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Residence Cybernetics

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***Abstract*—Now a days, security has become a major concern in many areas. Unknown person accesses the data or device to create more problems. recently, automated control of wide building systems was found only in large commercial buildings and more expensive houses. Typically involves only heating, cooling and lighting systems, building automation rarely provided more than basic control, monitoring and scheduling functions and was accessible only from specific control points within the building itself. Residence Cybernetics is towards a step what is referred to as the Internet of Things. In which everything has an assigned IP address and can be monitored and easily accessed remotely. The main features of this paper is to control the device from anywhere in the world and to monitor the place for any incidents from any part of the world. Therefore the two main characteristics of this title is the ability to do the program and schedule events for the devices on the network.**

***Index Terms*— ARM, Zigbee, GSM ,Sensors & Mobileapps etc..**

I. INTRODUCTION

The recent technology is all about miniaturizing the electronic/electrical systems. The revolution in communication has brought the human effort to minimum and ease of services now a days major concern about security in many fields. Unauthorized access to data or devices creates lot of problems. The main aim of this paper is to design and develop an embedded system for home automation and security system using smart phone, which can be used for real time application.

A. Automated Home

Security has become a major concern in many fields. Unauthorized accesses to data or devices create lot of problems. Recently, automated central control of building wide systems was found only in large commercial buildings and more expensive homes. Typically involving only lighting, heating and cooling systems, building automation rarely provided more than basic control, monitoring and scheduling functions and was accessible only from specific control points within the building itself. Residence Cybernetics is a step towards what is referred to as the Internet of Things. In which everything has assigned IP address and can be monitored and also easily accessed remotely. The main features of this paper is to control the device from anywhere in the world and to monitor the place for any incidents from any part of the world. Therefore the two main characteristics of Residence Cybernetics is the ability to program and schedule events for the devices on the network. The programming may include time related commands such as having your lights

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turn on or off at specific times each day. It can also include nonscheduled events, such as turning of the lights in your home when your security system alarm is triggered. The other main characteristic is remote monitoring and access. With the right automation system, you can use any internet connected device to control the system itself and any attached devices. Monitoring Apps can provide a wealth of information about your home, from the status of current moment to a detailed history of what has happened up to now. You can check your security system status, whether the lights are on, whether the doors are locked .Even simple notification can be used to perform important tasks. You can program your system to send you a text message or email you whenever your security system registers a potential problem, from motion detector warnings to fire alarms.

B. Importance

The household activities are automated by the development of special appliances such as water heaters to reduce the time taken to boil water for bathing and automatic washing machines to reduce manual labor of washing clothes. In developed countries, homes are wired for electrical power, door bell, TV outlets, and telephones. The different application includes when a person enters the room, the light turns on. In advanced technology, the room can sense the presence of the person and who the person is. Taking into account the day of the week, time of the day and other such factors it can also set apt lighting, temperature levels, television channels or music levels. The home automation system can also dial up the house owner on their mobile phone to alert them or call any alarm monitoring company. Other automated activity includes the air conditioner set to an energy saving setting when the house is vacant and get back to the normal setting when the resident is about to return home. The classy system preserve a list of products, records the usage through bar codes or an RFID tag and replaces the order automatically.

Figure 1.Smart home

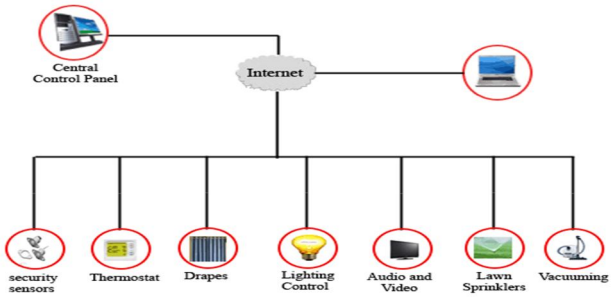

Figure 2. Features of automated home

C. Features

Computers, wireless transmitters, cell phones, and touch screens controls different features of automation home such as:

