

Providing Online Home Security and Control of Home Appliances using Android Application

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Abstract—This paper encompasses automation in home security and home appliances using Internet of things (IOT). Day to day automation is going on hike. Automation is provided by android application via internet. Give input by android application to Wi-Fi module and get command on web server which creates by microcontroller. Microcontroller sends this command to home appliance according to request.

1. INTRODUCTION

IOT is internet of things which is very useful and familiar to everyone. Gives the connectivity every day to object as TVs, light, fan, sensor, actuator through internet where the devices are intelligently linked together make new forms of communication between people and things or things and things Or people and people [1]. Home security is one of the most important features nowadays. Everybody wants to secure his home. By this system we can monitor and controlling the most critical area of home to detect the misshaping which related to insecurity [13]. Home automation is developing based on java. Physically connected a personal computer (Pc) and all home appliances which control with an embedded board. a personal computer (pc) which based web server, gives the accessibility of remote to the system. Java technology creates network security features and gives a secure solution [2]. Bluetooth application and environment of networking proposed in home automation [15]. On smart home or home automation various works has been done by remotely control [14]. Some limitation with the remotely control that is range. Range of the remote is not so far so can't be used for long distance. Smart home or automation can also control through a remote which connected to home appliances and automation gives by wired and wireless medium such as telephone line, wireless transmission or internet and android application to gives the control by a smart phone or tablet. Home automation is done by GSM, Internet and voice recognition. In this automation need a PC and its must be on all time. By this automation the more power consume [3]. Proposed a zigbee based home automation, home appliances control by zigbee infrared combination and zigbee power adapter [4]. But zigbee infrared combination has range limitation. Its work only for 700nm to 1mm. using Wi-Fi is no range limitation.

2. RELATED WORK

Home automation provides comfort, easy to operate, security. Home automation work done for old age people, disabled people to improve the life of them. They can use home automation from a place. Don't need to move in home [5].

1. Home automation use of FPGA controller:

In this paper, gate array controller of field programmable, android phone and Bluetooth used. FPGA controller has many inputs and outputs pins so home appliances connected with it [11]. FPGA is used for control the appliances and Bluetooth for monitoring of appliances.

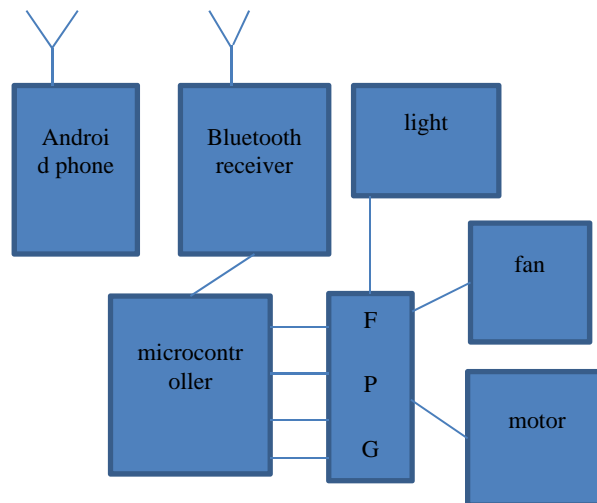


Fig. 1: Home automation using FPGA [11].

2. Home automation use of zigbee:

Zigbee same as Bluetooth and WI-FI[6]. Radio frequency (RF) also used in this technology. RF is used for controlling and signaling and Zigbee work as a protocol. Zigbee gives a wireless technology which reduced the obtrusive installation problem. Zigbee gives the data at rate 250kbps which is

enough to control of home appliances. Zigbee technology is cost effective [7].

