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# DESIGN AND IMPLEMENTATION OF SMART SECURITY SYSTEM FOR WOMEN WITH LIVE VIDEO STREAMING USING IOT

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***Abstract*** **:** Every day, women, young girls, mothers and women from all walks of life are struggling to be safe and protect themselves from the roving gaze of horribly insensitive men who molest, assault and violate the dignity of women on a daily basis. The streets, public transport, public places in particular have become the domain of the hunters. Due to these atrocities that women are subjected to in the present scenario. A smart security device for women based on the internet of things is proposed. In this project, an Embedded Real time video monitoring system is designed, in which the embedded chip and the programming techniques are used. The central monitor which adopts Raspberry pi is the core of the whole system. Real time video transmission is widely used in surveillance, conferencing, media broadcasting and applications that include remote assistance. First, USB camera video data are collected by the embedded Linux system. All data are processed, compressed and transferred by the processing chip. Then, video data is uploaded to the cloud by wireless network. The live video streaming is performed using the web camera and live location is achieved by GPS module. This embedded monitoring system overcomes the weak points of the traditional video surveillance systems, such as complex structure, poor stability, and expensive cost. It can be widely used in many fields, and also used for long distance transmission. The next generation of surveillance will be able to annotate video and coordinate the tracking of objects with multiplexing hundreds of video streams. Video surveillance has evolved over the years and is a vital tool for safety. It was initially dominated by the camera with coaxial cable and they connected using coax cables. There is a digital type of switching and IP based data delivery. They can capture a wide area so, the camera here we are using an Omni directional camera or mobile camera can also be used. Raspberry Pi used for core control, camera for capturing the video, GPS to track the live location and user phone or laptop connected to Wi-Fi to receive the live streaming videos.

***Index Terms*** **– GPS Module, USB Camera, GPS Tracking, WiFi Streaming.**

## I. INTRODUCTION

Women are the backbone of any economy primarily shaping the future of the country. In the present scenario, women are keeping pace with men in every walk of life but unfortunately at the cost of being subjected to abuse, harassment, violence in public and even at their own houses. They cannot step out of their houses at any time of the day. This system is implemented by Raspberry Pi Zero. There are many apps like Be safe, with you, so most of the apps work on tracking alert models. That means the user selects a number of contacts from the contact list. Then the user sends an sos signal. When the power is off, then the total system will be off. The Raspberry Pi Zero is slower than the Raspberry Pi 3. It is used to develop a device which can protect women in such situations where communication via mobile also becomes challenging. Raspberry Pi3 is used for interfacing Raspberry Pi camera and buzzer, a buzzer module emits a high frequency alarm to draw the attention of the public towards the victim, a camera that captures the image of the criminal when the victim is being attacked thus helping in criminal apprehension on pressing of a button, a message sending module that is used to send the current location of the victim tracked via GPS of the user's smartphone and the link of the image captured via Raspberry Pi camera to the emergency contact numbers using SMS. Live video is streaming on the emergency contact number. If there is any case of crime it becomes evidence produced to court. An embedded system are often defined as a computer that does a selected focused job. Applications like the air-conditioner, VCD player, DVD player, printer, fax machine, mobile etc. are examples of embedded systems. Each of those appliances will have a processor and special hardware to satisfy the precise requirement of the appliance alongside the embedded software that's executed by the processor for meeting that specific requirements.

In the system overview we are discussing the block diagram and working of the system. Here we can see in the block diagram that all operations are controlled by the Raspberry Pi unit. The system works in the following manner. There is an RFID card which is used to swipe and detect the authentication of the user. The RFID contains registered users. This is swiped by the driver as well as the employee. Next the alcohol content of the driver is checked. If the driver is drunk means a green light will glow on the sensor. Then the vehicle will not start. If he is normal, the vehicle will start. Now there are some buttons provided in the cab in case of emergency situations. The panic button provided is used to press in case of any panic situations or attacks. Once the panic button is pressed the camera in the cab will be activated and start recording the video. The video is sent to a person monitoring the cab through a Telegram application. This is similar to a chat app with additional functionalities such as update of data leave application, video and message sending. Messages are also sent to various contacts through the Twilio account created by the user. When the breakdown button is pressed a message will be immediately sent. A piezoelectric sensor is placed to detect accidents.

