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A Total Smart Security Solution for Women and Children Using IOT

Dr. Ritu Shrivastava
Associate Prof(Deptt of CSE)
SIRTS Bhopal
ritushrivastava08@gmail.com

Prof. Abhigyan Tiwary
Asst. Prof.(deptt of CSE)
SIRTS BHOPAL
abhigyantiwary@gmail.com

***Abstract*—In India the violence against women and children has grown to be a matter of grave concern, cutting across the boundaries of culture, class, education, ethnicity and age. In the current situation, the important goal is to provide security to women from issues of women harassment. The only thought haunting every girl is when they will be able to move freely on the streets at any time without worrying about their security. Over 34,600 cases of rape have been reported across the country last year with Madhya Pradesh and Delhi topping the infamous list of states and union territories. This statistics was released by the Country's National Crime Records Bureau (NCRB) and that's a HUGE number! This paper suggests a new idea to use technology for women safety.**

We propose an idea which changes the way everyone thinks about women safety. Our objective is to develop a complete, fool proof and technically sound security system which is also commercially viable. We propose to have a device which is the integration of multiple devices, hardware comprises of a wearable "Smart band"/ microchip embedded in a piece of jewelry and can be activated by press of a button in case of emergency. The Device can be equipped with Panic buttons **which in-turns communicate to an Intelligent Transport (IOT) Platform, IOT integrated platform is a great way that can help us envisage a connected world where there are connected devices riding over secure end-to-end solutions. It is capable of making safety and health professionals access and analyze data in real time and respond accordingly to keep people as safe as possible.**

Keywords—IOT, sensors, GPS, GPRS, Raspberry Pi

I. INTRODUCTION

In India the violence against women and children has grown to be a matter of grave concern, cutting across the boundaries of culture, class, education, ethnicity and age. Today in the current global scenario, the prime question in every girl's and parent's mind, considering the ever rising increase of issues on women harassment and child abuse, is mostly about their safety and security. Over 34,600 cases of rape have been reported across the country last year with Madhya Pradesh and Delhi topping the infamous list of states and union territories.

No total security solution is available in the market which is affordable easily accessible and is sold as a commercial product. Our objective is to design a device which has a security system, specially designed for women/children in distress. The Device can be equipped with **Panic buttons** which in-turn communicates to an Intelligent Transport **(IOT) Platform**, and is equipped with GPS for location information and GPRS/CDMA communication technology for sending the location updates to the Intelligent Transport Platform. Voice service facility could be offered on top of the entire solution, as and when required. IOT integrated platform is a great way that can help us envisage a connected world where there are connected
devices riding over secure end-to-end solutions. It is capable of making safety and health professionals access and analyze data in real time and respond accordingly to keep people as safe as possible.

II. LITERATURE REVIEW

There have been many attempts to make security devices for women and children, but none provided the complete solution and none of them is commercially available in the market.

A brief review of such work is done below:

SHE (SOCIETY HARNESSING EQUIPMENT) is a garment embedded with an electronic device. This garment has an electric circuit that can generate 3800kV which can help the victim to escape. In case of multiple attacks it can send around 80 electric shocks [3]. **J.K.Thavil,V.P.Durdhawale, P.S.Elake,** in their paper have proposed a device which is the integration of multiple devices, hardware comprises of a wearable "Smart band" which continuously communicates with Smart phone that has access to the internet. The application is activated and loaded with all the required data which includes Human behavior and reaction.

VITHU APP is an emergency app initiated by a popular Indian crime television series "Gumrah" aired on Channel [V]. When the power button of the smart phone is pressed twice consecutively, it begins sending alert messages with a

link of the location of the user every two minutes to the contacts.

D. G. Monisha1*, M. Monisha1, G. Pavithra2 and R. Subhashini3,have developed a personal safety device Femme designed to keep women safe 24/7. It is packed with features for both everyday safety and real emergencies, making it an ultimate tool for all. This user-friendly application can be accessed by anyone and provides you with fastest and simplest way to contact your nearest help.

SMART BELT system is designed with a portable device which resembles a normal belt. It consists of Arduino Board, screaming alarm and pressure sensors. When the threshold of the pressure sensor crosses, the device will be activated automatically. The screaming alarm unit will be activated and send sirens asking help [3].