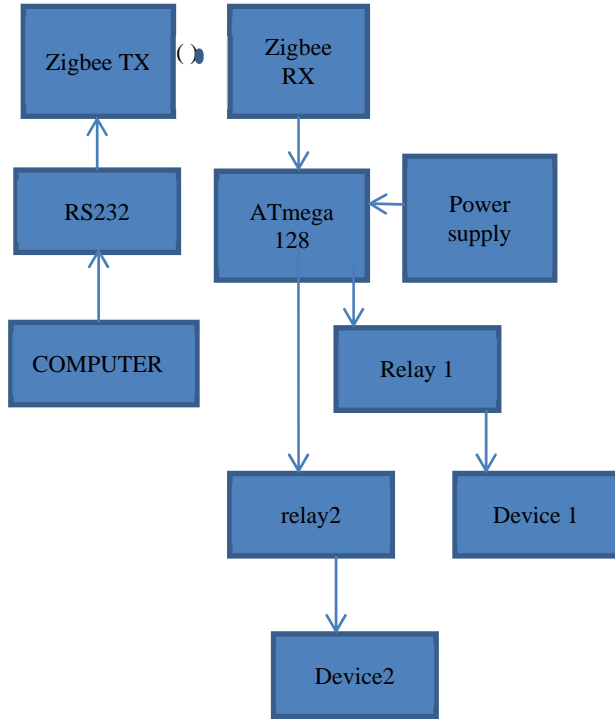


Fig. 2: Home automation using zigbee[12]

3. HOME AUTOMATION VIA GSM USE OF ANDROID APPLICATION:

In this paper makes different blocks and source code as in LAB view software. Main focus by this technology is providing security by GSM using android application. User firstly sign in online and then design both parts of display and programming logics. Home appliances can be control from anywhere of the world by GSM. Component used in this, peripheral driver array of ULN2803 octal, microcontroller with Arduinio ATmega328 controller board, modem of GSM, and relay use for switching. Hardware and software work done individually [16].

According to fig.1 send the request from mobile phone to modem through transmission channel. The request receives by Bluetooth modem forwards this request to microcontroller and gets command by receiver, available on microcontroller pins. Microcontroller sends the request to relay driver which is connected to microcontroller and the appliances control by relay. Its work as a switch. Zigbee is family of low-speed WPLN network. It has limited band width. 256 Kbps is maximum data rate at every physical layer [10].

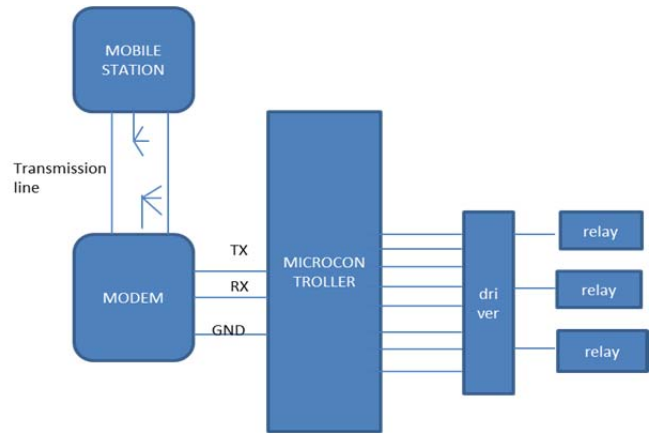


Fig. 3. home automation use of GSM[10]

Sends the SMS messages by the GSM techniques like transmission channel to the applications set. 5v power supply gives to microcontroller, relay driver ULN2003. System has GSM modem which is interfaced with microcontroller by RS232 cable and level shifter. In GSM modem a SIM card inserted. When get the data or any message from any mobile phone, it communicate this data to microntroller by level shifter which converted the information in correct form so microcontroller can understand. The command will process by microcontroller and it drives relay through relay driver. Relay connected directly to load. Loads are controlled as ON and OFF according to command which send to GSM modem.

4. HOME AUTOMATION BASED ON ANDROID APPLICATION:

In this paper work on light intensity and speed of fan controlled. Its divide into two parts one is process unit, that is hardware part and other is monitoring unit that is software part. Process unit consist of microcontroller PIC16F877 it is 40 pin IC, LCD, dimmer circuit, Bluetooth module LM400. Dimmer circuit is designed by SCR for better efficiency. Android phone controlled home appliances and it has Bluetooth. Dimmer circuit used for control of light intensity and fan speed [8].

Home automation via Bluetooth use of ARM9:

In this paper, two microcontrollers is used one is ARM7 and other one is ARM9. ARM7 (LPC2148) is placed at receiver side and ARM9 (S3C2440A) is placed at transmitter side. Hardware component are relay, Bluetooth modem, ARM7, ARM9. For designing of app used VB.NET. Software part consists of serial port profile modules and graphical user interface module. Light and fan controlled by Bluetooth [9].

