Design and Development of an Intelligent Security System for Women Safety based on RF, GSM and GPS Technology

Abstract

Security for women has become a major issue as the number of crimes over women and girls are increasing day-by-day. The main intention of our project is to make women security system more reliable and accurate so that we can deal with this social issue promptly thereby enhancing women security. The security system gets activated when the women presses the switch, GPS Receiver tracks the location of the women and sends emergency messages using GSM to the predefined numbers. We can also view live streaming of video images with the USB camera. The vehicle ignition system can be turned OFF using RF module.

Keywords: Raspberry pi processor, USB Camera, GPS Receiver, GSM, RF module, Relay

1. Introduction

At the present scenario, women are competing with men in every prospect of society. Women also contribute to the development of our nation. The status of women in India has gone through many great changes over the past few years. But still women are facing social challenges and are often victims of abuse and violent crimes. Hundreds and thousands of incidents of physical abuse are happening to women every day. According to the statistics, it is found that every two out of three women have suffered trauma. According to the survey of women, it is found that women are losing their confidence because of such incidents. The basic approach in this project is to intimate instant location and along with a message to a predefined number like parents, friends, media, and women cell to avoid unfortunate incidents. In global scenario, the prime question in every girl's mind is about her safety and the harassment issues. The only thought haunting every girl is when they will be able to move freely on the streets even in odd hours without worrying about their security. We are all aware of importance of women safety, but we must analyze that they should be properly protected. Women are not as physically fit as men, in an emergency situation a helping hand would be assistance for them. This project suggests a new technology to protect women. This project focuses on a security for women so that they will never feel helpless.

2. EXISTING SYSTEMS:

[1] Proposed project acts as a security system for women based on IOT. In this paper the system intends to a wireless technique in the form of embedded device namely Raspberry Pi for women that will serve the purpose of alerts and way of communicating with secure channels and it captures the image using R-pi camera. There are many android applications for women safety but they as not as much as efficient. So, to solve this issue of women safety we developed a prototype which is easy to use and which is efficient to provide help to that victim. So, when the victim presses the button, the application will capture the photo, collect user's information to send notification to registered phone numbers with link of captured image. This saves the time and that victim get help without loss of time. Also, in the case of Children security the system proposes a speed monitoring and location tracking facilities using GPS, GPRS, GSM. The system consists of bus unit. The bus unit which is used to detect the path of Bus by using GPS. Weather the bus is travelling on its day to day route and also it monitors the over speeding of bus. According to that the by using GSM alert messages will be send to their parents and vehicle owner. The system has been developed on web-based data driven application and android application has provides the useful information.

[2] Nowadays, women and children safety are a prime issue of our society. The count of the victims is increasing day by day. Project proposes a model which will help to ensure the safety of women and children's all over the global. We have used different sensors like heartbeat sensor, temperature sensor, accelerometer sensor for detecting heartbeat, temperature and sudden change in motion of user. We have also used GPS which will help to detect location of the device. GSM used in the model is used to send alert message to guardians, relatives and police station. We have proposed IoT (internet of things) based device which will help to continuously monitor values of different sensors and GPS used in device.

3. PROPOSED SYSTEM:

Design and Development of an Intelligent Security System for Woman Safety based on RF, GSM and GPS Technology
Transmitter
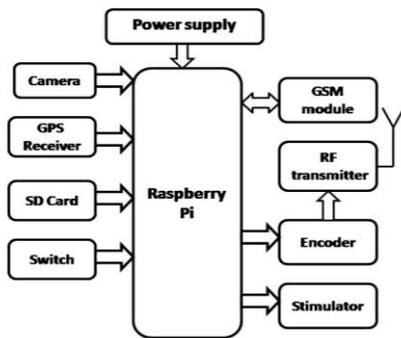
Design and Development of an Intelligent Security System for Woman Safety based on RF, GSM and GPS Technology
Receiver
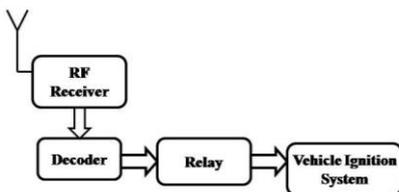
In this proposed system, Camera is used for live streaming of the video images. GPS receiver is used to track the location of the women. Whenever emergency switch is pressed, the location of the women goes to the predefined mobile number through SMS with the help of GSM module. Stimulator is used to produce the electric shock. With the help of RF module, we can OFF the vehicle ignition system. With the help of inbuilt Wi-Fi present in the Raspberry Pi processor we can monitor the live video images remotely.

