

“Suraksha Yantra: Self Defense System for Public Safety with Location Tracking and Sms Alerting through GSM Network.”

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ABSTRACT

The people living on this planet are working hard for a comfortable life style and wants to safe their investment that they has made in day to day work.[3] Eventually, at the end we all need is security of life for proper lifestyle and our belongings. The most important problem is to ask your self is we really living good secure life? [3] The globe is not secured and we are victimized to the dangers that exist in our nearest environment hence the need to feel protected and safe is fulfilled by the use of ”SURAKSHA YANTRA: SELF DEFENSE SYSTEM FOR PUBLIC SAFETY WITH LOCATION TRACKING AND SMS ALERTING THROUGH GSM NETWORK ”[3]. The globe in which people live, faces lots of problems and goes through as a challenging super problems and an economic distress, are still under in the problem of various issues evils like molestations, dowry, crime against women, worst among all is Rape. The main issues against the women can be now brought to an end with the help of a device called suraksha.[6] Suraksha Yantra paper explains the basic idea over viewing suraksha yantra which is to give a warning to an instant location of the distressed victim to the police so that the incident could be prevented and the offender captured. This globe helps to reduce crime against women. Suraksha Yantra also summaries other significant works in this field and hence forth discussed suraksha device in a greater detail. [6]

Keywords

Arduino, GSM, GPS, LED, Tracking, Mapping.

1. INTRODUCTION

The device, “Suraksha yantra” is a surveillance system specially designed for women in discomfort.[6] In today’s globe, women immunity has become a major issue as they can’t go out of their house at a particular time due to physical/sexual abuse and a creeps of assault. Even in the modern world where the technology is briskly growing and new gadgets were developed and because of this new gadgets came into existence but still women and girls are facing complication. Even today in globe and especially in India, women cannot come out at night in many places and even at day time crowded places hundreds and thousands of incidents of physical/sexual abuse happens to women every day. Among other criminality, rape is the fastest growing crime in the country today. [3]

Mentioning the device described here is a self-defense system specially designed for women in discomfort to help them to defend themselves. Gadget can be fitted in a purse, belt or fitted to the girls sandals and the panic button attached on the gadget. The women in discomfort can activate the device by pressing panic button on device. It is quiet easy and simple to carry gadget with wide range of features and performance. The basic appeal is to intimate insistent location and a

discomfort message to the cops and registered number like parents, friends, media, and women cell etc. so that inappropriate incidents would be averted and to provide real time evidence for swift action against the perpetrators of crime against women. [1]

2. EXISTING METHODOLOGY

A) Cheeka: Mobile App.

B) mTracker

C) VithU App.

2.1 Cheeka: Mobile App.

The Cheeka, a personal safety application for smart phones of various platforms like Android, Windows phone and Blackberry O/S. The name being coined from the pug who appeared in the you and I advertising campaign of Vodafone’s cellular service in India. The dog follows the boy in unlikely locations, prompting the tagline, wherever you go, our network follows. We named our application as Cheeka since it acts as a personal security guard following the user similar to the pug in the advertisement. If the user feels he/she is in danger, the application reports the location to the user’s reliable contacts for every few minutes unless the user feels he/she is secure. Thus, works like a security guard following behind till the person reaches a secure place. [1]

2.2 mTracker

A phone or a personal digital assistant (PDA) equipped with a GPS receptor and connected to a global system for mobile (GSM) network that takes advantage of these technologies in behalf of the user security. Assuming a problematic situation, when a father wants to know his son’s location, this application allows the father to set an interest point, for instance his son’s school, and know if he is within a radius that he has previously defined around the school.[3] If the son is out of the radius, it will be issued a warning via shortest message service (SMS) to a predefined number. For this context, mTracker is a useful mobile application that combines several features which aims at the user’s security. Providing the scenario of an emergency situation when the user is feeling threatened, mTracker permits the user to send discomfort calls with the current GSM cell and the GPS coordinates (or the last known coordinates) by pressing one key from the PDA’s keypad. [3] The distress call is sent to a predefined number via SMS. To improve security measures, mTracker is also capable to detect an unauthorized SIM card in the gadget, and then send a warning via SMS with the current GSM cell and GPS position. mTracker has a record of the positions that were monitored. Focusing on developing a PC application that shows in the Google Maps the positions that were stored in the PDA, allowing the user to see when and where the device was. [3]



Fig. 1: mTracker

2.3 VithU App

Emergency app initiated by a popular Indian crime television series Gumrah aired on Channel [V]. Providing when the power button of the Smartphone is pressed twice consecutively, it will begin sending out alert messages with a link to the location of the user every two minutes to the contacts fed into the app.[6]

3. SCOPE

The gadget described here is a self-defense system specially designed for women in discomfort to help them to defend themselves. Here gadget can be fitted in a purse, belt or fitted to the girls shoes and the panic button attached on the gadget. The lady in danger can activate the system by pressing emergency button on the gadget. It is quiet easy to carry gadget with wide range of features and functionality. The basic approach is to intimate insistent location and a discomfort message to the cops and registered number like parents, friends, media, and women cell etc. so that regrettable incidents would be averted and to provide real time evidence for swift action against the executioner of crime against women.