## II. HARDWARE SYSTEM DESIGN

In system design various modules are used for the design of the system. The system has mainly two units cab unit and the company unit. Customer and driver related interactions will be incorporated with the Cab unit module and the cab evaluation along with monitoring is done with the Company unit.

### 2.1 A Cab Unit

The cab unit that has been installed within the car would ensure to provide the security services for women employee. It tracks taxi movement, updates taxi‟s location through the GPS module and enables taxi driver to get into the cab only if the driver is passed with the alcohol detection test. The mobile sniffing system that automatically disconnects the phone call of the driver in few seconds is also incorporated with the cab unit. The mobile application with the customer captures the video at the panic situations and the emergency call is send to the phone numbers registered in prior. The Main server provides an android application for customers. The android application stores the information into the main server that records the details of the employee using the cab. B.Company unit The company unit has its physical existence within the company itself which can control and coordinate the cab. The information like tracking taxi movements, updates taxi‟s location and capturing and sending of the video at the panic situations are obtained and monitored at the company unit. Third part, the Main Server provides a way to integrate these two modules. A main server coordinates the communication between these two components and merges them into a complete and unique system. Main server collects and handles the data received from customers‟ application. The company unit is monitored to obtain the details and updations of the employee that using the cab from the details being sent from the cab unit through the GSM module. The cab unit that has been installed within the car would ensure to provide the security services for women employee. It tracks taxi movement, updates taxi‟s location through the GPS module and enables taxi driver to get into the cab only if the driver is passed with the alcohol detection test. The mobile sniffing system that automatically disconnects the phone call of the driver in few seconds is also incorporated with the cab unit. The mobile application with the customer captures the video at the panic situations and the emergency call is send to the phone numbers registered in prior. The Main server provides an android application for customers. The android application stores the information into the main server that records the details of the employee using the cab.

### 2.2 Company unit

The company unit has its physical existence within the company itself which can control and coordinate the cab. The information like tracking taxi movements, updates taxi‟s location and capturing and sending of the video at the panic situations are obtained and monitored at the company unit. Third part, the Main Server provides a way to integrate these two modules. A main server coordinates the communication between these two components and merges them into a complete and unique system. Main server collects and handles the data received from customers‟ application. The company unit is monitored to obtain the details and updating of the employee that using the cab from the details being sent from the cab unit through the GSM module.

### 2.3 Implementation With IoT

Its is impossible to envisage all potential IOT applications having in mind the development of technology and the diverse needs of potential users. In the following sections, we present several applications, which are important. These applications are described, and the research challenges are identified. The IoT applications are addressing the societal needs and the advancements to enabling technologies such as nano electronics and cyber physical systems continue to be challenged by a variety of technical (i.e., scientific and engineering),institutional, and economical issues.

