

Iot Based Night Patrolling Robot for Women Safety

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ABSTRACT

The protection and welfare of women is a major concern around the world. We have all noticed that, despite living in a technologically advanced world, crime rates against women are steadily rising. We designed an embedded device based on Arduino and a GSM module with GPS to send an emergency message with location and generate an alarm in order to mitigate and ensure the safety of women. This device notifies the police control Centre, as well as family and friends. Women in stressful situations may also use shock generators for self-defense. When the victim is in danger, the system produces an emergency call, which the victim then activates. The wireless interface is appropriate and can be triggered by the victim simply by pressing a push button when they are abused. The device is cost-effective and user-friendly as a result of the integration of both of these components.

Keywords: Arduino, Embedded System, GPS, GSM, Push Button, Raspberry Pi, and ShockGenerator.

I.INTRODUCTION

As we all read newspapers or watch news headlines the one thing that is never absent in our day-to-day headlines are the concerns regarding the women's safety and hence many do not feel safe stepping out. As the world is progressing gradually, the sector of security has progressed in terms of development of existing technology but is yet to fully embrace technology to its maximum value. To reduce the issues related to women's safety, we are working on the concept of incorporating robotics in the security sector i.e., Night patrolling robot. Robots function as a computer and can be controlled remotely. Patrolling is nothing more than keeping track of an area where the corresponding robot patrolling area is constantly moving and traveling is continuously moving in the area allocating to the robot, which generally reaches the scene where the crime is taking place once it gets an input from the victim and then the robot sends the location of crime scene to nearby police station, the robot takes the pictures at 360-degree rotation. Then, these images are sent to the user in real time, they will be evaluated by the user and action will be taken if any problems are found, the functioning of the robot is done in order to record or capture whole crime scene as an evidence in order to catch the culprit. So generally, by using this robot the evil-minded culprits of the society are either caught and punished or live-

in fear of being caught which indeed reduces the crime rate and makes our society a better and safe place.

II.LITERATURE REVIEW

The authors grant an alternatively small print analysis of female security machine the usage of IoT [13], which is accessed on the web and tune the region of sufferer by using GPS, and speak with friends, family, and police about the incident of victim and authors of proposed a system, which is involved about women protection issue [7]. They have used two mechanism for preventing the female from harassment. One of the items used to be a wrist band. They built a switch into the wrist band, and when the switch is pressed, an alarm is activated, as well as a tear gas

mechanism for self-defense, and an alert message is sent to the emergency contact. Another method for identifying the harasser is to employ stay video streaming. The authors of [5] want to create an IoT-based women's safety system. In this paper, we will try to collect data from various sensors and use it to monitor the exact location of the victim. In this study [3] we gathered information on how to transmit and receive data utilizing the LPC2148, GPS, and GSM. The simplicity with which the position can be tracked and relayed to previously saved contacts has been emphasized. The author offers a “advanced intelligent protection and self-defense framework” for people, which comprises a self-defense alert system as well as an electric shock device [15]. This gadget may be turned on using a pressure sensor or a tilt sensor. The authors devised a one-touch warning system that included an emergency call for help and did not require the usage of a smartphone [14]. Hasmah Mansor proposed employing a Remote Health Monitoring System to determine body temperature [11]. A device temperature sensor and a wireless sensor are used to measure body temperature and heart rate. The ambulatory gadgets [9] were designed by Humnguyen, and they use an inertial sensor to observe and detect a person's behaviors in normal life with Parkinson's disease.

The author in this proposed a GPS and GSM-based strategy to promote women's safety [16]. A compact gadget containing a buzzer and a microprocessor that can be worn on a band or on a watch has been designed. Orlando Arias and his colleagues' Wearable gadgets, which are embedded devices with sensors that collect data from their surroundings, are explored as part of the Internet of Things in this study [1]. After that, the information is processed and transferred to remote sites for analysis. Even though they appear to be harmless, these emerging technologies create security and privacy risks. They raise the issue of the likelihood and consequences of hacking such devices. They focus on the design flow of IoT and wearable devices to address common design techniques and their implications on security and privacy.

The authors, J. H. Ziegeldorf and O. G. Morchon suggested a method that motivates four dangers of privacy breaching interactions and presentations, lifecycle transitions, inventory attacks, and information linkage [18]. The threat arrangement in our reference model helps us understand where threats occur and how to conceptually address them. Finally, technical issues are explored in the context of each danger, which can help to clarify future research prospects.

