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Switch Smart Foot Device for Women Safety with Night Patrolling Robot

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ABSTRACT

In the global scenario, women safety is a crucial problem. The atrocities against women are increases day by day. Women in various walks of life,faces situations that make them feel threatened in different enviorments. Their are many methods already developed for the safety of women like samart-devices, smart applications etc. All these have their own limitations ie,many of the devices are not portable and are easily visible to the attacker. Hence the need of the hour is to, design a system address all these problems. In this paper, an attempt has been made to develop a smart device with a night patrolling robot that can assist women when they feel unsafe and to help women as soon as possible and to apprehend the culprits. This device can be clipped to the footwear of the user and can be triggered discreetly. On tapping one foot behind the other four times, an alert will be sent via Bluetooth Low Energy Communication system to the victim's phone, programmed to generate a message seeking help with the location of the device attached. Due to the unavailability of LBB an Arduino UNO is used as the main micro controller, a magnetic reed switch is used to give the input trigger instead of accelerometer in the LBB module and GSM-GPS modules are used to trace and send location and emergency alert. The alert will receive to the police control room. A night patrolling robot nearest to the victim will be get activated from the control room and moves manually to the victim's location. The robot consist of night vision camera, it will transmit live pictures to the IoT website. Many crime cases against women are remain mysterious due to insufficient evidence. The proposed system may become a complete solution for all such cases.

KEYWORDS: *GSM- Global System for Mobile Communication, GPS- Global Positioning System, LBB- Light Blue Bean, IoT- Internet Of Things.*

1. INTRODUCTION

Women from various walks of life face situations that make them feel threatened in different environments. Sixty six percent of women have reported sexual harassment in the year 2010 in New Delhi. It has also been proven that in urban environments, women are more prone to experience harassment especially in developing countries. In such situations, the aid of a safety device that will inform the victim's family members or the authorities may help women feel safer, confident and reduce the chances of harassment. There are a few Smart-phone based solutions for the same, it might not be possible for the victim to reach for her phone in some situations without the knowledge of the perpetuator. Thus, there is a need to introduce a discrete safety device that can be triggered discursively without any explicit action.

So, as a solution for this, the proposed project aims to develop a Smart Foot Wear device with a Night Patrolling Robot. A quick and smart emergency alert

sending system device and a robot with night vision camera to stream live visuals are the topic of concern.

2. Literature Survey

A system, that alarm the emergency contacts while pressing the emergency switch in the side of the shoes using Raspberry Pi and Arduino|1| .The key advancement introduced in this paper are the switch is not visible easier to others. Also the GSM and GPS modules inside the shoes will helps to send the present location of the operator, with the help of cameras it provides 30 sec. live video recording or live streaming, through opening a link given with the emergency alert to the SOS contacts. The system also supports a shock circuit generator, capable of generating shock of 400kv. The proposed system can only implement in shoes only that is its disadvantage.

A paper on |2| describes a IoT based self-security system with Raspberry pi. They key advancement of this paper is that it can be on accessed by only one person for that the device uses R-307 fingerprint sensor. The GSM and GPS modules will helps to find the nearest safe location to the operator. By the help of cameras ,images will capture and safe to the cloud. The disadvantage of the system is that, it have to be connected to the users smartphone for internet connection. It will discharges the smartphone charge very quickly.

A One touch alarm system that detects and send the location of the user to the SoS contacts in an emergency situation|3|. The proposed system is easier to operate. The device consisting of only three modules. PIC microcontroller is controller used in it GPS and GSM modules are used. They are interfaced with the PIC 14f28k microcontroller. The disadvantage of the system is that is designed like a watch, while operating it can be easily noticeable to the attacker.

A simple and easily carrying device with magnanimous fuctionality |4|.Can be actuated in three different methods ,voice, switch and shock. 40 pin ATMEL's AT89s52 microcontroller is used to interpret information from the senor, switch and voice recognition. The GSM and GPS modules used in it will helps to send the location of the operator to police control room and to the family members. The disadvantage of the system is that it is not portable.

The proposed system is a smart device for women's safety device, send emergency message automatically to the relatives and nearby police station by the help of GSM,GPS modules|5|. These all modules are interfaced to the Arduino UNO microcontroller.The key advancement of the project is that, it automates the emergency alert system by using pressure, pulse rate and by temperature sensor. The disadvantage of the device is that ,,it can be easily visible to the attacker.

The proposed system introduces a IoT device along with an android application that can make women safer|6|. The key advancement of the system is ,women can get swift and supreme safety support by pressing the device's emergency switch and the system works in both online and offline modes. Arduino nano is the micro controller is the controller used for the system. Modules like GPS,GSM ,Bluetooth etc. are interfaced with this Arduino. The disadvantage of the system is that ,in this cameras are not provided.

A Smart-phone application which incorporates all the unique features such as real-time location tracking and integrate all the features offered by the exiting system such as GPS tracking, SOS |7|. The applications requires an initial registration along with emergency contacts and the user needs to update the contacts time to time. The key advancement of the system is that, when the user travelling from one place to another, the dynamic GPS tracking offered by Pub-Nubs channel turned on to view the users location on a map. Users with the same app can monitor other users with this app also the user can access to first aid information and toll free helpline numbers. All the data and information is integrated with fire base. This is system is not practical to use in all situation sis its main disadvantage.