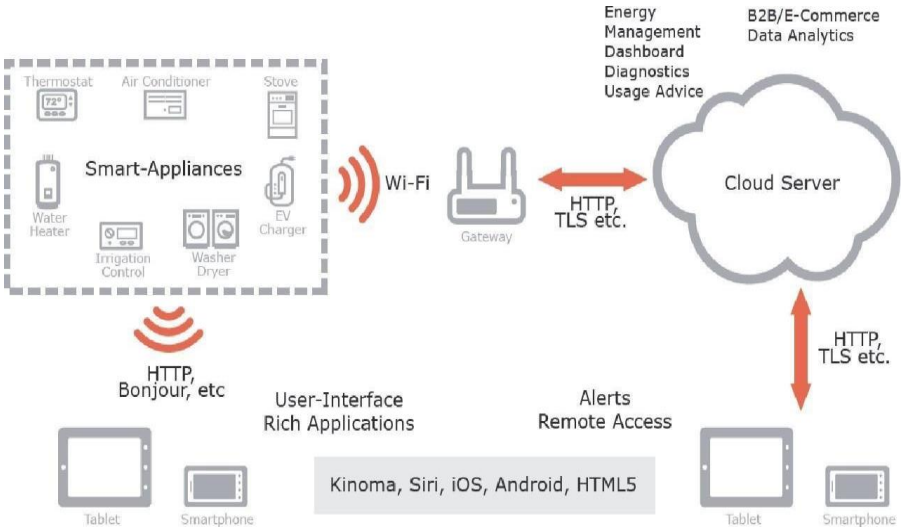



Fig 2.1: Smart Home platform

**2.4 Proposed Work**

The proposed system comprises of Power Supply , A 5V, 1A control supply is required for this framework. The exceptional association is accommodated the raspberry pi demonstrate B. The power supply can be given by utilizing that USB association, Camera , Used to catch a yield picture, it is legitimately associated with the Pi 3 Model B raspberry. There are two different ways to associate the camera to the Pi 3 display B raspberry. The first is by means of USB port and the second is a 15pin header for raspberry Pi3 camera interface, Raspberry PI , Raspberry Pi is a little PC like module. The camera caught picture will be sent to the Raspberry Pi.Using Open CV library; Raspberry Pi forms the picture and recognizes it, GSM , Used to send the SMS to the framework proprietor, Screen as presentation , The screen shows the name and images.

