergency Switch, Voice recognition module, GPS Receiver, GSM Modulator-demodulator (MODEM), High Voltage Shock Circuit, LCD display, Buzzer, and Wireless camera. The microcontroller periodically monitors the status of all the devices and also keeps on checking for any incoming SMS message from the parents or any caretakers. When there is no GSM network, on pressing the Emergency Switch, the processor activates the speech circuit to make loud shouting sound to catch the attention of the nearby people for help. Thus, when the user asserts the voice command the buzzer will automatically turn on. It also prepares the High Voltage Electric Shock Circuit to be ready to give a non-lethal shock to the attacker. If the help is not available and if the system is not reset within the stipulated time, the system obtains location information from the GPS and prepares a text SMS containing the present location information and sends a SMS through the GSM modem to the police control room and a distress message to the pre-programmed mobile number[3]. The design is implemented using an embedded microcontroller, in a modular form to be adaptable to different types of location tracking. Based on the total design of the system, the hardware and software of the system is designed to be near real-time monitoring of the women and immediate help. The lady can protect herself by the electric shock to the person harassing her. The software is developed in assembly language to demonstrate the system capability in providing real-time response. Using the location information supplied by this system, the location can be tracked and traced using GPS and Google Maps. Thus the lady will be safe and she feels protected. At the product level it can be as compact as a smart watch.

V. DESCRIPTION OF THE PROTOTYPE

ARM7-LPC2148 is the heart of this device. All the peripherals are interfaced into and programmed using this microcontroller. This processor is chosen because of its low power consumption and available two Universal Asynchronous Receiver/Transmitter (UART's) which facilitates easy interfacing through multiplexing by maintain the speed.

A GPS receiver system calculates the location of victim by precisely timing the signals sent by GPS satellites high above the Earth.Each satellite continually transmits messages that include the time the message was transmitted and satellite position at the time of message transmission. The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite. This position is then displayed, perhaps with a moving map display or latitude and longitude.

GSM modem is interfaced with ARM7 processor. This modem is used for audio calls, SMS and internet access through Attention commands (AT) commands.GSM accepts certain commands through serial interface and acknowledges these AT commands .The ten digit mobile number will be stored in the processor, the program instructs the MODEM to send text message using sequence of AT commands. For each command, processor sends acknowledgement message to the MODEM.

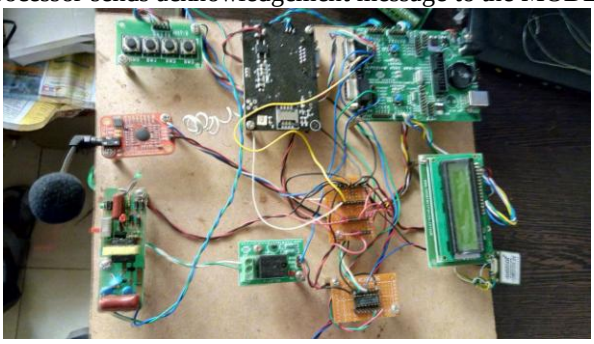


Fig (b): Working prototype

Voice recognition device supports maximum 80 voice commands, with each voice 1500ms (one or two words speaking) .Maximum 7 voice commands are effective at same time. It recognizes the pre-recorded voice of the user and finds the keywords like 'help', 'save', 'danger' etc and activates the system to generate help message and alarms the police station with the victim's location details and the image of the assailant[4]. All the status of the device along with the pre-loaded voice commands are displayed in 16x2 LCD. The wireless camera is interfaced to the ARM processor. The camera captures the live image of the assailant and the image is transmitted to the nearest police station. The buzzer produces alarming sound based on reverse of the piezoelectric effect. These buzzers can be used to alert a user of an event corresponding to a switching action, counter signal or sensor input. The buzzer produces a same noisy sound irrespective of the voltage variation applied to it.

Shock wave generators are used. The shock waves when generated can produce burns on the assailant.