A smart phone application developed for the safety of women|8|.In this, the SoS technics are used. The 16 application will send a text message to the recipient numbers that includes position of the victim using SOS service. They can find the nearby police station and hospital details by using GPRS. It will work in the absence of network.Its dis advantage is that, it requires mobile phones nearby to operate.

The paper on prototype is a smart device for women works on Arduino UNO|9|. The key advancement of the system is installing in a wearing glove.The glove is the conducting layer which can be activated by the wearer on encounter of any violent activity. For giving a

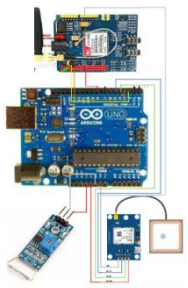
daunting shock to the oppressor, shock generator is developed. The gloves inside having insulating layers so the product provides the user complete safety. This device is not much user friendly.

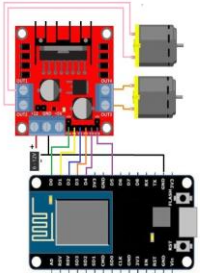
A smart phone application using for critical situation|10|. User have to create an id including his details with 3 contacts of her family members.The main feature of this application is that, it can be actuated by voice recognition with that, by shaking or by clicking they can actuate the application and send the alert to the pre saved three contacts with the victims location. The Android SDK gives the instruments and APIs used to create applications on the android stage utilizing the java programming language. Disadvantage is that, it only works when the smart phone is kept near to the user.

3. PROPOSED SYSTEM

Considering the issues with women of today the need of the our is to keep our women in safe hands. The Blue-bean technologies of 21st century have been utilised in developing various applications in devices to protect women in dangerous situations. Technologies like IoT are in demand and have proved beneficial to the women society. But still tragedies prevail indicating the needs for better approaches. Hence, this project aim' s at designing a device that is more accessible and portable to help the victim to reach her family and authorities in an emergency. Most of the times, it is challenge to apprehend the criminal. This issue can be solved by the image that is captured by the camera of the surveillance robot. The proposed system comprises of Light Blue Bean module, Motor driver, Node MCU, Night vision surveillance camera etc. Due the unavailability of the LBB module ,parallel for that GSM-GPS modules and Magnetic sensor are used.

CIRCUIT DIAGRAM & WORKING





Circuit Diagram of Emergency Alerting System and Night Patrolling Robot

Step1: Emergency message generation

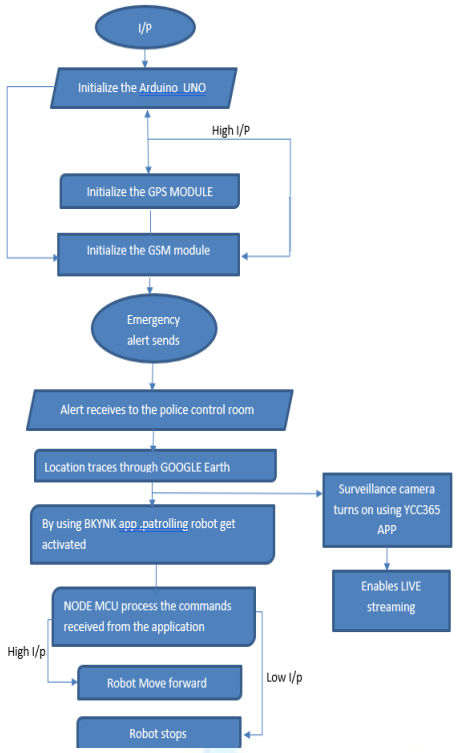
A Magnetic Reed switch/sensor is used here to activate the circuit in an emergency. When the user taps her right foot behind the left foot once, the Neodymium magnet which is placed in the right footwear will come in contact with the magnetic reed sensor placed in the user left footwear. The Arduino UNO will receive the alert from the Magnetic reed switch and get activates the GPS module to take the exact position of the victim. For that NEO -6M GPS module is used. It is a wellperforming complete GPS receiver with a built-in 25*25*4mm ceramic antenna, which provides a strong satellite search capability. With the power and signal indicators, user can monitor the status of the module.

Here the GPS module's Tx pin is connected to the 4th pin of the Arduino board and the Rx in the GPS module is connected to the 5th pin of the Arduino UNO. The module will track the exact longitude and latitude value of the victims position and transfer the value to the Arduino UNO. The traced Longitude and latitude value are passing through the emergency alert to the pre-saved contacts by the user. It is done with the help of SIM 900A GSM module. The Tx pin in the GSM module is connected to the 2nd pin of the Arduino UNO and the Rx pin of GSM module is connected to the 3rd pin of Arduino UNO for the completion of 2 way communication. The information's received from the Arduino UNO is send as a SMS to the pre-contact numbers via the GSM module.The emergency message which is received from the victim' s phone number to a pre-saved contact number. In this The latitude: 8.5133543 and longitude: 76.9485855 is given. It is the satellite positioning of the victim and for getting the exact location of the victim, enter the given longitude and latitude value in series format in Google-earth. In fig:3.3.3 shown below is the location traced by the given longitude and latitude using google earth.

