Home Automation Using - Personal Computer

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ABSTRACT

The aim of this project is to control the electrical appliances through a personal computer (PC). With this system, one can control the electrical appliances ON/OFF by just being seated at one place using a PC.

This system is integrated with the electrical loads and also connected to the PC where centralized control takes place. It uses an RS-232 protocol from the microcontroller to communicate with the PC.

This project can be further enhanced by implementing a GUI based control panel on the PC with appropriate embedded software. The intensity control can also be incorporated using power electronics devices.

Keywords— GUI, Visual Basic, PIC Microcontroller, SPDT, Load

I. INTRODUCTION

Now a days it is necessary to control the home appliances from remote locations. Every home is different, and just like you have to instruct your maid in the operation of your home, you have to instruct your PC in your personal preferences. Also, we know the importance of saving electricity with the advancement of technology things that are becoming simpler and easier for us.

Automatic systems are being preferred over manual system. This system is integrated with the electrical loads and also connected to the PC where centralized control takes place. It uses an RS-232 protocol from the microcontroller to communicate with the PC. The main reason to develop this system is to save time and man power along with maintaining security and convenience.

1.1 NEED OF THE PROJECT:

Today we are living in 21st century where automation is playing important role in human life. Home automation allows us to control household appliances like light, door, fan, AC etc. Home automation not only refers to reduce human efforts but also energy efficiency and time saving. The home automation helps handicapped and old aged people which can enable them to control home appliances and alert them in critical situations. The main objectives of home automation are controlling, management and co-ordination of home appliances in a comfortable, effective and secure way.

1.2 OTHER TYPES OF HOME AUTOMATION

1.3.1 Home Appliances Control Using A Remote Control.

The lights, fans can be automatically turned on/off with the help of a remote where there will be a sensor instead of going near to a switch board and putting on/off the switch. Companies like Legrand and Gold Medal already started these kinds of control system and they are at present available in the market.

1.3.2 Home Appliances Control Using DTMF.

In this method, the control of home appliances can be done even though when we are elsewhere just by using the DTMF tone generated when the user pushes mobile phone keypad buttons or when connected to a remote mobile.

1.3.3 Home Appliance Control Using Free Hand Gesture.

This is a type of home appliance control system where the person must be present in sight to the appliance that is needed to be controlled and a predefined gesture must be used to turn on the device and another gesture must be used by us to turn off the device. The performance of the proposed system is done with a hardware embedded in that particular device.

1.3.4 Home Appliance Control Using Internet And Radio Connection.

In this system, the control of home appliances can be done from a remote are with an option from a local server, using the Internet and radio connection. This
system is accomplished by personal computers, interface cards, radio transmitters and receivers, microprocessors, ac phase control circuits, along with window-type software and microprocessor control software.

II. LITERATURE SURVEY

“A System for Smart-Home Control of Appliances Based on Timer and Speech Interaction”

S. M. Anamul Haque, S. M. Kamruzzaman and Md. Ashraful Islam [15] The paper discusses two major approaches to control home appliances. The first involves controlling home appliances using timer option. The second approach is to control home appliances using voice command. Moreover, it is also possible to control appliances using Graphical User Interface. The parallel port is used to transfer data from computer to the particular device to be controlled. An interface box is designed to connect the high power loads to the parallel port. This system will play an important role for the elderly and physically disable people to control their home appliances in intuitive and flexible way. We have developed a system, which is able to control eight electric appliances properly in these three modes.

“Home Automation and Security System Using Android ADK”

Javale Deepali [1], this paper put forwards the design of home automation and security system using Android ADK. The design is based on a standalone embedded system board Android ADK (Accessory Development Kit) at home. Home appliances are connected to the ADK and communication is established between the ADK and Android mobile device or tablet. The home appliances are connected to the input/output ports of the embedded system board and their status is passed to the ADK. We would develop an authentication to the system for authorized person to access home appliances. The device with low cost and scalable to less modification to the core is much important. It presents the design and implementation of automation system that can monitor and control home appliances via android phone or tablet.

“Embedded Web Server for Home Appliances”

Mr. Vichare Abhishek, Ms Verma Shilpa [2], this paper offers a new approach to control home appliances from a remote terminal, with an option from a local server, using the Internet. This system is accomplished by personal computers, interface cards, microcontroller, along with window-type software and microcontroller control software. The system is designed to control home appliances' on/off, to regulate their output power, and to set their usage timing. The microcontroller which is used in this project is the Philips P89C51RD2BN microcontroller.

