

HOME AUTOMATION USING ARDUINO BOARD

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ABSTRACT

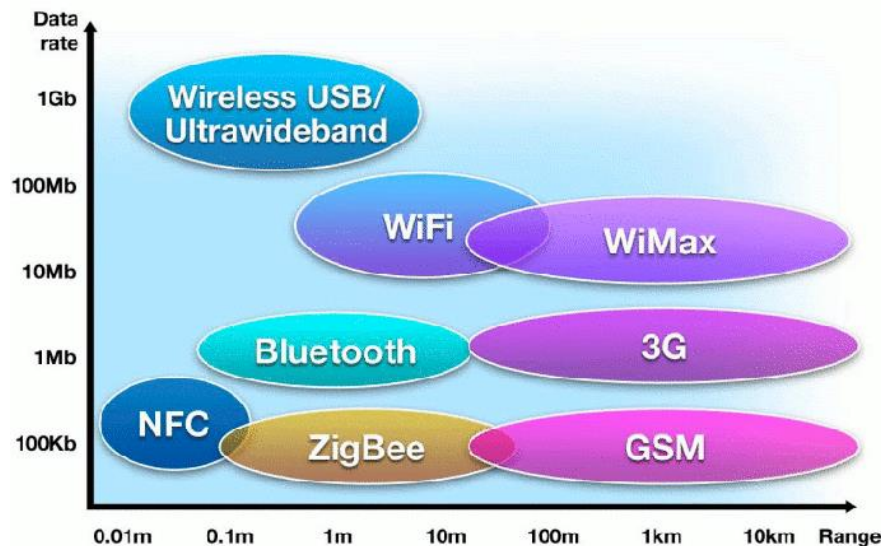
Automation plays a very important role in this modern world. Automation decreases the human effort increases his work efficiency and comfort. This leads to save money and time by decreasing human hard word. The main thing in this technology is to operate household equipments like fan, bulb, door, AC etc. Smartphones can operates this equipments. In worst case it is useful for old age people and handicapped persons .In this paper we have a detailed comparison between the other home automation techniques like ZIGBEE, GSM and other systems with Bluetooth.

KEYWORDS: GSM, BLUETOOTH, ZIGBEE

1. Introduction

The home automation increases the level of affordability and simplicity through the integration of home appliances by using the smartphones. Smartphones are already capable to make connectivity with the devices like Bluetooth. Introduction of various wireless communications such as GSM, WIFI, ZIGBEE and Bluetooth are discussed here. Home automation saves time and effort and decreases the human effort, throughout the world, the wireless technology nowadays is very famous. Automation can operate home appliances like fan, bulb, AC, TV, Tube lights etc. Android smartphones plays very vital role in most of the systems. Bluetooth is used widely. Bluetooth module LM400 having distance 100 meters, frequencies 2400Hz, speed 3 Mbps. In some project GSM technology and Bluetooth technology is used. In GSM technology the home appliances can be controlled by GSM technology by giving a text message but in Bluetooth technology the home appliances can be controlled by using the android applications and the Google tab. GSM can transfer upto 9.6kbps speed with SMS and voice call services .Power supply or dc voltage battery is used, Arduino board (ATMEGA328) (AT89S52), FPGA Controller, ARM7, ARM9, PIC16F877 (40 pin IC) etc. acts as a controller in most of the home automation system.

After study of different review papers based on home automation starts with the brief description of home automation its need and importance then after that after review of different research paper is done on the basis of which literature survey of different automation system like ZIGBEE,GSM BLUETOOTH used for automation with this we will use Bluetooth as our Module.



2. Different Types of Home Automation Techniques

1. Advanced Home Automation Using Field programmable gate array Controller: - In this, the introduction of 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 many home appliances at a time. Bluetooth is used for control equipment by wireless techniques .For speech recognition the android phones are used.

2. Android Based Appliances Control System:- 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 smartphones. 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. This Dimmer circuit is used for controlling the fan speed and intensity of light.

3. Bluetooth Based Home Automation and Security System:- Using ARM9 , 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. 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. Efficient Interactive Control System based on GSM the introduction of GSM technology with AT89S52 microcontroller:- Simulation software is Proteus v7.7 and ISIS 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. RTOS Based Home Automation System Using ATMEGA:- In this the introduction of home automation system using ATmega328 controller with RTOS (Real Time Operating System). Bluetooth module-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. 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.

3. Comparison

Table 1: Comparison of Zigbee & Bluetooth for various parameters

Parameter	Zigbee	Bluetooth
Power Requirements	10mA	100mA
Development Costs (Codesize in Zigbee/Codesize in Bluetooth)	0.5	1
Sensitivity	-92dbm	-82dbm
Number of supported nodes	65536 (mesh)	7 (star)
Security	AES (128 bit)	SAFER (64/128 bit)
Latency requirements	Optional Guaranteed Time Slot	None
Range	~75m (LOS)	10m
Maximum Data Rate	20-250 KB/s	720 KB/s
System Resources	4KB-32KB	250+KB
Battery Life (days)	100-1000+	1-7
Network Size	65K+	7
Range(m)	1-100+	1-10+

4. Analysis

From above surveyed papers, all the home control automation system uses wireless technology. Smartphone plays a very important role in this system. 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. Bluetooth modules LM400 having distance 100 meters, frequencies 2400Hz, speed 3 Mbps. So here we have done the analysis that the arduino board should be interfaced with Bluetooth and can be operated by smartphone.

5. Conclusion

We have gone through many different techniques of home automation. The concluded technique will be used is Bluetooth. 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.

It provides the flexibility & system reliability with low cost as well as less maintenance. It provides remote access to the system to deliver service at any time of the day. With this system, we can control as well as monitor the devices at remote location

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Biography

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