Step 2: Activation of surveillance robot

Among the pre-saved numbers, one message will be received to the police control room. By entering the longitude and latitude received through the emergency in the google, the exact location of the victim can be identified. Considering this, the surveillance robot nearest to the victim get activated from the control room. The Patrolling Robot consist of a Node MCU, Motor

driver, robotic chassis and a live streaming Night vision camera . The Patrolling robot get activated from the control room by using a smartphone application called BLYNK. Through the Blynk application we can control the Robot with the help of a module fitted in the surveillance robot named Node-MCU . The Node MCU is a Node micro controller unit and a open source platform based on ESP8266. Which can connect objects and let data transfer using the Wi-Fi protocol. The Node MCU is the main control unit of the surveillance robot, which works with 5v power supply. This device needs internet connectivity to work. The node MCU will receive the command's given through the smartphone and process according to it. The Node MCU is connected to a Motor driver. L298 2A motor driver is taken ,It drives 2 DC motors at a time, works with 12v DC supply. It is used here to control the movement of the patrolling robot. The pins D2, D3, D6, D5 of Node MCU are connected to the pins 7, 2, 1, 9 of the motor driver. When a command is received for example: If we are clicking the forward button in the smart phone ,the node MCU in the robot will receive the command and process it. And transfer the processed command to the Motor driver. Motor driver works according to the command and the robot will move forward. By this method the robot can reach to the victim easily and due to its smaller size no one can easily notice the robot. For seeing the direction and for recording the images of the culprit a Night vision camera is also provided in the robot ,which will transmit live visual's through an another application called YCC365.Its an user friendly application the visual transmitting from the camera can be displayed on the mobile screen while opening the application, for that the camera have to paired with the application earlier. The camera records visuals at 720p , enables night vision, voice recording etc. By the help of the camera the robot can be controlled and reaches to the victims area. Through the visual recorded, the authority can easily capture the culprit easily ,in case of the culprit is escaped before the police reaches.



4. Results & Discussion

The main aim of this project was to develop a Smart device that can assist women when they feel unsafe. For that fabricated a Smart emergency alert system, which will alert the family members of the user and to the authorities via sending an emergency message. For that GPS,GSM modules and a magnetic reed switch are used .These components interfaced with Arduino UNO. The programme used here is Embedded C. One among the emergency message will receives to the police control room. After that, we fabricated a Night patrolling, which Can be consider as the second part of the project. The Night patrolling robot is developed Because, in so many women abuse cases the culprits are doesn't identified due to the lack of information about them. So, the projects second part will be complete solution for that problem. From the control room itself can identify the patrolling robot nearest to the victim. Then the robot can be driven to the victims location from the control room with the help of a smartphone application called BLYNK . Night vision camera with audio recording is also attached to the robot for seeing the road directions and for capturing the images of the culprit.

Many devices and equipment's are available in the market for women to use in an unsafe situation. But they all are not providing 100% about the safety of the women. So devices are larger in size so women will feel

discomfort while carrying it and also needs more time to operate. In a critical, unsafe situation her each second is very valuable by considering this we implemented a simple one touch mechanism in our project. Some devices like Smart electric teasers etc. are not much user friendly and their will be some risk while operating such device. In this project doesn't included any components that is dangerous to human. The main key feature of the device is that it provides double protection to women's

5. Conclusion & Future Scope

Without women progress, a country cannot move forward, yet we see women suffer a lot of harassment on their way, which is a hindrance to their progress. For this reason, we decided to work on a project which will help millions of women. The proposed design will deal with critical issues faced by women in the near past and will help to solve them with technologically sound equipment's and idea's. The society may or may not change for the enhanced, the power to be autonomous, truly free, self-assured and come with arming one self with the best possible device which can over come the fear that scares every women in the country about her safety and security. The main benefit of using this system is that women can feel confident when they go outside as they can quickly get support through the system when they are in crises. So the project combines several existing technologies like wireless communication, IoT etc.

There are many method's and equipment's available in the market which can be use by the women when they are in a critical situation. But still, the percentage of harassment against women and child abuse are increasing year by year. These all shows the absents of a proper safety device which can be operated very quickly in crucial situation. For this, we have implemented our system which can be activated under 5 seconds for that we are using the LBB device. Which will helps to send an emergency message to the victims family members and to the authorities. The current longitude and latitude of the victim is also send through the emergency alert and by entering the shown longitude and latitude in the message on google earth ,family members or the authorities can trace the victim's exact location.

In Future scope the, night vision camera is to be sealed of to the outside world by encasing it in a protective poli-carbonate casing that causes no hindrance to the camera in terms of functionality and accuracy. The Robot is to be optimized for its use in harsh weather's and times allow it in run in places difficult for human to spend long period of time. The another scope is that the protype can be modified to wearable like smartwatches, bracelet, necklace etc. through the process of customization.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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