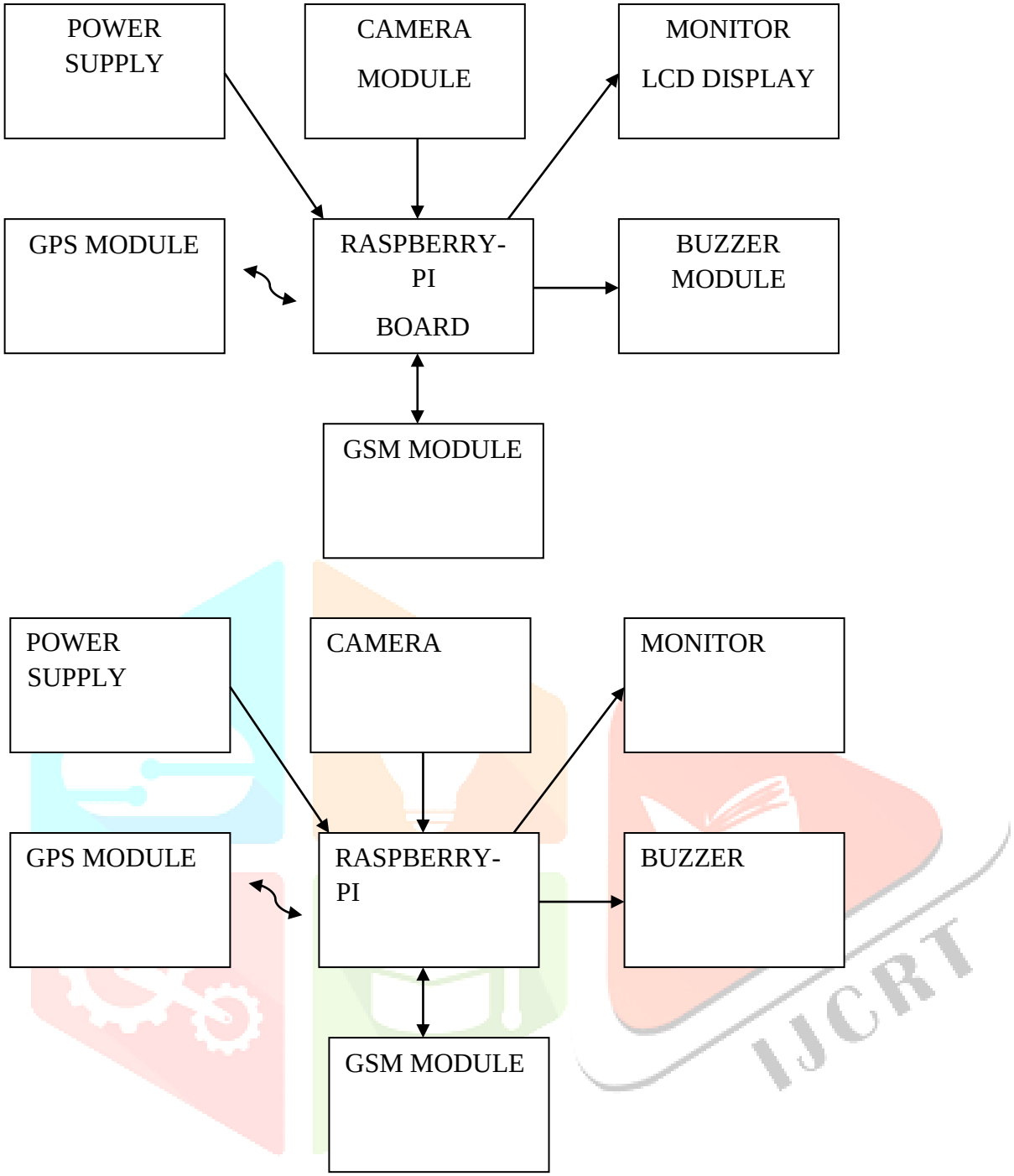
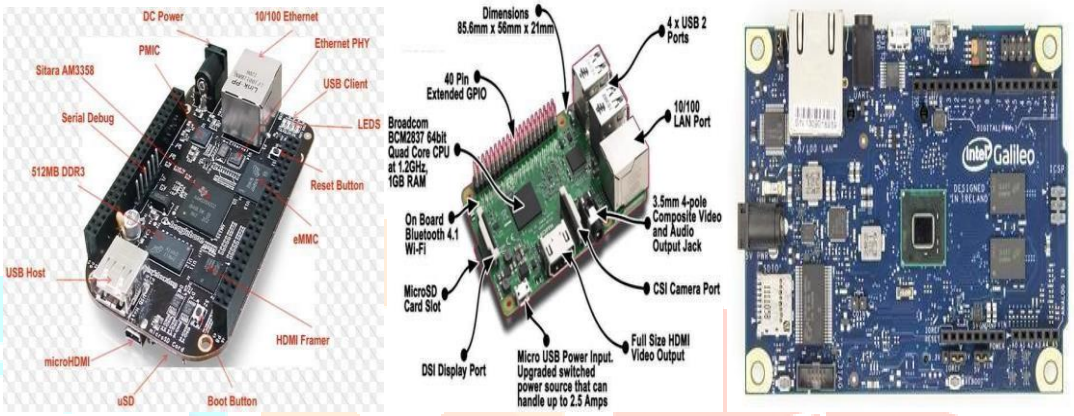



Fig 2.2 : Architecture of the proposed design ( Block diagram )

## III. IOT DEVELOPMENT BOARDS

Microcontrollers are compact computers with processors, memory and peripherals, but they are very compact in size and can perform a limited tasks whereas System on Board are full- fledged computers that can be used for a lot of activities, like playing games, playing music, watching HD videos, performing complex computing, and installing different types of apps and software etc. But, real implementations start when we use a combination of Wi-Fi, Bluetooth, infrared rays, Azure data posting stream analytics, and many more things with the help of sensors. So, we can say that sensors play a vital role in IoT implementations. We can use a wide range of sensors with IoT. Some real world implementations can be done like: Smart Parking, Smart Lighting, Smart Roads, Smart Fridge, Smart AC, Smart House, Smart Power Grid, Smart Product Management, Smart Animal Farming, Smart Agriculture, Smart Storage Tank, track your activity, Smart Retail, Smart Supply Chain, Connected Cars, Smart manufacturing, and many more smart things around the world. The basic purpose of IoT is connecting the devices through the internet. Those devices can be anything, e.g., mobile phones, camera, music system, audio player, video player, smart watch, wall mounted watch, fans, calendar, hospitals, home, hotel, restaurant, healthcare devices, bus, car, cycle, TV/monitor, chair, beds, water bottles, purifiers, gas cylinders, traffic signals, printer, scanner, 3D printer, medical appliances and many more things.




