

A Survey on Various Home Automation System and Security

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Abstract— Home automation which is playing a very vital role in modern times due to its flexibility, reliable in using at different places with high precision and in which will save money and thus time by decreasing human hardwork. General idea in automation of home shows the various quality of human being at the house. Main focus of technology is in controlling the household equipment's like light, TV, fan, door, AC etc. automatically. In case of hazardous condition, it is useful for many old aged and handicapped persons. In Home Automation, remote, wireless controlled switches, PC, Laptop or smartphone are used for operating the appliance. In this paper we detailed a survey on home control automation using GSM and Bluetooth by considering the parameters like efficiency of working, controllers used, type of communication, the apps developed etc. A comparative analysis of home automation system is done at last.

Keywords— Home Automation, ZigBee, Bluetooth, ARM9, SMS, Android ADK, App Inventor

I. INTRODUCTION

The home automation control the home equipment. "SAVE ELECTRICITY" is the main purpose of home automation. The sufficient use of electricity is important in daily routine life. The home equipment or office equipment automatically controlled by everyone. Various type of technologies are surveyed in this paper. Introduction of several wireless communication such as GSM, ZIGBEE, WIFI and Bluetooth are discussing here. Home automation system(HAS) saves time, money even electricity, man workforce. The specification of home automation system are Reliable, Secured, flexible, user friendly and affordable. The wireless technology is more famous in automation process. Any kind of home appliances can be controlled and monitored through the home automation via internet. In some project Bluetooth and GSM technology is used. GSM technology home appliance is controlled by message services and in Bluetooth technology home appliance is controlled using android apps application. The information of the home automation components such as sensors, methods, wireless technology have been surveyed in this paper.

II. LITERATURE SURVEY

2.1. Home Automation and Security System Using Android ADK.

In this paper author designed a standalone embedded board with Android ADK (Accessory Development Kit) at home. The appliances of home are connected to the ADK and the communication is established between the Android mobile device and ADK. The appliances of homes are connected to the input/output ports of the board (EMBEDDED SYSTEM) and their status is passed to the ADK. Accessory mode is a feature of Android OS since version 2.3.4 Gingerbread and 3.1 Honeycomb and above. Software design the main screen has contained a list of functions that could be controlled by the user. The microcontroller board (Arduino ADK) based on the ATmega2560. It contains a USB host interface to connect with Android based phones, and that is based on the MAX3421e IC. The Android Open Accessory Protocol 2.0 with two new features: audio output that is from the Android device to the accessory and it also support for the accessory acting as one or more Human Interface Devices (HID) to the Android device. This project is based upon Android and Arduino platform in which both are FOSS(Free Open Source Software). Include

motion sensors for Security systems that will detect an unauthorized movement and it will automatically notify the user through cell phone or the security system.

2.2. A ZigBee-Based Home Automation System.

In this paper author identifies the reasons for this slow adoption and also it evaluates the potential of ZigBee that for addressing some these problems through consideration of the design and implementation of a flexible automation of home architecture. In order to monitor and control the home appliances the ZigBee based Home automation is designed and implemented. The network coordinator record and stores the device performance(that are permitted to join the network database). To implement the homes Wi-Fi network a standard Wireless (802.11b and 802.11g) ADSL Modem Router, along with a port of four switch is used. The Wi-Fi parameters (network SSID and security parameters) are preconfigured. The virtual home algorithm process the message for security and safety purpose after that it declared safe is the message is re-encrypted and forwarded to the real network device of the home. ZigBee controller sent message to the end devices, over the ZigBee network. The virtual home algorithm in this is used to checks the security and safety of all messages that are received. The use of ZigBee communications technology helps expense to be reduced of the system and the intrusiveness of the respective installation of the system.