Home automation via RTOS use of ATMEGA:

In this paper, using ATmega328 controller with real time operation system. Hardware components are LM35 Temperature sensor, Bluetooth module-JY MCU BT HC-06, LCD (Liquid crystal display), DS1307 real time clock and relay use for switching[17]. ATmega328 has 14 digital pins and 6pins I/O analog. Power supply-3.6v to 6v DC.

5. HOME AUTOMATION VIA WI-FI MODULE USE OF ANDROID APPLICATION:

In this technology, use the Samsung galaxy Y5S360 as a controller. Its operating system is Gingerbread with 835 single core processor. Application installed on device which communicates with PC. When command sends it's communicate with the home appliances via relay board which designed to parallel interfacing [18].

Figure.4 is activity diagram of the system. Its shows basically security system, gives access via authentication password. WI-FI is turned on with router and gets accessed through AVR ATmega16. Dimmer circuit is used to control the speed of FAN and intensity of light. Also used for on/off for FAN and light.

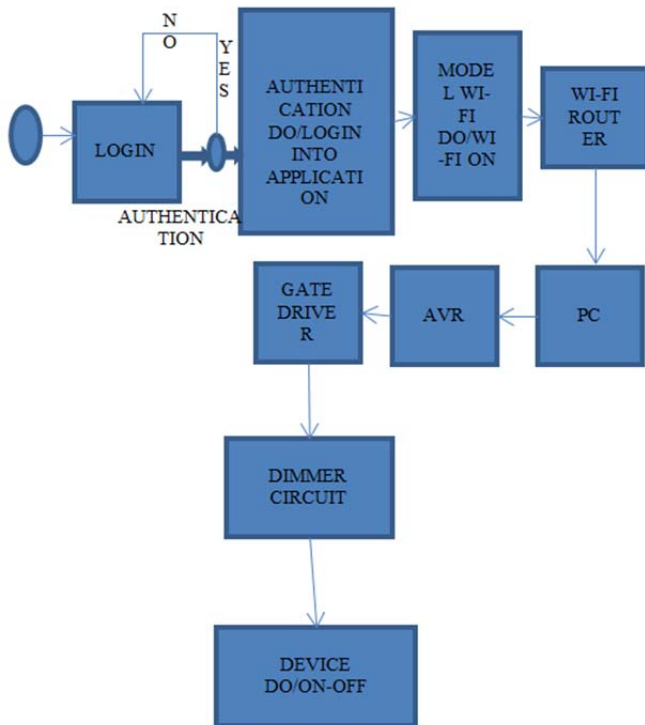


Fig. 4: Home automation based on WI-FI

6. COMPARATIVE ANALYSIS

From above papers, home automation is used by wireless technology. Android phone plays main role in all technology.

GSM technology, Bluetooth modem, ATmega328 Arduino board, FPGA controller, ARM9, ARM7 are work as a controller for smart home or home automation. FPGA Controller use of Programming XILINX Spartan-3E, use of embedded c, and VB.NET, android application. distance 100m, speed 3Mbps, frequency 2400Hz of Bluetooth module.

Table 1: Technology comparison of Home automation

	OPERATING FREQUENCY	DATARATE	NETWORK TOPOLOGY	RANGE	COMPLEXITY	POWER CONSUMPTION
IR WIRELESS	800-900 nm	20-40 Kbits/s, 115 Kbits/s 4 &	Point to point	<10 meters	LOW	LOW
ZIGBEE	900-928 MHZ(NA), 2.4 GHZ(WORLD WIDE)	20,400 AN 250 Kbits/s	AD-hoc, very small network	10-100 meters	LOW	VERY LOW
GSM	880-915 MHZ and 925-960 MHZ	9.6 Kbits/s		300 meters	LOW	High
UWB (ULTRA WIDE BAND)	3.1-10.6 GHZ	100 - 500 Mbits/s	Point to point	<10 meters	Medium	LOW

BLUE TOOTH	2.4 GHZ	1 Mbits/s	AD-hoc, very small network	10 meters	High	Medium
WIRELESS USB	2.4 GHZ	62.5 Kbits/s	POINT TO POINT	10 METERS	LOW	LOW
WI-FI	2.4 and 5 GHZ	11 & 54 Mbits/sec	Point to hub	50-100 meters	High	High

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