The main drawback of these applications and services is that the initial action has to be initiated by the victim which often in situations like these is not possible. So the emphasis is to build a solution that works automatically in situations encountered. Also all the above systems must be connected to the GPRS service to work properly, hence they cannot be used during emergency if there is no internet connectivity. There was no hidden camera detector which is portable. Keeping the above drawbacks in mind we have proposed a system based on IOT integrated platform which will work in emergency automatically and alert the concerned people thus providing safety to the victim in timely manner

III. PROPOSED METHODOLOGY

We analysed that there are no security device for total safety of women & children .The user has to carry multiple devices. We propose an ALL-IN-ONE security device which has all the features in one click. This device provides safety to women and children at home, in office and at public places, This device comes with inbuilt camera, audio recorder and sensors for various body parameters like temperature, pulse rate etc. The hidden camera detector is another critical feature of this device which senses a hidden camera and alerts the person who has the device thus making the person cautious in changing rooms and hotel rooms. This device will be developed using VLSI so that the size is very small and hence can be embedded inside a smart band or any piece of jewelry. The device will communicate through an android App and has a hidden camera detector and GPS sensors, The various technologies are integrated on a IOT platform.

The audio and video recordings will be backed up on a cloud based server and help in the further analysis of crime and criminals using any data analytics tool. The proposed device can be activated by just merely pressing the emergency button once. This device gets activated and sends instant location with a distress message to the police pre-set numbers through a GSM module.

When the emergency button is double clicked, the device sends both the distress message with instant location and records the audio of the incident. When the same button is long pressed it activates a call to the police and sends a audio message to the police giving instant location. The location is located using GPS (UBLOX). When the same button is long pressed it activates call to the police and sends message to the police instant location. The location is located using GPS. The audio is recorded using audio recorder and call is made from GSM modem respectively. This GSM Modem (sim 900) can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. The plus point of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. It can be used to send and receive SMS4 or make/receive voice calls. The hidden camera detector can be used anytime to find whether there is any hidden camera in the surrounding to help our privacy. The hidden camera detector works with the help of RF signal interface. When the RF signal is interrupted, camera can be detected. We can also connect the device with our mobile (through Bluetooth HC05), to find our location even if our mobile is lost which can be activated by clicking tracking your mobile button5 and the location of the mobile is sent to the pre-set number.

When you click on the emergency button the application gets opened automatically then sends an emergency message and audio is recorded and sent to the pre-set contacts. This emergency message consist of the current location tracked by Global Positioning System and sent to GSM module in which our location and our default emergency message is sent to our pre-stored contacts for every two minutes and a call is connected to the police with a recorded voice to seek help. Hidden camera detector is a radio frequency receiver, which picks up electromagnetic signals that are broadcasted from electronic device such as spy camera. By moving this detector, we are able to alert the user about the hidden camera. It lights up when it receives a strong frequency.

The hidden camera detector can be used anytime to find whether there is any hidden camera in the surrounding .The hidden camera detector works with the help of RF signal interface. When the RF signal is interrupted, camera can be detected.

We can also connect the device with our mobile through Bluetooth and we can find the location if our mobile is lost which can be activated by clicking tracking your mobile button and the location of the mobile is sent to the pre-set number. Sensors are incorporated to detect the variations in body temperature, changed heart rate and abnormal breathing patterns. The application is programmed and loaded with all the required data which includes Human behavior and reactions to different situations like anger, fear and anxiety. When activated through sensors the application running on the security device will be fed with the normal and parameters that are within range in case a person is

exercising/ walking fast, and how these parameters change in case of anger, anxiety and fear. Depending on these parameters the device will go in panic mode and generate alerts.

When activated either manually or through sensors the Raspberry camera also takes pictures/video of the incidence. The audio and pictures/video can also act as proofs later and help in convicting the accused. We propose to use VLSI technology so that the size of chip and hence the device is very small and therefore it can be worn in the form of a wrist band or embedded in jewelry or clothing A smart phone can also be connected to the safety device through Bluetooth low energy The device communicates with smart phone through a specially designed application that acts an interface between the device and the phone

The data directed by the smart band such as the temperature of the body along with the motion of the body is continuously monitored by the application which is pre-installed in the phone.

Location co-ordinates are converted to the Google URL and then smart security mobile application send this Google URL along with alert message to an Emergency contact and near by police station. In the absence of smart phone (if it is destroyed) the software runs on the device sending alerts and recordings to the preset numbers.

IV. Brief Overview of the various Components Used

- **SOS Message**

This emergency message consist of our current location tracked by Global Positioning System (UBLOX) and sent to GSM module in which our location and our default emergency message is sent to our pre-stored contacts every two minutes and a call is connected to the police with a recorded voice to seek help.