“Application of AI in Home Automation”

Kumar Sandeep and Qadeer Mohammed Abdul [3], in this paper we will see the types of home automation systems and then see how these system can utilize the AI tools so as to increase the effectiveness, powerfulness etc.

“Smart Homes-Based On Mobile IP”

ShuklArti, YadavPriyanka [7] This paper provides a review of the recent developments, technology, architecture, application and future scope for Smart Homes with the tremendous help of MIPv6. The principles of MIPv6 are included for mobility on the design of the architecture for MIPv6 based Smart Homes. Smart Homes based on Mobile IPv6 Consists of various techniques and Home Networking for Interactive services. The crucial Advantages of Smart Home is to support and improve the quality of life for disabled and elderly people.

“Overview of Automation Systems and Home Appliances Control using PC and Microcontroller”

Tadimeti Hari Charan, Pulpipati Manas [4]. In this paper, the main point that is discussed is regarding the automatic control of home appliances (On/Off) with the help of computer and microcontroller [8951]. This is a wired system and every appliance must be connected with the help of cables. The other modules which are used in order to accomplish our desired goals are Dallas Timer, Relays, ULN, MAX232, Keil cross compiler, flash magic and power supply circuit. This paper presents the design and implementation of APPLIANCES CONTROLLING USING PC module. Simply by using this home automation we can save time, money, man power. And also we can have command, security and convenience on controlling appliances.

“The Design and Implementation of Voice Controlled Wireless Intelligent Home Automation System Based on ZigBee”

Patil Mitali, Bedare Ashwini, Pacharne Varsha [11], Home Automation Systems provide a sense of security and comfort. Using Wireless technology like ZigBee the cost of wiring of Home Automation System can be reduced as well as a reliable and secure communication can be achieved. ZigBee is a low data rate wireless network standard with added features like low-cost, low power consumption and fast reaction. This System also allows controlling of devices using Voice commands which reduce user interaction with system directly.

“Green House Automation using Zigbee and Smart Phone”

Dhumal Y.R., Chitode J.S. [12], This paper proposes a wireless monitoring and control system for greenhouse based on Zigbee for solving the problems such as poor real time data acquisition, excessive manpower requirement and to overcome the shortcoming of the wired system such as complex wiring. Here we are going to make our own Visual Basic Software Web Server which will communicate with the other devices such as Android.
mobile phone using synchronizing software (TEAM VIEWER). This software will keep all the devices in sync with the server. Also the devices can view the required information anywhere from the world as these devices are connected via Internet enabling owner to check and control in a real time manner.

“Bluetooth Based Home Automation and Security System Using ARM9”

D.Naresh, B.Chakradhar, S.Krishnaveni [6]. This paper put forwards the design of home automation and security system using ARM7 LPC2148 board. The design is based on a standalone embedded system board ARM7 LPC2148at home. Home appliances are connected to the ARM7 and communication is established between the ARM7 and ARM9 with Bluetooth device. The home appliances are connected to the input/output ports of the embedded system board and their status is passed to the ARM7. We would develop an authentication to the system for authorized person to access home appliances. The device with low cost and scalable to less modification to the core is much important. It presents the design and implementation of automation system that can monitor and control home appliances via ARM9 S3C2440A board.

“A Computer Control System for Home Appliances”

Mohammad Rabiu Alam, Md. Fazlul Kader, Kazi Tanvir Ahmed & Nur Akter Jahan [16]. In this paper, we present a system to control home appliances from a computer. This system is designed for controlling the ON/OFF mode of different home appliances such as light, fan, TV, air-condition and so on. The appliances are connected to a computer through a programmed PIC16F73 microcontroller. An USB interface is used to connect the microcontroller with a computer. The program for the PIC16F73 has been written in micro C language. All the commands are carried out from a software layout running on a computer to control the home appliances.

“Bluetooth Remote Home Automation System Using Android Application”

R.A. Ramlee, M.A. Othman, M.H. Leong, M.M. Ismail, S.S.S. Ranjit [9]. This paper presents the overall design of Home Automation System (HAS) with low cost and wireless remote control. This system is designed to assist and provide support in order to fulfill the needs of elderly and disabled in home. Also, the smart home concept in the system improves the standard living at home. The main control system implements wireless Bluetooth technology to provide remote access from PC/laptop or smartphone. The design remains the existing electrical switches and provides more safety control on the switches with low voltage activating method. The switches status is synchronized in all the control system whereby every user interface indicates the real time existing switches status. The system intended to control electrical appliances and devices in house with relatively low cost design, user-friendly interface and ease of installation.