4. HARDWARE DESCRIPTION:

A) Related Work:

The brief introduction of different modules used in this project is discussed below:

Raspberry Pi (ARM-11) PROCESSOR:

The Raspberry Pi 3 Model B is the latest single-board computer from the Raspberry Pi Foundation. In this version, they've upgraded to a 1.2 GHz 64-bit quad-core ARM processor and added 802.11n Wireless LAN, Bluetooth 4.1 and Bluetooth Low Energy.

Like the previous version (the Pi 2) it has 1 GB of RAM, 4 USB ports, and full HDMI support. The Raspberry Pi 3 also has the same form factor as the Pi 2 (and Pi 1 Model B+).

The Raspberry Pi runs Raspbian and/or NOOBS (both Linux-based operating systems) which boot from the removable SD card. A host of third-party operating systems are also supported, including Ubuntu Mate, Windows 10 IoT Core, and OSMC.

The Raspberry Pi 3 is a credit-card sized computer capable of doing just about anything a desktop PC does. From web surfing and word processing, to playing Mine craft or acting as a media player, the Raspberry Pi's capabilities are extensive. With plenty of graphics processing power, the Raspberry Pi 3 is capable of streaming BluRay-quality video. If you're looking to incorporate the Pi into your next embedded design, the 0.1" spaced 40-pin GPIO header gives you access to 27 GPIO, UART, I2C, SPI as well as both 3.3V and 5V power sources.

Raspberry Pi processor is programmed using embedded 'Linux'. Linux is the best-known and most-used open source operating system. As an operating system, Linux is software that sits underneath all of the other software on a computer, receiving requests from those programs and relaying these requests to the computer's hardware.

B) RELAY:

A relay is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism, but other operating principles are also used. Relays find applications where it is necessary to control a circuit by a low-power signal, or where several circuits must be controlled by one signal. A type of relay that can handle the high power required to directly drive an electric motor is called a contactor. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protection relays".

C) GSM MODULE:

GSM is a cellular network, which means that cell phones connect to it by searching for cells in the immediate vicinity. This is a GSM/GPRS-compatible Quad-band cell phone, which works on a frequency of 850/900/1800/1900MHz and which can be used not only to access the Internet, but also for oral communication (provided that it is connected to a microphone and a small loud speaker) and for SMS.

D) GPS:

A GPS receiver calculates its position by precisely timing the signals sent by the GPS satellites high above the Earth. The receiver utilizes the messages it receives to determine the transit time of each message and computes the distances to each satellite. These distances along with the satellites' locations are used with the possible aid of trilateration to compute the position of the receiver. This position is then displayed, perhaps with a moving map display or latitude and longitude; elevation information may be included. Many GPS units also show derived information such as direction and speed, calculated from position changes.

E) Wi-Fi:

Wi-Fi or WLAN as it is commonly known is fast becoming the preferred mode of connecting to the internet. Many people are not aware of the descriptions and explanations related to it. Wi-Fi gets its name from a certification called Wireless Fidelity given to networks operating under 802.11 standards. Wi-Fi allows computers, PDAs and other devices to connect to a broadband connection in a wireless mode. The 802.11 standard defines the wireless communication operating via electromagnetic waves. While reading the descriptions and explanations related to Wi-Fi, one should remember there are different modes for wireless networks like Infrastructure mode and Ad-Hoc mode that can be used for different criteria.