To track the passage of time, Velocity and utilized an association algorithm. Holistic approaches and video surveillance, which are depicted in a 2D histogram, can be used to observe people's behavior. However, it would be unable to identify motion change in human crowds in a 3D histogram representation [6]. Charranzhou proposed a system to find the trip ends when traveling or not traveling, using smart phones and a GPS monitoring gadget [2]. The author developed a system that uses PR (Promoted Recall) technology and data-driven machine language to determine speed, distance, and heading direction.

The research of S. A. More focuses on the use of temperature and pulse rate sensors to detect the probability of a possible problem and inform family and friends via a smartphone application [8]. Another researcher is aiming to create such a device using the Internet of Things [4]. This is what the suggested system "Watch me" entitles you to. It includes a sensor that monitors the victim's heart rate when she is distressed, triggering an alarm to alert nearby individuals [4]. It can also make an automatic call and use a GPS device to track its location. The creators of a women's protection mechanism based on the Internet of Things [14]. In this article, we'll try to collect data from several sensors and utilize it to track the victim's exact location. The creators of proposed a Raspberry Pi and IoT-based women's safety system [12]. The harasser was photographed and sent to the police by smartphone in this project. The authors recommended the Abhaya app, an Android app for women's safety [17]. By tapping a button on the smartphone, this software was designed to transmit location information to registered contacts.

III. PROPOSED METHODOLOGY

3.1. Proposed Design:

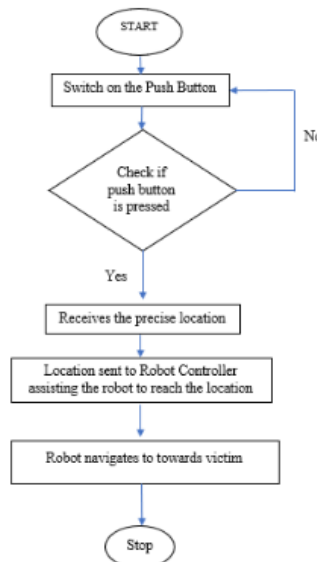


Fig 1: Flow of operation

The construction of a wristwatch/Smart women gadget. The block diagram for the women's safety gadget, which we can refer to as a smart safety watch, is shown in Figure1.1. In this watch, there is a SOS button built into the watch/gadget, in the event of an emergency, women must click the button, which causes the Arduino nano to read the input and collect the precise position of the person/women and send the location information, such as latitude and longitude values, to the phone number specified, such as friends, parents, or the police station this Aids in tracking the exact location. The Arduino nano sends the obtained location to the robot microcontroller, which assists the robot in reaching the location by sounding a siren. This mechanism is triggered for self-defense, and a notification is sent to the touch. Arduino IDE was used to write the input code in this project.



Fig 1.1: Proposed Design of Wrist Band

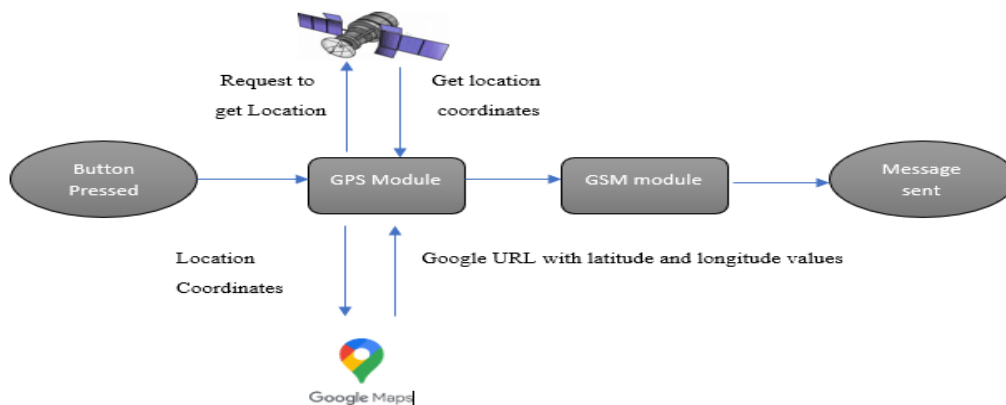


Fig 1.2 Architecture for Message Alert System

Rover/robot working

We will be using a robot with an Arduino Mega, which is a microcontroller board that will serve as the robot's main operating device, as well as a compatible motor controller that will

act as an intermediary between the microcontroller, batteries, and motors, in our work. A Bluetooth module is also attached to the robot body in order to have a communication between the user's device and the robot, in order to exchange the longitudinal and latitude values to locate the exact location, by using the GPS module which works by receiving information from GNSS satellites and then calculate the device's geographical position i.e. the location from the person wearing our wrist band and so on, our robot will also be having a hmc5883l magnetometer/compass and the ultrasonic motion sensors for the better tracking and reaching the location.