“Home Automation through FPGA Controller”

Sawant S. D. Mukkawar Madhuri R [10]. In this paper, we present the design and implementation of home automation system. The design has been described using VHDL and implemented in hardware using FPGA (Field Programmable Gate Array). This system uses GSM (Global System for Mobile) network to establish communication between mobile and controller. The system is SMS (Short Messaging Service) based and uses wireless technology to improve the standards of living.

“PC Controlled Home Appliances”

Soni Laxmi, Thorat Sarika K. And Chawda Sandeep [17]. In this paper, a PC based system which will control various devices like Motor, Light, and Fan etc. Designed a GUI (Graphical User Interface) on the PC and which helps to give command to the system. Microcontroller is used in order to receive commands from PC and accordingly control the devices connected to it. In this way this system is completely controlled by PC.

“Building automation system using solar power”

N Rajesh, Sinchana K. A., S. Suhas, Reddy Deepika A [5]. In this paper we aim at discussing a building automation system using solar power. The solar panel status and other parameters such as water level in overhead tank are registered and auxiliary units are run based on these signals. This way unnecessary wastage of energy can be curbed and intelligent homes with low energy consumption can be built.

“A Review on Home Control Automation Using GSM and Bluetooth”

Bhadane Dinesh Suresh, Wani Monali D., Shukla Sanjeev. A., Yeole Aniket R. [16]. 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. and at last a comparative discussion is given which summarizes the previous literature work.
“Home Automation Using Internet of Things”
Vinaysagar K N, Kusuma S M [17] , In this paper we present a Home Automation system (HAS) using Intel Galileo that employs the integration of cloud networking, wireless communication, to provide the user with remote control of various lights, fans, and appliances within their home and storing the data in the cloud. The system will automatically change on the basis of sensors’ data. This system is designed to be low cost and expandable allowing a variety of devices to be controlled.

III. PROPOSED SYSTEM

Block Diagram Of Project

Circuit Diagram of the Project

IV. RESULTS

Project operated in Individual Mode where all loads are in Off Mode

Project operated in Individual Mode where load 1 in on mode load2 and load 3 in Off Mode

Project operated in Individual Mode where load 1 in load2 and load 3 in On Mode

Project operated in Individual Mode where load 1 in load2 and load 3 in Off Mode

V. ADVANTAGES
64. It is able to know the status of device to be controlled.
65. Highly reliable, accurate and time saving system.
66. Security is more as system is being operated by PC
67. Cost Saving
68. Remote Control

VI. DISADVANTAGES

1. Internet access will be required for long distance communication.
2. Always need pc should be in on condition.

VII. APPLICATIONS

1. Security & Surveillance – Various security systems can be integrated along with this system such as, cameras, motion sensors, luminance sensors etc to enable the users to monitor various accepts of their home via a remote machine in real-time.
2. Energy Management – One of the major applications of this system one involving the optimised management of energy consumed by the various appliances of a household. Since all appliances can be monitored & controlled in real-time, users can program the system so that a schedule is followed for the various appliances. It can be particularly useful in situations where the user has forgotten to manually turn off a particular device (lighting, fan etc.) while leaving the house. All the user needs to do is access the web application & make the required changes.
3. Lighting – The system can be programmed to switch on certain lights as & when required, using the timers in the circuit. Example: turning on the porch light at 7PM every day.
4. Entertainment – The system can be integrated with other devices such as sound systems, special lightings etc. For example, the user can program the system to turn lights ON & OFF in a sequence.

VIII. CONCLUSION

Necessity of automation is part of our day to day life. The automated household things which are controlled by remotely when plugged into a mains supply are in demand.

FUTURE SCOPE:

Looking at the current situation we can build cross platform system that can be deployed on various platforms like iOS, Windows. Limitation to control only several devices can be removed by extending automation of all other home appliances. Security cameras can be controlled, allowing the user to observe activity around a house or business. Security systems can include motion sensors that will detect any kind of unauthorized movement and notify the user. Scope of this project can be expanded to many areas by not restricting to only home. It will be flexible to support various wired as well as wireless technologies like Bluetooth, Zigbee, Wi-Fi, World Wide Web. we will improve the software performance such as giving time delay, intensity control ,notification about system ,status of the load.

REFERENCES


