



A Review on Home Control Automation Using GSM and Bluetooth

¹Dinesh Suresh Bhadane, ²Monali D. Wani, ³Sanjeev. A. Shukla, ⁴Aniket R. Yeole

^{1, 3}Department of E&TC Sandip Polytechnic, Nashik, Maharashtra, India

^{2, 4}Department of E&TC SITRC, Nashik, Maharashtra, India

Abstract— Home automation in essence plays a very vital role in modern era because of its flexibility in using at different places with high precision which will intern save money and time by decreasing human hard work. General idea of home automation shows the quality of human being at house. Prime focus of this technology is to control the household equipment's like light, fan, door, AC etc. automatically. In hazardous condition, it is useful for old aged and handicapped persons. In this technology, remote, wireless controlled switches, PC, Laptop or smartphone are used for operating. 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.

Keywords— Home Automation, GSM, Bluetooth, Wireless, Controller, Android Apps

I. INTRODUCTION

The home automation increases the quality of the control of the home equipment. Main purpose of home automation is "SAVE ELECTRICITY". In daily routine life sufficient use of electricity is very important. Everyone can control the home equipment or office equipment automatically. Various technologies are surveying throughout this paper. Introduction of several wireless communication such as GSM, WIFI, ZIGBEE and Bluetooth are discussing here. Home automation system saves time, man workforce, money even electricity. Secured, flexible, reliable, user friendly and affordable this are the specification of home automation system. [9, 10] Detail information of components, methods, sensors of all systems are discussed in this paper. In all over the world, wireless technology is famous. Nowadays, Automation is not hard but advanced technique in home automation is required. Automation systems can control home equipment such as TVs, Fan, Tube lights. Android smartphones is done very important role in most of the systems. In wireless technology Bluetooth is used widely. [6,7,8] Bluetooth module LM400 having distance 100 meters, frequencies 2400Hz, speed 3 Mbps. In some project GSM technology and Bluetooth technology is used. Among them, in GSM technology home equipment can control by text messages and in Bluetooth technology home equipment can control using android apps application. GSM has transfer speed up to 9.6 kbps with voice call service and SMS service. Author has used power supply or DC volt power battery in some project. User can control many devices using home automation system. (ATMEGA328) Arduino Board, (AT89S52), FPGA Controller, ARM7, ARM9, PIC16F877 (40 pin IC) etc. acts as a controller in most of the home automation system. [1,2, 10]

II. LITERATURE SURVEY

1. Advance Home Automation Using FPGA Controller

In this paper, author introduced a new technology with Field Programmable Gate Array (FPGA) controller, Bluetooth and Android phones. It is wireless technology. VHDL language is used for a Xilinx Spartan-3E. V means VHSIC (Very High Speed Integrated Circuit). FPGA Controller is based on Basys2 development board. FPGA has a many input and output pins so it can connect number of home equipment's. FPGA is used for controlling home equipment's. Bluetooth is used for monitoring equipment by wireless technique. Android phone is used for speech recognition. DC motor, stepper motor, a LED are connected to FPGA. A microcontroller has less number of input and output pins than FPGA Controller. Main aim of this paper is to increases the speed using parallel communication. [1]

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

In this paper, author introduced Home automation based on GSM system using App-inventor for Android mobile. In App inventor, programmer has to design different blocks than design the source code like in LabVIEW software. Programming is not essential. The main aim of this paper is to have ease in programming using App inventor and security using GSM. App inventor is a platform to design a new smart phone apps using android. User has to login first online then start to design both part the screen objects (Designer) and the programming logics (blocks). User can control home equipment using GSM by each corner of world. In hardware, ULN2803 octal peripheral driver array, ATMEGA328 Arduino board with microcontroller, GSM Modem, Relay and some other small components are used. Arduino board worked as a transceiver. It has 23 I/O lines. In this paper hardware and software part is done individually. [2]

3. Android Based Appliances Control System

In this paper, controlling fan speed and light intensity is specialty of the project. This paper hold two parts, hardware part called process unit and software part called monitoring unit. Process unit contain Bluetooth module LM400, LCD, dimmer circuit, and microcontroller PIC16F877 (40 pin IC). Monitoring unit contain only smartphone. For better efficiency dimmer circuit is designed using SCR. Home appliances can control using android phone which has Bluetooth application. Bluetooth module is used for communication. It is wireless technology. Dimmer circuit is used for controlling the fan speed and intensity of light. [3]

4. Bluetooth Based Home Automation and Security System Using ARM9

In this paper, the two microcontroller development boards viz ARM 7 and ARM 9 were used. ARM 9 (S3C2440A) is in transmitter side and ARM 7 (LPC2148) is in receiver side. Operating system Wince6.0 is used for designing the application on ARM9. In hardware parts ARM7, ARM 9, ULN2003, Relays, Bluetooth module are used. VB.NET is used for designing apps. Graphical User Interface module and Serial Port Profile modules are used in software part. Bulb, fan is controlled using Bluetooth, ARM – MDK kits acts as a processor. It is cost effective project.[4]