- Security – home automation, the lights of the car are turned on in order to help you to walk in the dark. In case the alarm goes off, the authorities can be alerted and a message can be sent to your cell phone by the system.
- Thermostat – This is programmed to run the central heating and cooling system as per our own required settings.
- Drapes – With the help of the automation home system, the drapes of the room can be opened and closed during the night time.
- Lighting – This can be set as per our own required settings for dim and bright light.
- Audio/Video – The home automation system can turn on the stereo and play music or can also turn on the television to any channel.
- Lawn sprinklers – The sprinkler system can be activated as per the schedule settings.
- Vacuuming –Vacuum robotic cleaners automatically glides over the carpet to help you keep the house neat and tidy.

Hence the term automated home is used to describe the working together all appliances and household amenities. For example, a centrally-controlled LCD panel can have the capability to control everything from heating, air conditioning, security systems, audio systems, video systems, lighting, kitchen appliances, and home theatre installations. A diagram of a automation home system is shown above.

D. Objective

This paper involves two sub-parts. The front end involves only designing an android application and to communicate with remote microcontrollers through Internet. The back end involves only building a network of microcontroller based prototype to emulate devices used at residential locations for the purpose of automation home such as temperate sensors, motors, occupancy (proximity) sensors, lighting control etc. Micro-controllers communicate between other via Zigbee- a low power, low cost wireless communication protocol. The main objective of this paper is to develop a automation home system with mobile apps application controlled by remote. As recent technology is advancing houses are also getting more smarter. houses are gradually shifting from conventional switches to by centralized control system, involving wireless switches. Now presently, the conventional wall switches located in different categories of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. In order to achieve this, Android application act as transmitter, which sends ON/OFF commands to the receiver where loads are connected. By operating the remote specified switch on the transmitter, the loads can be turned ON/OFF remotely through wireless device. The microcontroller used here is of 8051 family. The loads are interfaced to the microcontroller.