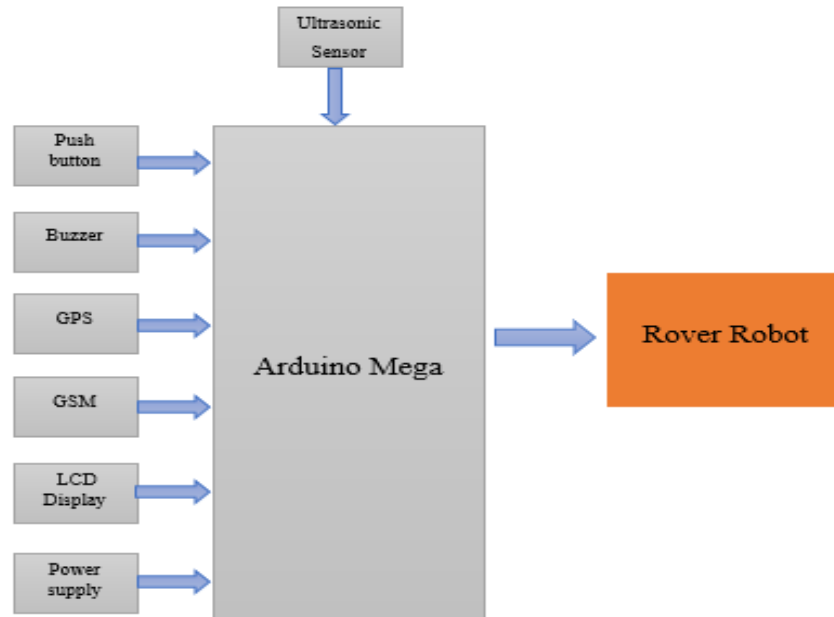


Fig 1.3: Proposed Design of Rover Robot

V.RESULTSAND DISCUSSION

There is a SOS button integrated into the smart safety watch. When the receiver receives the SOS packet, it contains the position in latitude and longitude format. The navigation chart will show you the exact position. The obtained location is then sent to the robot's microcontroller, which uses a siren to assist the robot in reaching the emergency location. Figures 1 and 1.2 display the components and modules that were used to build the module. The model includes all of the necessary hardware, including GSM, GPS, a buzzer, and an Arduino uno microcontroller. When the victim presses the button and is in risk, a warning message is sent to the pre-programmed mobile numbers. When the victim/women is in danger, the automated system is activated; however, the woman must click the button if there is an emergency.

The suggested system has the benefit of being adaptive, in that it allows the alarm mechanism to be triggered using a simple button in situations when it is humanly possible to reach the computer, and it detects the threat using the sensor in situations where it is not possible

to respond. The proposed technology is also portable, lightweight, and cost-effective. It is simple to comprehend and apply. It does not necessitate the use of the internet. The sole stipulation is that the sim card be able to receive mobile signals in the area. The proposed gadget is also lightweight, portable, and inexpensive. It's simple to understand and use. It is not required that you utilize the internet. The only stipulation is that the sim card be able to receive mobile signals in the field.