5. Efficient Interactive Control System based on GSM

In this paper, author introduced GSM technology with AT89S52 microcontroller. Simulation software is Proteus v7.7 and Keil compiler used for embedded C programming. Prime aim of this project is if in future any accident will happen then system will send SMS messages to the user. At any time, user can send request for condition of system. Home appliances can be control using SMS service means GSM so user can save his/her money and time. In proposed system, power supply gives 5V power to the system. AT89S52 is 8-bit, low cost controller. MAX232 is used for conversion of signal. Relay driver ULN2003 drives the all relays which connected to the loads. Last but not the least GSM module SIM300 is messenger between the user and microcontroller using AT command. This paper gives detail information about circuit diagram in Proteus simulation diagram and all necessary components.[5]

6. RTOS Based Home Automation System Using ATMEGA

In this paper, author introduced home automation system using ATmega328 controller with RTOS (Real Time Operating System). Blue-tooth module-JY MCU BT HC-06, Microcontroller -ATMEGA 328, LM35 Temperature Sensor, Liquid Crystal Display, Real Time Clock DS1307, and Relay Board are the hardware components of this project. 14 Digital, 6 Analog I/O pins, Open-Source single-board are the specification of ATmega328 microcontroller. Supply voltage - 3.6 to 6V DC, I/O - 5V tolerant, Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps, Bluetooth SPP (Serial Port Protocol) are the specification of Blue-tooth module (JY MCU BT HC-06). Serial real time clock, I2C serial interface, 2 Automatic switch circuitry and power fail detect, Programmable square wave output signal are the specification of RTC (DS1307). This system gives more secure and cost effective home automation system. [6]

III. COMPARATIV ANALYSIS

From above surveyed papers, all the home control automation system uses wireless technology. Smartphone plays a very vital role in all these systems. GSM technology is used in two systems. (ATMEGA328)Arduino Board, (AT89S52), FPGA Controller, ARM7, ARM9, PIC16F877 (40 pin IC) etc. acts as a controller in above home automation system. For driving the relays ULN2003 is used in almost all system. In programming Xilinx Spartan-3E for FPGA controller, App inventor, embedded C, Keil Compiler, VB.NET etc. this all software's are used. Bluetooth modules LM400 having distance 100 meters, frequencies 2400Hz, speed 3 Mbps.

IV. CONCLUSION

Different techniques for home automation system have been surveyed. Different author gives various techniques with block diagram, flowchart and their explanation with proper layout of successful execution with adequate strengths and weaknesses. All systems are designed in this surveyed papers are designed and tested practically. Main purpose of this method of implementation is that all systems are in hazardous condition, henceforth it is useful for old aged and handicapped persons and save electricity, time, money etc.

REFERENCES

- [1] Sweatha K N, Poornima M, Vinutha M H – “ADVANCE HOME AUTOMATION USING FPGA CONTROLLER”, International Journal of Advanced Research in Computer and Communication Engineering Vol. 2, Issue 7, July 2013.
- [2] Mahesh N. Jivani “GSM Based Home Automation System Using App-Inventor for Android Mobile Phone” International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 3, Issue 9, September 2014.
- [3] Belgi Y.G., Avatade P.G., Deshmukh P.V., Sakhare A.M., Shinde A.J. and Prof. Patil J.M., - “Android Based Appliances Control System” International Journal of Emerging Technology and Advanced Engineering, Volume 3, Issue 12, December 2013.
- [4] D.NARESH, B.CHAKRADHAR, S.KRISHNAVENI, “Bluetooth Based Home Automation and Security System Using ARM9”, International Journal of Engineering Trends and Technology (IJETT) – Volume 4 Issue 9- Sep 2013.

- [5] Mohamed Salman, Jayavrinda Vrindavanam, - "Efficient Interactive Control System based on GSM", International Journal of Latest Trends in Engineering and Technology (IJLTET), Vol. 3 Issue2 November 2013.
- [6] Aniket Yeole, Sapana Bramhankar, Arjun Gaikwad, Abhijeet Bansod, Atul Borade, "RTOS BASED HOME AUTOMATION SYSTEM USING ATMEGA", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 3, Issue 2, February 2015
- [7] N. Sriskanthan and Tan Karand. "Bluetooth Based Home Automation System". Journal of Microprocessors and Microsystems, Vol. 26, pp.281-289, 2002.
- [8] Baris Yuksekkaya, A. Alper Kayalar, M. Bilgehan Tosun, M. Kaan Ozcan, and Ali Ziya Alkar, "A GSM, Internet and Speech Controlled Wireless Internet Home Automation System", IEEE Transactions on Consumer Electronics, Vol. 52, No. 3, AUGUST 2006.
- [9] R.Piyare and M.Tazil. 2011. Bluetooth Based Home Automation System using Cell Phone, IEEE 15th International Symposium on Consumer Electronics, Vol.42,No.4.
- [10] R.A.Ramlee, M.H.Leong, R.S.S.Singh, M.M.Ismail, M.A.Othman, H.A.Sulaiman, M.H.Misran, M.A.Meor Said,(2013) "Bluetooth Remote Home Automation System Using Android Application" Vol. 2, pp 149-153.