"Home Automation" New Approch for Security

Jay Prakash Patel, Mansi Kapoor [*]

Department of Electrical Engineering, Moradabad Institute of Technology, Moradabad, India

Abstract

This paper explains an investigation into the potential for remote controlled operation of home automation systems. It considers problems with their implementation, discusses possible solutions through various network technologies and indicates how to optimize the use of such systems. The home is an eternal, heterogeneous, distributed computing environment which certainly requires a careful study before developing any suitable Home Automation System that will accomplish its requirements. Nevertheless the latest attempts at introducing Home Automation Systems in actual homes for all kinds of users are starting to be successful thanks to the continuous standardization process that is lowering the prices and making devices more useful and easier to use for the end user. Even so several important issues are always to be handled strictly before developing and installing a Home Automation System; factors like security, reliability, usefulness, robustness and price are critical to determine if the final product will accomplish the expected requirements.

1. Introduction

Today the technological world's main focus is to automate every possible thing to take advantage in providing ease in life. In the most of the well developed countries home automation is very famous and well adopted because it has several many benefits it saves electrical energy and provides numbers of security. Equipment for heating and ventilation, lighting, sun blinds, windows as well as presence detector, among others, can all be integrated into the room automation. Room automation is the one part of the home automation.

In the home, appliances and equipment can be controlled automatically and remotely. Automated controls can turn equipment on or off, or adjust operating settings at predetermined times; they can be triggered on site or remotely; they can adjust equipment operation in response to changes, such as temperature, in the home environment.
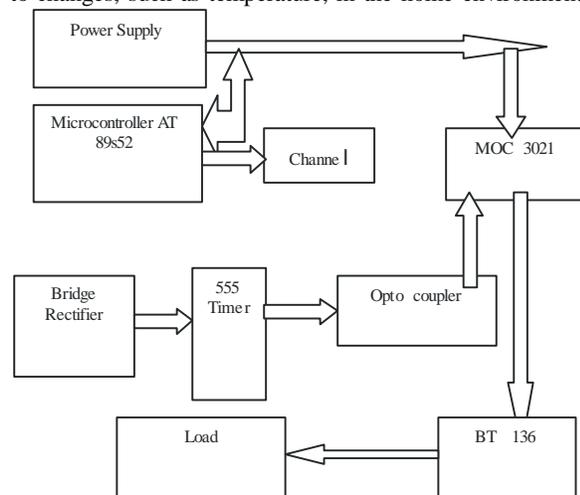

Fig: 1. Block diagram of light, Fan and curtain control

Corresponding Author,
E-mail address: kapoor_mansi@yahoo.co.in

The term "home automation," defined as capability to automate and control multiple disparate systems, more closely describes currently available technology.
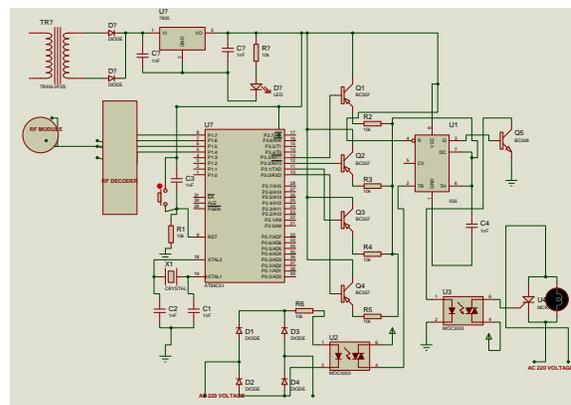

Fig: 2. Circuit Diagram of Light, Fan, and Curtain Control

2. Basic parts functions

Microcontroller: A microcontroller can be considered a self-contained system with a processor, memory and peripherals and can be used as an embedded system. The majority of microcontrollers in use today are embedded in other machinery, such as automobiles, telephones, appliances, and peripherals for computer systems.

Bridge Rectifier: A diode bridge is an arrangement of four (or more) diodes in a bridge circuit configuration that provides the same polarity of output for either polarity of input. When used in its most common application, for conversion of an alternating current (AC) input into a direct current (DC) output, it is known as a bridge rectifier. A bridge rectifier provides full-wave rectification from a two-wire AC input, resulting in lower cost and weight as compared to a rectifier with a 3-wire input from a transformer with a center-tapped secondary winding.