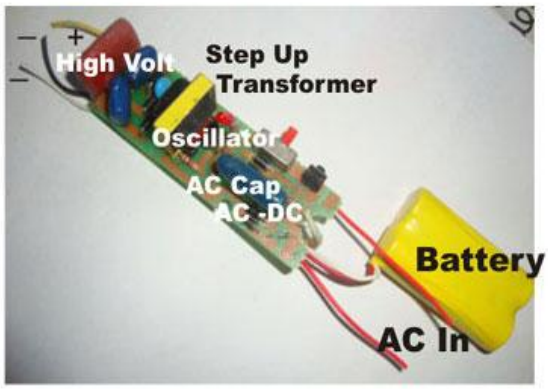


Fig (c): Shockwave generator

VI. WORKING PROCEDURE:

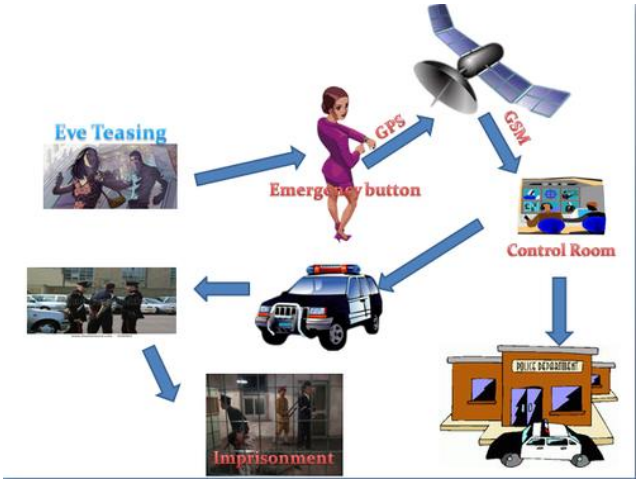


Fig (d): The working flow diagram

The user on asserting any one of the pre-loaded voice commands can start operating the device. On acknowledgement of the voice command of the user and user's voice verification, the device turns on. On pressing a button, a message regarding the threat can be sent to the nearest police station and the family members whose contacts have been pre-loaded. The police station receives the message and user location tracking is been provided by GSM, GPS and GPRS modules. Along with the message, the user can also capture and send the image of the assailant to the police station with the help of miniature camera in the device. Additionally, to add more safety in cases where GSM network operators are not available, a built in shock generator produces shock waves which harms the attacker and the buzzer which produces an alarming sound in the surrounding location. The user can also just press a button to send a message to the police station which will be unaware to the assailant.

VII. RESULTS

Fig (e): The GPS location of the victim's lattitude and longitude will be sent to the Police Station.

Fig (f): The voice recognition module asserts this message. The victim can speak out loud the key words like 'help'.

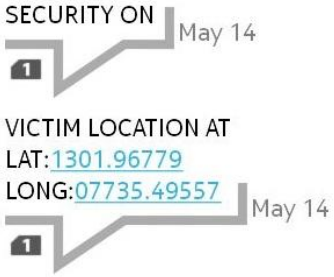


Fig (g) : The messages received from the victim

VIII. TOOLS USED

Keil µVision:

The prototype presented in this paper makes use of Keil µVision Software for coding purposes. We have written the C complier designed code for implementing our objectives.

All the components like LCD display, GSM, GPS, Voice recognition module etc are all interfaced to ARM processor using Kiel µVision software and the prototype operates based on the codes being given to the processor.

IX. FUTURE SCOPE

The prototype proposed in the paper can be implemented into digital watch by reducing the size of the components. This device can be implemented for office security, colleges, and hospitals and also in parking system. By integrating a culturally-relevant educational curriculum (service) with a product (good) that is affordable and accessible, Our innovation is helpful in saving women from

harassment. In India lots of crime happen against women every day. "Smart Watch For Women" can readily solve this issue. We will install these watches at small scale and we will try for further progress in the same. Lastly fulfilling our main aim to spread this project in the whole world that is large scale production

X. CONCLUSION

Women security can be increased by making use of this gadget. Inter-network between the women and the police station provides easy access to women to obtain safety with just a message .The image captured by the camera will serve as evidence and record for the police to trace the assailant. The prototype can be developed and made as digital watch

XI. REFERENCES

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