- **Hidden Camera Detector**

Hidden camera detector is a radio frequency receiver, which picks up electromagnetic signals that are broadcasted from electronic device such as spy camera. By moving this detector, we are able to alert the user about the hidden camera. It lights up when it receives a strong frequency

- **Audio Recorder**

The audio recorder is in the hardware device, which when activated records audio and sends to the police for further investigation.

- **Video Recorder**

The Raspberry Pi board comes with a camera which when activated records the whole incident, and also clicks pictures . When panic button is long pressed this video and pictures are sent to the police and preset numbers. Simultaneously they are backed up on the server too. These recordings help as proof , thus convicting the accused easily. The server backup can be analyzed for studying the crime and the criminal behavior/pattern.

- **Temperature and Heartbeat Sensors**

LM35 is used for sensing the body temperature. The temperature sensor accurately measures temperature and provide an over temperature alarm/interrupt/shutdown output. This device converts the temperature measurements to digital form using a high-resolution, sigma-delta, analog-to-digital converter (ADC).

The basic heartbeat sensor consists of a light emitting diode and a detector like a light detecting resistor or a photodiode. The heart beat pulses causes a variation in the flow of blood to different regions of the body. When a tissue is illuminated with the light source, i.e. light emitted by the led, it either reflects (a finger tissue) or transmits the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in form of electrical signal and is proportional to the heart beat rate.

- **Server:** Lenovo IdeaCentre 520 (F0D5007HIN) (Intel Core I5,8GB,2TB,Win 10 Home) All In One Desktop Specifications

We have used Raspberry Pi as hardware as it has multi core CPU and is set up to run as one would expect a desktop computer to run. It has a large (gigabytes) permanent store (hard drive), a lot of RAM, a decent graphics chip capable of driving an HD monitor/television and the I/O is geared towards consumer connection standards like USB and Ethernet, though it does have some general purpose I/O. The other hardware used is a motion sensor, gps tracker, Raspberry Pi, Hologram Nova, Raspberry pi camera, gprs, Bluetooth, Microphone ,Voice recorder.

Our primary goal is to reduce the size of the device to micro level so that it is embedded in a small wrist band or a piece of jewelry. For this reason we need Very large scale Integration (VLSI) and get the microchip fabricated. Only then the product can be marketed and can have commercial viability.

V. The Application

The Application will be developed using Python/PHP and the database will be maintained using SQL .The data stored in the application can be used as a proof of the crime and help in further investigations. The data will also be analyzed using data analysis software to predict a trend of such crimes and prevent further such hazards.

VI. Advantages of the Proposed System

1) A few devices are available in the market, but none of them give a complete solution. The device developed will be an ALL in one system and we don't need to carry multiple devices.

2) Many devices require the use of a mobile, but in cases of abduction and kidnapping the mobile will be destroyed first.

Hence, the device we develop will not be dependent on a mobile and will function even without internet connectivity

3) Previous devices did not have the facility for audio and video recording. These can be used as proofs and can help in further investigations and analysis of crimes.

4) When the battery is running low, it automatically sends the location the pre-stored contacts

5) Another distinct feature is, it also detects the hidden cameras which help in our privacy

6) No commercial device with so many features is available as size of the device is the greatest challenge. Hence, we will go for VLSI fabrication to convert the complete device in the form of a micro chip.

7) The Device can be worn as a piece of jewelry in a wrist watch or in clothes.

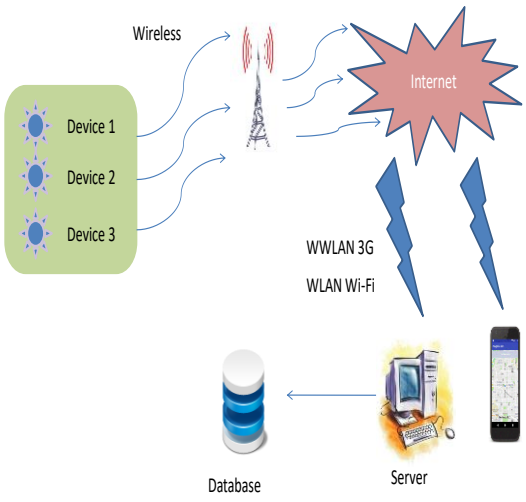

Fig.1 Device Server Communication

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