(A) (B) (C)

Fig 3.1 : (A) Beagle Bone; (B) Raspberry Pi; (C) Intel Gellileo;

### 3.1 Wi-Fi configuration with raspberry pi

GUI is provided for setting up WiFi connections in the current Raspbian release. WiFi connections can be made via the network icon at the right-hand end of the menu bar. If a WiFi dongle is plugged in, left-clicking this icon will bring up a list of available WiFi networks, as shown below. If no networks are found, it will show the message "No APs found - scanning..." - just wait a few seconds without closing the menu, and it should find your network.

- The icons on the right show whether a network is secured or not, and its signal strength.
- Click the network that you want to connect to; if it is secured, a dialogue box is shown prompting you to enter the network key:
- Enter the key and press OK, then wait a couple of seconds. The network icon will flash briefly to show that a connection is being made; once it is ready, the icon stops flashing and shows the signal strength.
- Raspberry pi requires less additional hardware compare with a personal computer.
- The following are more or less essential

### 3.2 GSM/GPRS Modem

It is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires a **SIM (Subscriber Identity Module)** card just like mobile phones to activate communication with the network. Also they have **IMEI** (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM/GPRS MODEM can perform the following operations:

- Receive, send or delete SMS messages in a SIM.
- Read, add, search phonebook entries of the SIM.
- Make, Receive, or reject a voice call.

### 3.3 RS-232 Communication (UART)

- RS-3202 communication enables point-to-point data transfer. It is commonly used in data acquisition applications, for the transfer of data between the microcontroller and a PC.

- The voltage levels of a Modules and PC are not directly compatible with those of RS-232, a level transition buffer such as MAX3232 be used.

**Table 1: RS-232 Communication (UART)**

| UART DB-9 CONNECTOR | | GSM MODULE SIM900A | SERIAL PORT SECTION |
|---|---|---|---|
| UART (DCE) | PIN-2 (TXD) | GSM-TX | GSM BOARD MAX |
| PIN-3 (RXD) | | GSM-RX | |

**3.4 Getting Started :**

- Insert SIM card: Press to remove the tray from the SIM cardholder. After properly fixing the SIM card in the tray, lock the tray in the slot provided.
- Connect Antenna: Screw the RF antenna on the RF cable output provided.
- Connect RS232 Cable to the Host device: (Cable provided for RS232 communication) o Note: Default baud rate is 9600 with 8-N-1, no hardware handshaking.
- Connect the power Supply (9V-AC/DC) to the power jack. In case of DC polarity should be Center +ve and outer –ve on DC jack.
- Network LED indicating various status of GSM module eg. Power on, network registration & GPRS connectivity.
- After the Modem registers the network, led will blink in step of 3 seconds.

## IV. CONCLUSION

In this paper, we have described “A solution for women travelling in corporate cabs” for the safety of women. This application helps in live tracking of the location of victim through GPS, Camera RFID card and other devices. It also uses high range hardware and software devices to make the system. It also makes use of phone contacts to get assistance from others and also to send messages to relatives. The person monitoring the system can get the exact things happening in the cab. The main advantage is that the location of the cab can be traced easily from anywhere. Hence the system is working well and meets its requirements.

## V. FUTURESCOPE

As future enhancement it can be integrated with law enforcement database which includes the databases of all the regional cops and also it can be developed for IOS and Windows platforms. Thus our application can be very useful for ensuring maximum security with variety of features.

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