2.3. Bluetooth based Home Automation system using cell phone.

In this paper author designed a Bluetooth based automation. A standalone Arduino BT board and the appliances of home are connected to the input and output ports of this board via relays. The Arduino BT board can be programmed wirelessly over the connection of Bluetooth using the microcontrollers high-level interactive C language. The authorized users are only allowed to accessing the home appliance so protection is done by providing a password. The wireless communication is established between the cell phone and the Arduino BT board. Python script is used where it is portable and can run on any of the Symbian Operating System platform. To indicate the status of the device after receiving a command from cell phone the feedback circuit is designed and implemented. The algorithm which interact with the mobile phone Bluetooth stack and display the list of known devices.

2.4. GSM Based Home Automation System Using App-Inventor for Android Mobile Phone.

In this paper author describes GSM (Global System Messaging) based secured device control system using App Inventor for Android mobile phones. In order to provide a global network environment for the home appliance control the system is based upon the serial data transmission using SMS over GSM Network. The App Inventor which provides a graphical user interface(GUI), which allows users to drag-and-drop visual objects to develop an application that can run on Android based smart phones. The code written in the Arduino is able to communicate with the GSM module using AT commands. The information of the App and its developers as well password is contained in the 'splash screen'. The GHAS is invoked in the mobile menu, Splash Screen appears and password is entered correctly the Device Control Screen will appears on screen and the user has to enter the mobile number of GSM Modem which is interfaced with device control circuit. The mobile number is entered, so that all 'Check box' are available for selection operation. User also can check the list of check box available for making device from 'ON/ 'OFF'. The GHAS has the capability to exchanging the ASCII data with the GHAS circuit through the SMS message facility of mobile, when users check/uncheck appliance option is appeared to show the list. The platform of Android comprises of SMS message stack.

2.5. Design of Wireless Home automation and security system using PIC Microcontroller.

In this paper author introduces the intelligent home automation system (IHAM) which is developed using PIC microcontroller and the ZigBee wireless communication technology, GSM network

technology and speech recognition technique that control the home appliance. The messaging facility using the GSM modem and which are connected to the PIC controller for sending the SMS to the mobile when the house is detected with the smoke. The overall system integrates all the modules through wireless communication like zigbee and gsm technologies. The signal has been generated at the various pins of the microcontroller (PIC) depending on the digitalized commands received by the zigbee module. During the fire accidents the security system is very useful. The messaging facility using the GSM modem which is connected to the PIC controller which for sending the SMS message to the mobile when the smoke or fire is detected in the house is introduced.

2.6. Bluetooth Based Home Automation and Security System Using ARM9

In this paper author designed the system that is programmed to control on and off lights during the late night hours. Manually it can also be performed for the adjustment of the fan/AC based on their requirement. The middleware key applications are Wince6.0 is a OS which is mainly used for ARM9 devices. The Kiel MDK board which provides input and output pins that can implement through the use of "shields" attachments. In the receiver side wireless technology Bluetooth module is interfaced to the controller board to transceive the obtained data from the ARM9 processor. Microcontroller will have to decide the devices operation like on and off the devices and lock and unlock the door which is based on that data already which is obtained. In order to provide safety protection to the user, a low voltage activating switches is replaced with the current electrical switches. Moreover, implementation of wireless connection of Bluetooth connection in control board allows simple way of the system installation.

2.7. Design and Development of Activation and Controlling Of Home Automation System VIA SMS through Microcontroller

In this paper author proposed the home appliance control system based on GSM network technology is used for transmission purpose of SMS from the sender to the receiver. SMS sending and receiving is used for universal access of appliances which is allowing breach control at home. A processing unit 8051 microcontroller and a communication module that used GSM module. The SMS issued for status reporting in case of power failure. Mobile user will transmits message SMS using GSM technology and it will call GSM Module and it will get activated. The mode of communication is wireless and main mechanism works on the GSM technology. Cell phone has a SIM card and also consist GSM subscription. User transmits the instructions through SMS and then the system takes action against those given instructions. GSM technology has provide the benefit that the system may be accessible in remote areas as well. The programming and also interfacing of microcontroller has been monitored during the implementation.