II. PROPOSEDSYSTEM BLOCKDIAGRAM

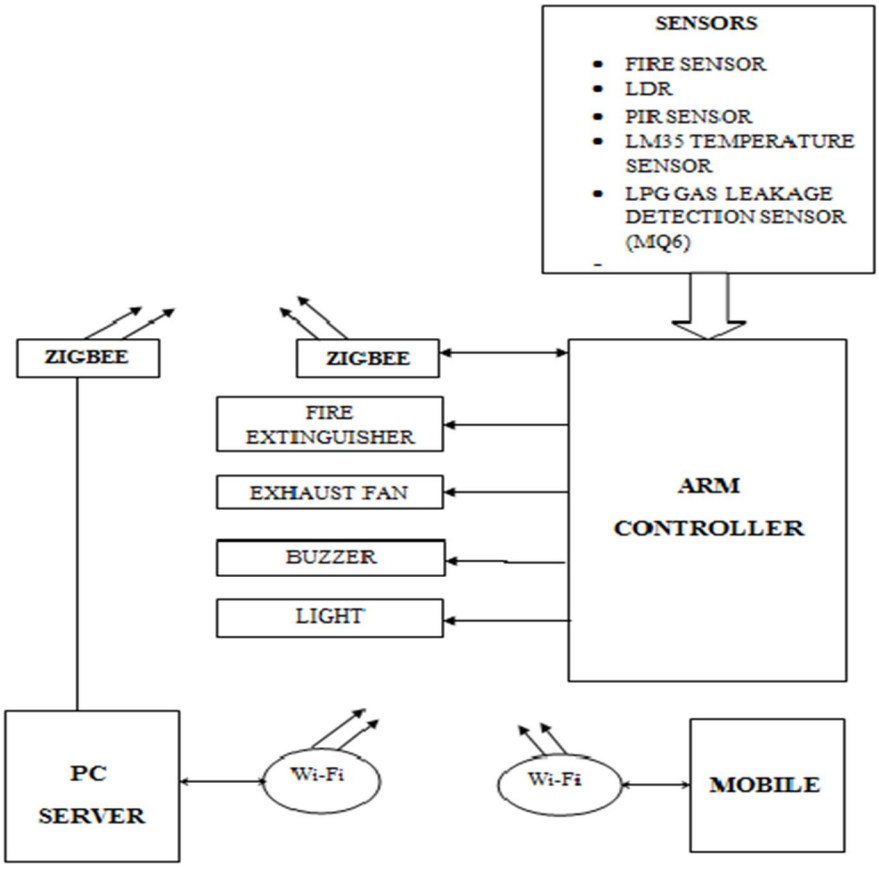

Figure 3. Block Diagram of Proposed system

A. ARM controller

The main component of an embedded system. It is high performance with low power consumption and also so many instructions to achieve high density. The main advantage is that arm processor it can switch between 16 bit and 32 bit mode, which saves lot of power required by processor, thus mainly used in portable battery operated instruments. Microcontroller used in this paper is LPC2148. The microcontroller processes the

Figure 4. ARM Controller LPC2148

incoming data from the sensors and displays relevant information on the LCD and sends message to the user phone. Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 KB up to 40 KB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power.

Sensors Used:

- LDR: In this paper LDR is used to monitor the room light intensity.
- Gas Sensor (MQ-5): To detects the presence of gas in an area, often as part of a safety system.
- Fire Detector: The Fire sensor, as the name suggests, is a simple and compact device for sensing the presence of fire, it monitor the room continuously to detect the fire in a room.
- PIR Sensor: It used for motion detection and also helps to monitor the movement of person in room.
- Temperature Sensor (LM35): It is used to detect ambient air temperature, and also to monitor the temperature of each room.

B. Devices Used

ZigBee: It is a low-cost, low-power and wireless mesh networking. The low cost allows the technology to be widely deployed in wireless control and monitoring applications, the low power-usage allows longer life with smaller batteries, and the mesh networking provides high reliability and larger range.
Buzzer: The PS series are high-performance buzzers, designed for easy incorporation into various circuits. The feature extremely low power consumption in comparison to electromagnetic units.
LEDs: It is used in our project which is connected in the hall and room. These LEDs are controlled through mobile App and LDR sensor to detects the light intensity, if the light intensity is low then the LEDs get automatically ON.
Exhaust Fan: It is used to control the damages which may be caused due to LPG gas leakage. The MQ5 sensor detects the gas leakage and when this information is passed to the ARM controller the exhaust fan gets automatically ON.

III. SOFTWER DESCRIPTION

A. Android and ADT Bundles

Android is a mobile operating system (OS) based on the kernel and currently was developed by Google. With a user interface based on direct manipulation, software is designed primarily for touchscreen mobile devices like such as smart phones and tablet computers, with specialized user interfaces for televisions, cars, and wrist watches. The OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate on-screen objects, and a virtual keyboard. Despite being primarily designed for touch-screen input, it has also been used in game consoles, digital cameras, regular PCs, and other electronics. We are developing the application to monitor and control the entire industry and home. The application will be developed as the user requirement and the images of home or industry will be displayed in 3D-objects, which will be easy to operate the software. Android software development is the process by which new applications are created for the Android operating system. Applications are usually developed in Java programming language using the Android Software Development Kit (SDK), or ADT bundles but other development environments are also available. The Android Debug Bridge (ADB) is a

toolkit included in the Android SDK package. It consists of both client and server-side programs that communicate with one another. The ADB is typically accessed through the command-line interface.

- JAVA and MYSQL
- MySQL
- Eclipse and Net beans
- JDK and Apache Tomcat Server
- Keil-uv4
- IDE

IV. Conclusion

The paper “Residence Cybernetics” has been implemented successfully. It helps in connecting physical data objects into digital data world. The paper cost and also easily implemented for real time applications. It can be implemented with the usage of less power. In this paper an attempt is monitor the entire home/industry from faraway place using smart phones. This paper is secure and user friendly. It can be implemented by government in large scale to help industries. Its help to control the unauthorized access of data and devices.

Scope For Future Enhancement

This paper has tremendous scope in developing it and making it more user friendly, With additional features such as:

- It can be implemented for military applications.
- Hologram system can be implemented.
- 3-D projector can be implemented with smart phones.

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