Optocoupler: It is a component that transfers electrical signals between two isolated circuits by using light. Opto-isolators prevent from affecting the system receiving the

signal. Commercially available opto-isolators withstand input-to-output voltages up to 10 kV and voltage transients with speeds up to 10 kV/μs

555 Timer: The 555 timer IC is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element. Derivatives provide up to four timing circuits in one package

3. Working

First of all we make the power supply. to take the step down transformer this transformer convert 220 voltage into 9v .and after that rectifier convert into dc voltage ,regulator provide the fixed five voltage .and to give the all component.

With the help of switch we send the signal by rf remote by fsk modulation. And this signal receive by rf receiver and decode this signal and according coding microcontroller control ac supply that provide intensity and speed of induction motor and curtain.

4. Home Automation Energy Management Strategies

4.1 Heating and cooling control

A well-designed automation system can:

• improve passive solar heating and passive cooling through the control of blinds, awnings, windows, vents and fans

• control heaters and air conditioners so they are used only when and where they are needed and to achieve a desired temperature.

Before considering automation options, ensure that your home is designed to make the best use of solar energy and natural ventilation for passive heating and cooling .Use thermostats or temperature sensors in different rooms to control heating and cooling. Appropriately placed, they, along with timers to control heating/cooling appliances, can significantly reduce energy use, even if automated systems are not used.
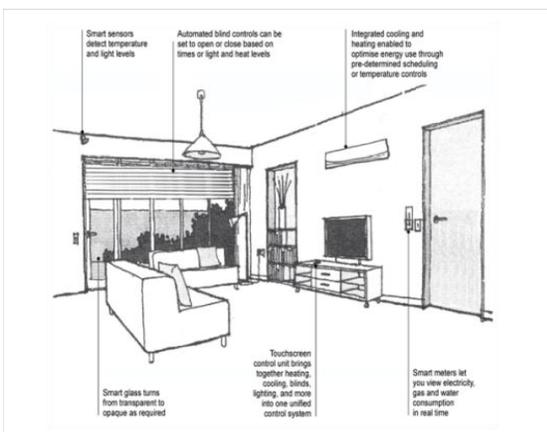
Fig: 3. General layout of Room with Light, Fan and Curtain

Home automation systems can be designed to save energy. Analyses your heating/cooling needs and how to manage them, Plan your automation system. Consider how opening and closing blinds, awnings, windows and vents can assist passive heating, cooling and natural lighting.

Explore how switching fans and heat shifters on and off might reduce the need for cooling or heating.

4.2 Hot Water control

Automate the hot water system so it can be switched on and off as required, e.g. off when going on holidays, on again just before your return. Solar systems can be controlled so they do not require the use of an auxiliary booster during summer months — and the controller overridden during periods of poor solar gain in summer.

4.3 Lighting Control

Automate lights through motion sensors and timers, or more elaborate centralized systems or remote system, so they operate only when needed and switch themselves off when rooms are vacant. Use motion sensors to switch on external lights when needed, or lights when entering the home, rather than leaving lights on.

4.4 Energy Monitoring

The home automation system can monitor the total energy use of the house or even individual circuits or appliances. Current is measured by a measuring device at the meter board, and is converted into power and energy consumption.

Automation equipment potentially includes any appliance or machinery in the home whose operation is controlled through its electricity supply, for example:

• Hot water system
• Appliances
• Home entertainment, home office and other electronic equipment
• Lighting
• Heating and cooling/air conditioning systems
• Fans and air pumps/heat shifters
• Powered window blinds, shutters and awnings
• Powered vents and window openings
• Water pumps, pool pumps and spas garage doors Security systems.

Features

• Room automation for HVAC, lighting control, sun blind control and more with L-ROC Room Controllers
• Efficient configuration of the room automation system with L-STUDIO
• Simple adjustments of the room configuration can be made by the operator
• Ethernet/IP communication down to room level
• Room operation via PC desktop using LWEB-800
• Simultaneous communication via different communication protocols
• AST functions – alarming, scheduling, trending
• Integrates seamlessly into the L-WEB System.