2.8. Zigbee Based Home Appliances Controlling Through Spoken Commands Using Handheld Devices

In this paper author presents a wireless based automation of home system which can be controlled through spoken commands. In the proposed system architecture, the components of wireless connection is added by GSM and for home networking ZigBee technology is used. For processing of voice command an application is developed and that has installed in the mobile phone. The heart of the hardware is PIC16F877A when the command is completely received it is transferred to the microcontroller PIC16F877A through Bluetooth Module BTM 222 which uses AT commands serially to communicate with the mobile. The system convert voice commands in to text. To enable such feature we installed the software in the android phone. On different appliance the working of the system is tested.

2.9. Home Automation System For Disabled People Using BCI.

In this paper the author proposed a system in which brain waves electric signals are used to control computer and the hardware system. The variations in electric signal strength through voltage level near the eye area will detect and generates a wireless RF signals in order to control the home automation prototype sample model. The system consist of temperature sensor, light detector sensor, motion (obstacle) sensor, Water sensor and fire sensor. These sensors are connected to the central system and once any of the sensors gets activated then system will send alert message. Multiple Sensor Based Home Security System is very practical. It can be used not only in the home environment but also in a business or office environment. It can monitor the surrounds and also protect our properties and our lives. Besides, to suit each one's need and preference it can be highly customized. Home Security System with Multiple Sensor is very useful for people. To identify the human brain wave to operate the home appliances with very fast response or reaction and in case of critical conditions it is also expected that system should react at highest priority. The system will sense the signal from brain sensor of disabled person and follow the commands accordingly and he can comfortably operate or handle the home appliances. The overall system can be monitored externally by the person with android phone as well as alert signal will also be provided along with it in addition.

2.10. Multiple Appliances Controlling and Monitoring System based on Wireless Embedded Home Gateway.

In this paper the author presents a prototype with the low cost wireless embedded gateway for remote Controlled home and also monitoring other connected system through internet. The gateway in the proposed prototype which provides the data transfer between the user and multiple number of home appliances through connection of internet. The light weight Constrained Application Protocol (CoAP) in which it is used to provide better and efficient data transfer between the gateway and the Wireless Sensor and Actuator Modules (WSAM). This system mainly uses wireless technology to avoid connection of wire between appliances and the gateway. It helps to do complete monitoring and control functionalities of the home appliance environment using wireless sensors and actuators modules than just the switching operation like ON/OFF functionality provided by other similar systems. By using the proposed prototype system in the home appliances can be automated at lower cost. This system does not require any dedicated expensive components which includes a server PC but as it uses only low cost embedded devices.

III. COMPARITIVE ANALYSIS

From above surveyed papers, all the home control automation system uses wireless technology. Smartphone plays a very vital role in all these systems. [1, 4] The android phone which uses the app inventor and Accessory Development Kit which can be attached to the android device for the transfer of data between the devices and external peripherals. [8, 3, 6] the spoken command is used for controlling the home appliances by Bluetooth Module BTM 222 which uses AT commands serially to communicate with the mobile and another along with ARM9 processor. [10] The gate way which also mainly provides a low cost system by eliminating the various components.[9] the sensors which have been employed in this system can improve the automation by proving a alert signal in case of problems.[7] simply the microcontroller which control the home equipment through the SMS received from the user. [2, 5]in which the ZigBee with the Wi-Fi technology and GSM network which establish the very best performance of the home appliance control from the remote areas.

IV. CONCLUSION

Various kind of techniques have been adopted for home automation system have been survey. Different author gives many techniques with block diagram, flowchart and their explanation with successful execution with its advantage and disadvantages. All the proposed designed and

implementation is done in surveyed paper. The main purpose of the system is to help for old age person, handicapped person and also to reduce the electricity consumption.

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