4. MOTIVATION

Now a day's the world is not safe for women. Social evils like assault, dowry, criminality against women, worst among all is molestation is on a rise in many countries. Incidents of crime against women have been increasing at a frightening pace worldwide especially in India, most common incidents being molestation, kidnapping, sexual harassment and eve teasing. Safety for women is still a dominant issue as the number of violation over women and girls is increasing day-by-day. Age of technology, mobile phone is a device almost each one uses

to contact family and friends. All they need is a device that can be carried around easily and worn whenever the woman feels insecure. Providing proposal document describes a quick responding. [3]

5. ISSUES IN EXISTING SYSTEM

- 1) Able to notify only registered numbers.
- 2) No GPS accuracy.
- 3) Existing system does not have database.
- 4) Existing system does not provide continuous tracking of location.
- 5) No indoor mapping.

6. PROPOSED SYSTEM

"SURAKSHA YANTRA: SELF DEFENSE SYSTEM FOR PUBLIC SAFETY WITH LOCATION TRACKING AND SMS ALERTING THROUGH GSM NETWORK" This is an emergency response system which is helpful for public in the incidents of crime. The key objective is to develop an economical system which can store the data of the members in the particular locality and provide prompt alert in case of crime against public, especially women. This provides public surveillance. Being safe and secure is the demand of the day. To design and fabricate a gadget which is so compact in itself that provides advantage of personal security system. Device will probably be very useful for women. It is certainly a short term and defensive solution. Hence proved as a multipronged strategy with the participation of multi stake holders of society. The creation of a hardware and software prototype has achieved two objectives which are validation of the proposed architecture and checking whether the utilized technology is appropriate for the system. System will help its users in problematic situation. System is highly responsive and easy to handle. Its quick response will provide safety and security to individual user. System provides database facility to store victim database.

6.1 Benefits Of Proposed System

- 1) Inform to registered number as well as nearby police station.
- 2) Live tracking is possible.
- 3) Mapping.
- 4) Continuous live tracking.
- 5) Maintaining database.

7. RELATED WORKS

7.1 Amrita Personal Safety System (Apss)

A new technology to protect women from potential raper and sexual culprit. APSS is an insignificant, wearable and easy to operate electronic device that will help women in establishing communication with family and cops at the first sign of inconvenience. [6] The device will remain unseen to the culprit and yet can easily be triggered by the user with multiple options, to ensure reliable and secure communication. [6]

7.2 JIVI 2010

Feature of Jivi mobile providing with a fully devoted SOS button aimed at women. [6]In case of any distress or disastrous times, user needs to long press the SOS button and the phone starts calling 5 pre-stored numbers one after the other.[6] If case any of the numbers is busy or does not receive the call, a SMS is sent to the registered numbers. Mentioning that phone automatically dials other numbers on

the pre-stored list thereby ensuring immediate help. [6]

8. METHODOLOGY

8.1 Hardware Implementation

- 1) **GPS Satellite:** Global Positioning System (GPS) is a network of satellites that continuously transmit location information, which makes it possible to precisely identify locations on earth by measuring distance from the satellites.[3]
- 2) **GSM:** This GSM can accept any Global System for Mobile communication (GSM) network operator SIM card and act just like a mobile phone with its own unique phone number. It is a wireless MODEM and can send and receive data through the GSM network.[3] Requires a SIM card and connectivity to the GSM network. It can also be used in GPRS mode to connect to the internet and use all the applications for data logging.[3]
- 3) **LCD Display Unit:** System has a LCD display module for displaying Distance of police and Time and Date.[3]
- 4) **Power Supply Unit:** The power supply unit has to provide a regulated D.C supply to all sections of the system.[3] As it is essential to operate the instrument on batteries since it is used with the person while moving. It consists of rechargeable batteries, filter capacitors and voltage regulators.[3]

8.2 Software Implementaion

- 1) **Server:** Server, the Server serves its basic necessity even though it lacks a few major functionalities. Consists of Victim's Database features and Device Information. Also manages all devices.
- 2) **Android Application for Device Tracking:** Crucial part of the application is the tracking of device. Unlike the mobile version, this is achieved precisely by showing the locations of the victim on the map. Thus the android version of tracking application depicts a clear view of the real time positions on the map based on the indoor mapping.