5. Conclusions and Future Work

The process of standardization in Domestics is becoming the most important factor to introduce an automated environment in all homes. Not to forget That UPnP providing total compatibility with XML and IP. I agree with Simon Aurell (2005) that the most likely way of interfacing with devices in the future will be IP; it is more flexible, scalable and compatible. The biggest issue will be probably to make it usable and accessible to all kinds of users. Since this is a new field of investigation, the results of

the project are likely to be worthy of further analysis. The completion of a whole cycle of control between a remote device and the building will be critical for the success of the research; once control is achieved a meticulous study about how users and the system interact has to be done. It is important to clarify that this research does not exclude local control of HASs - it is simply focused on remote control as an important field for HASs in the future. To conclude, this research should help other researchers to achieve their goals with their future HAS projects and it will contribute positively to the E-Home community.

References

[1] L. Bauer, L. Cranor, R. W. Reeder, M. K. Reiter, K. A. Vaniea, User study of policy creation in a flexibleaccess-control system. Proc. CHI 2008, 543-552

[2] G. Bell, J. J. Kaye, Designing Technology for Domestic Spaces: A Kitchen Manifesto. Gastronomica 2(2), 2002, 42-62

[3] H. Beyer, K. Holtzblatt, Contextual Design: Defining Customer-Centered Systems. Morgan Kaufmann, 1998

[4] B. Brumitt, B. Meyers, J. Krumm, A. Kern, S. A. Shafer, Easy Living: Technologies for intelligent environments. Proc. HUC 2000, LNCS, 1927, 97-119

[5] M. Chetty, J-Y. Sung, R Grinter, How Smart HomesLearn: The Evolution of the Networked Home andHousehold. Proc. Ubi Comp 2007, 127-144

[6] Control4 home automation and control. http://www.control4.com

[7] S. Davidoff, M. Lee, C. Yiu, J. Zimmerman, A. Dey, Principles of Smart Home Control. Proc. UbiComp2006, 19-34

[8] C. Dixon, R. Mahajan, S. Agarwal, A. Brush, B. Lee, S. Saroui, V. Bahl, The Home Needs an OperatingSystem (and an App Store). Proc. Hot Nets IX

[9] DLNA. http://www.dlna.org/home.

[10] W. K. Edwards, R. E. Grinter, At Home with Ubiquitous Computing: Seven Challenges. Proc. Ubi, Comp 2001, 256-272

[11] W. Edwards, M. Newman, J. Sedivy, T. Smith, D. Balfanz, D. Smetters, H. Wong, S. Izadi, Using Speak Easy for ad hoc peer-to-peer collaboration. Proc. CSCW 2002, 256-265

[12] R. Grinter, W. Edwards, M. Chetty, E. S. Poole, J.-Y. Sung, J. Yang, A. Crabtree, P. Tolmie, T. Rodden, C. Greenhalgh, S. Benford, The ins and outs of home networking: The case for useful and usable domestic networking. ACM to CHI 16(2), 2009, 8:1-8:28.

[13] R. Grinter, W. Edwards, M. Newman, N. Ducheneaut, The Work to Make a Home Network Work. Proc. ECSCW 2005, 469-488

[14] L. Hamill, Controlling Smart Devices in the Home. The Information Society 22(4), 2006, 241-249

[15] R. Harper (ed.), Inside the Smart Home. Springer, London, 2003

[16] Home security systems, home security products, home alarm systems - ADT. http://www.adt.com.

[17] S. Intille, Designing a home of the future. IEEE Pervasive Computing 1(2), 2002, 80-86

[18] J. Kietz, S. Patel, B. Jones, E. Price, E. Mynatt, A. Abowd, The Georgia Tech Aware Home. Ext. Abstracts CHI 2008, 3675-3680.

[19] T. Kim, L. Bauer, J. Newsome, A. Perrig, J. Walker, Challenges in Access Right Assignment for Secure Home Networks. Proc. Hot Sec 2010

[20] T. Koskela, K. Väänänen-Vaninio-Mattila, Evolution towards smart home environments: empirical evaluation of three user interfaces. PUC 8, 3-4, 2004, 234-24