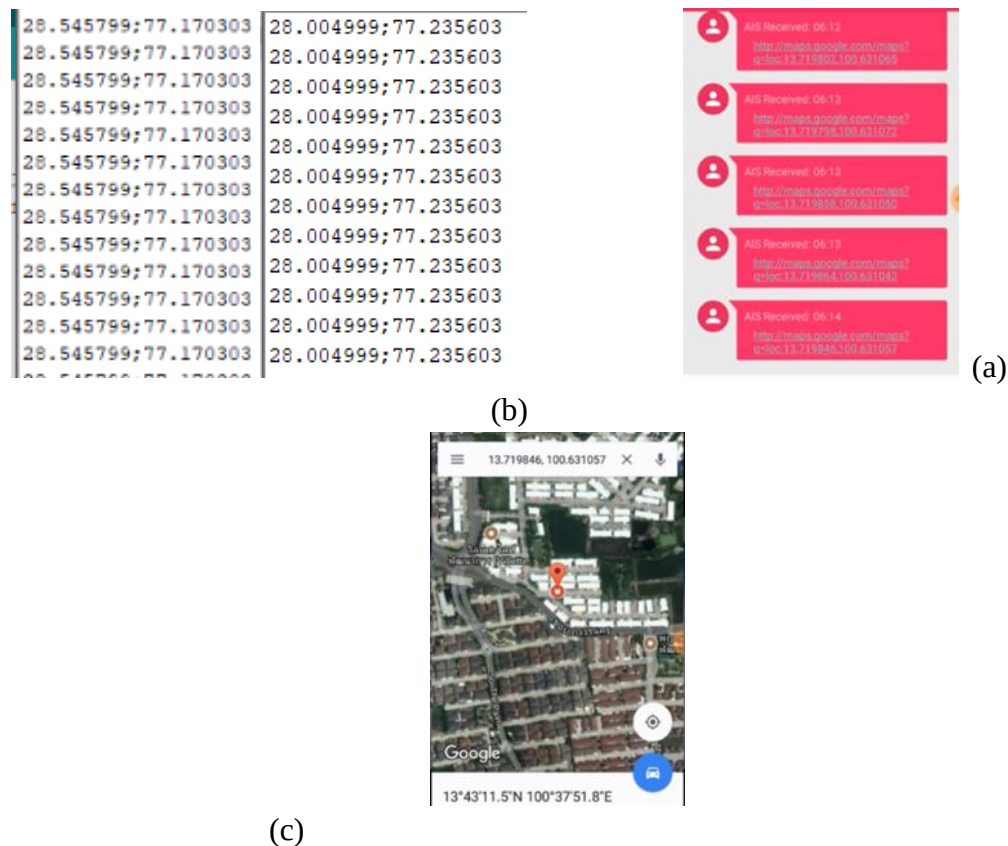


Fig 2: (a) Latitude and longitude values, (b) An example of an SMS, (c)GPS location on map

Fig 2: (a) on a serial display displays how GPS location is received in terms of latitude and longitude, these values are generated by the GPS module and supplied to the microcontroller, the microcontroller reads the output produced by this Module and then separates as latitude and longitude data.

Fig2: (b) When the victim presses the button, a SMS with the message HELP and the coordinates is sent to the stored phone number. This latitude and longitudinal values are sent to a list of phone numbers, which includes friends and the nearest police station. A Rover Robot is dispatched to that position using these coordinates.

Fig2: (c) Using the link that the microcontroller sends through SMS. When you click the link, it will take you to Google Maps, which will show you the exact spot where the victim is. The robot will utilize these coordinates to navigate to that spot.

IV. NOVELTY

The main goal of this project is to ensure the safety of women in emergency situations. GSM and GPS are used in this work and are attached to an Arduino Mega. We can send real-time messages with precise position information, including longitude and latitude, using these two systems. These longitude and latitude values are used by robots. Right away for few mins it will keep on sending the display scope and longitude values to the versatile number specified. So that the robot peruses the given data and attempt to reach the area it gotten. A siren is mounted in robot as the robot nears the area that produces the sound alarming the ladies who is in inconvenience.

In this showcase, there are distinctive sorts of security partner gadget, which are costly and not at all highlights are achievable this can be accessible there. Those gadgets are too complicated to utilize. Therefore, the oddity of this work is attempting to make a cheap and client inviting security right hand and badgering avoidance gadget for everybody.

VII.CONCLUSION AND FUTURE SCOPE

This concept suggested a system for women's protection and security by combining robotics and wireless technologies. An embedded system based on Arduino and a GSM module with GPS is designed and created to send an emergency message and sound an alert to predefined numbers. All this mechanism takes place during a short span of time and helps the victim to get maximum benefit from being saved. Also, the proposed system is not only restricted to Women's safety, but It can also be used for child tracking during abduction, for future enhancement we can use IOT to control the robotic vehicle. We can try to sum up other features like recording audio and video which can be a good source of evidence. The main purpose of this project is to ensure Women's safety and security and achieve cost-effective and user-friendly device. Future scope as the fallowing points

- The wristband's size can be further decreased by eliminating the GSM and GPS modules. GSM and GPS modules on the phone can be used to provide the necessary services. As a result of the victim's ability to shield the device from the attacker, he or she would have more access to it.
- A solar cell can be inserted in the wearable device and used to power the band to extend the battery life. The band can then be worn around the clock, seven days a week, without needing to be recharged.

- Instead of sending text messages using the victim's own phone number, we can use the GCM and XMPP servers to allocate a specific ID and send messages over a packet data network, preserving the victim's identity.
- The wristband would also have a small camera mounted in it to provide better proof of the crime and evidence against the defendant. The camera will record the crime and serve as proof of the assailant's identity, which can be used in court.

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