8.3 The Haversine Formule

For any two points on a sphere, the haversine of the central angle between them is given by

$$\text{hav}\left(\frac{d}{r}\right) = \text{hav}(\alpha_2 - \alpha_1) + \cos(\alpha_1) \cos(\alpha_2) \text{hav}(\lambda_2 - \lambda_1)$$

Where

- hav is the haversine function:

$$\text{hav}(\phi) = \sin^2\left(\frac{\phi}{2}\right) = \frac{1 - \cos(\phi)}{2}$$

- d is the distance between the two points (along a great circle of the sphere; see spherical distance),
- r is the radius of the sphere,
- ϕ_1, ϕ_2 : latitude of point 1 and latitude of point 2
- λ_1, λ_2 : longitude of point 1 and longitude of point 2

On the left side of the equals sign d/r is the central angle, assuming angles are measured in radians (note that ϕ and λ ; can be converted from degrees to radians by multiplying by $\pi/180$ as usual).

Solve for d by applying the inverse haversine (if available) or by using the arcsine (inverse sine) function:

$$d = r \text{hav}^{-1}(h) = 2r \arcsin(\sqrt{h})$$

Where h is $\text{hav}(d/r)$, or more explicitly:

$$d = 2r \arcsin\left(\sqrt{\text{hav}(\alpha_2 - \alpha_1) + \cos(\alpha_1) \cos(\alpha_2) \text{hav}(\lambda_2 - \lambda_1)}\right)$$

$$2r \arcsin\left(\sqrt{\sin^2\left(\frac{\alpha_2 - \alpha_1}{2}\right) + \cos(\alpha_1) \cos(\alpha_2) \sin^2\left(\frac{\lambda_2 - \lambda_1}{2}\right)}\right)$$

9. SYSTEM ARCHITECTURE

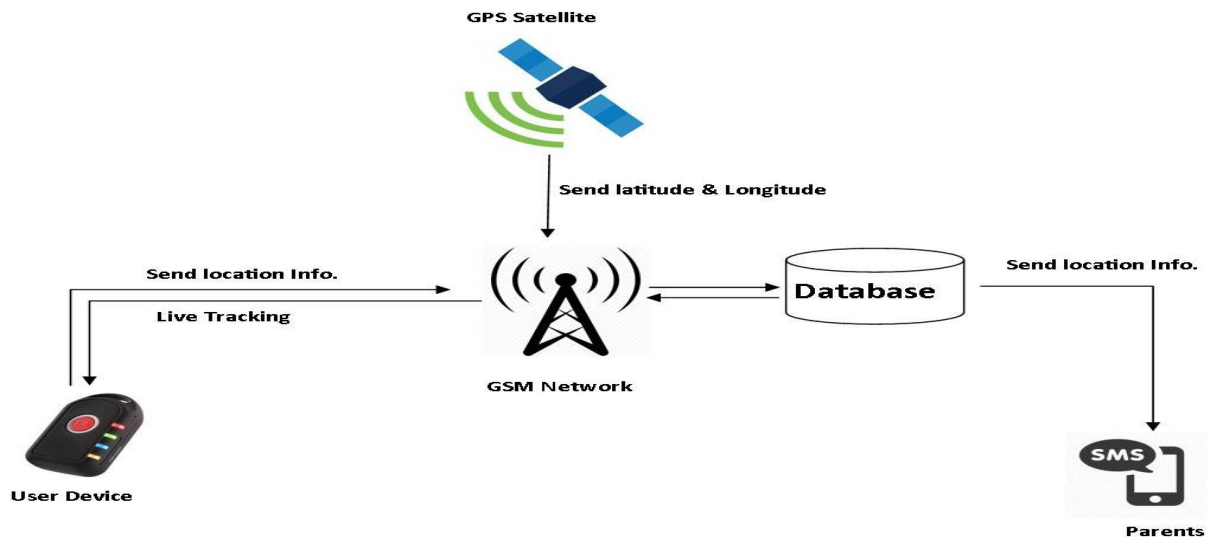


Fig 2: Suraksha yantra system architecture

10. CONCLUSION

SURAKSHA YANTRA: SELF DEFENSE SYSTEM will help in Prevention of attacks on public specially women and

being victim of any sex scandal. System will give assurance for women to live secured life. Using the Text summarization algorithm for calculating word frequency. System was

implemented by first designing the hardware and later the software. It was rigorously tested for its proper operation and reliability. Hardware design began by designing individual circuits and their testing. Suitable modifications were carried out at various stages as necessary. After the confirmation of the proper operation of each circuitry, the Printed Circuit Board (PCB) was designed using Protel PCB making software. PCBs are fabricated by the manual process using screen printing and chemical (FeCl) etching technique. After the holes are drilled, the mounting of components and soldering was carried out. The circuit was rigorously tested once again after mounting of all components on the PCB. Voltage levels and signals were checked for their correctness at various stages. Some minor modifications were carried out as needed.

Suraksha Yantra system can overcome the fear that panics every woman in the country about her safety and security. Thus "SURKSHA" device can ensure secure travel not only for the person who is travelling but also for the one who cares about the person.

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