F) RF MODULE:

An RF module (radio frequency module) is an electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and a receiver. They are of various types and ranges. Some can transmit up to 500 feet. The data can be wirelessly transmitted from transmitter to the receiver section.

G) USB TAG CAMERA:

USB Cameras are imaging cameras that use USB 2.0 or USB 3.0 technology to transfer image data. USB Cameras are designed to easily interface with dedicated computer systems by using the same USB technology that is found on most computers. The accessibility of USB technology in computer systems as well as the 480 Mb/s transfer rate of USB 2.0 makes USB Cameras ideal for many imaging applications. An increasing selection of USB 3.0 Cameras is also available with data transfer rates of up to 5 Gb/s.

5. SELF DEFENCE SHOCKING SIMULATOR

The shock generator has a DC source of 9V, 3A current rating is connected to a inverter using IRFZ44 N-channel Mosfet. The gate terminal of the Mosfet is connected to Raspberry pi and inturn the output of the Mosfet is connected to a conductor. When a High pulse is sent from the Raspberry pi pin the inverter is turned on there by a high current is obtained across the conductor

6. RF TRANSMITTER TO STOP THE IGNITION OF CULPRIT VECHILE

RF transmitter send the data from Raspberry pi to RF receiver where the vehicle ignition is controlled.

With the help of RF module, we can OFF the vehicle ignition system. With the help of inbuilt Wi-Fi present in the Raspberry Pi processor we can monitor the live video images remotely.

7. ADVANTAGES AND APPLICATIONS

ADVANTAGES:

- ➢ GPS tracking feature tracks the user lively when you are the move after triggering the emergency button.
- ➢ GSM modem send the alert messages when women is in danger.
- ➢ Inbuilt Wi-Fi present in the Raspberry Pi processor we can monitor the live video images.

APPLICATIONS:

- ➢ It is used for safety of women when she is in danger.
- ➢ It can also be used for child tracking during school time.
- ➢ It can also be used as a vehicle tracking system.

8. RESULTS

The development "Design and development of an intelligent Security system for women safety" aims to develop a security system for women. The system is able to tracking the scene and health of the women always. The system sends alerts to the predefined numbers in the case of emergency. The below images shows the proposed system and its output.
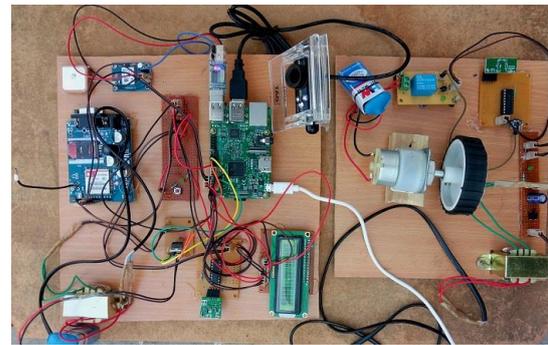
Security system for women safety

Alert Message output

GPS location output

9. CONCLUSION:

The existing model presents an Integrating feature of all the hardware components which has been used and developed in it with Arm-11 Raspberry pi processor. The Presence of each and every module has been reasoned out and placed very carefully. Hence the contributing to the best working unit for "DESIGN AND DEVELOPMENT OF AN INTELLIGENT SECURITY SYSTEM FOR WOMEN SAFETY BASED ON RF, GSM AND GPS TECHNOLOGY" has been designed perfectly. Secondly, using highly advanced IC's like Broadcom BCM2387 chipset, 1.2GHz Quad-Core ARM Cortex-A53 (64Bit) processor, Linux operating system

technology with the help of growing technology. Thus, the project has been successfully designed and tested.

10. ACKNOWLEDGEMENT

FUTURE SCOPE

 ➢ This device is can be made so small that it can be used as a hand band.
 ➢ This device can be compatible with mobile phones.
 ➢ Voice messages can be sent during need.

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