A Survey on Different Kind of Home Automation System using Internet of Things

Ansari Vasim Riyaj[1], Mulani Rijvana Vajir[2], Dr. J. N. Shinde[3]
[1, 2]*Student, Aaemf & Coe- Bhima Sppu, Pune*
[3]*Principal Of Aaemf & Coe,Sppu, Pune*

Abstract: Home automation allows to control household electrical appliances like light, door, fan etc. the abilities and benefits are increased by the Home automation. This paper present a survey of various home automation system in exist. In this paper we report the basic module of home automation techniques along with the latest development in home automation, in this we have reported that basic module of various systems to get the knowledge of various home automation system for developed best home automation system.

I. INTRODUCTION

Home automation is the automation of home. Home automation may provide increased quality of life for person who might to like caregivers. Home automation is a kind of automation systems which are used specifically for controlling the home appliances and devices mechanically and in some cases remotely. But due to controlling mechanically (in some cases remotely) make the physical limitation for controlling the system. So now day's mobile devices are increased rapidly in terms of cost and smooth functionality. And today life most of the mobiles are connected through internet and internet of things, by using the internet of thing it make easier for user to control the automation system while they are far away from the system. Due to the controlling of a system from the outdoor save the energy, money and most important time.

In this paper we present comprehensive survey of "HOME AUTOMATION SYSTEM" using internet of things and without using the internet of things. In section I, Introduction gives general information about Home automation system. The section II, describes different kind of home automation system. In section III, we present concluding remark about the system comparison of home automation system.

II. DIFFERENT TYPES OF HOME AUTOMATION SYSTEM:-

A. Android Based Home Automation System Using Bluetooth And Voice Command Implementation

The objective of given system is to home automation and security is to help handicapped and old aged people who will enable them to control home appliances and alert them in critical situations. In this system develop an authentication to the system for authorized person to access home appliances. It presents the design and implementation of automation system that can monitor and control home appliances via android phone or tablet.
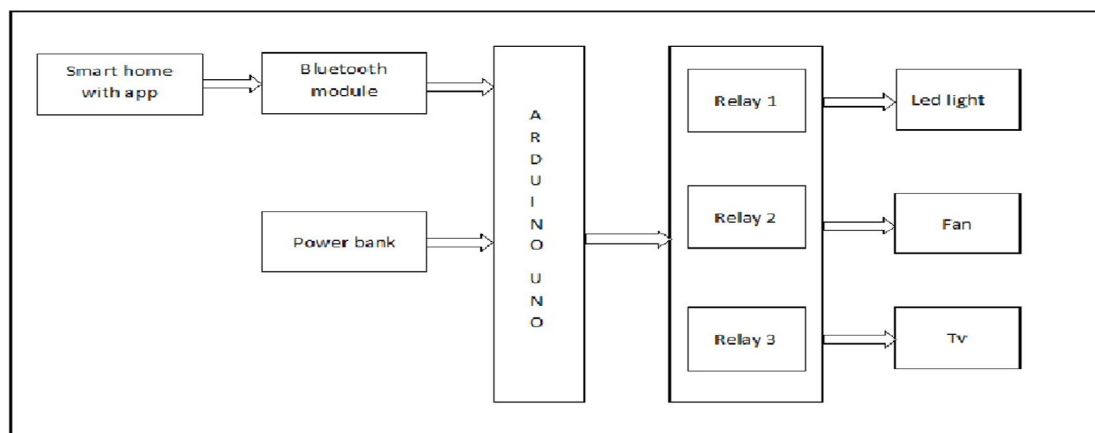
Block Diagram

Fig:-Block diagram of android based automation system using Bluetooth and voice command.

1) *Hardware Required*
a) Arduino uno
b) Bluetooth module
c) Relays
d) Power bank
e) Temperature sensor
f) Gas sensor

2) *Performance:* The system uses Bluetooth module which are connected to the arduino uno r3 (ATMEGA328).Where the HC-05 is Bluetooth module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH(Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle. The module is suitable where wireless data transmission is needed in slave mode. The board can be accessorized with a USB to TTL serial cable to connect to your PC. Like the HC-05, the HC-06 module can reach a range of up to 9 meters (30 ft). Then next

The Arduino Uno is a microcontroller board based on the ATmega328. Arduino is an open-source, prototyping platform and its simplicity makes it ideal for hobbyists to use as well as professionals. The Arduino Uno has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power bank, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. For switching purpose uses the relay module which operated on DC Voltage for operating we required 5V of power supply.

The system is only comfortable with the in-door controlling and out-door controlling is not possible

B.   Home Automation Using Wi-Fi Interconnection
This system from an android application based on arduino. This system uses Wi-Fi technology as communication protocol connect component .This home automation system consist of two main Component.
1) Android application
2) Arduino uno

The system based on the interconnection between Wi-Fi Module in which the client Wi-Fi modules will be connected to the station Wi-Fi module which will be giving commands through the smart phone which is connected to the same as an external device, will have priority in giving instructions and extracting work over them works in master-slave principle.
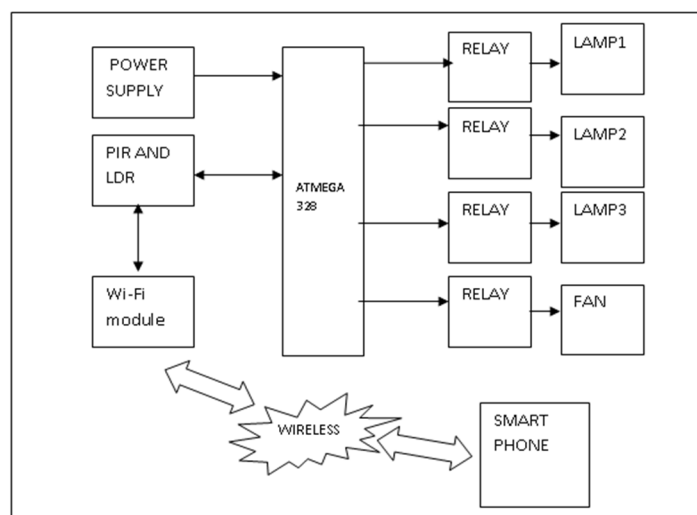
Block Diagram

Fig:-Block Diagram of Home Automation Using Wi-Fi Interconnection

a) *Hardware Required*
 i) Arduino
 ii) Wi-Fi module
 iii) Relay module
 iv) Power supply

b) *Performance:* In the given system entire appliances attached to relay are controlled by microcontroller   ATMega328 ESP8266 is a Wi-Fi module interface to microcontroller for wireless communication. The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer Systems.   This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi The successor to these microcontroller chips is the ESP32.It Makes the transfer of data faster and the processing the data much faster than other technology. The Arduino Uno is a microcontroller board based on the ATmega328.Arduino is an open-source, prototyping platform and its simplicity makes it ideal for hobbyists to use as well as professionals. The Arduino Uno has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power bank, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. For switching purpose uses the relay module which operated on DC Voltage for operating we required 5V of power supply. The system is comfortable for both the in-door controlling and out-door controlling is but for the particular range. It has the **366 meters** with the PCB antenna.

C. *GSM Based Home Automation System Using App- Inventor For Android Mobile Phone*
In this system GSM (global system messaging) based secured device control system using App inventor for android mobile phones. App inventor is a latest visual programming platform for developing mobile applications for android-based smart phones. Due to use of app inventor no need to write programming codes to develop app in the app inventor.
The preface of the Global system for mobile communication (GSM) and mainly the use of cellular phones got the novelty of distance communication at remote location.
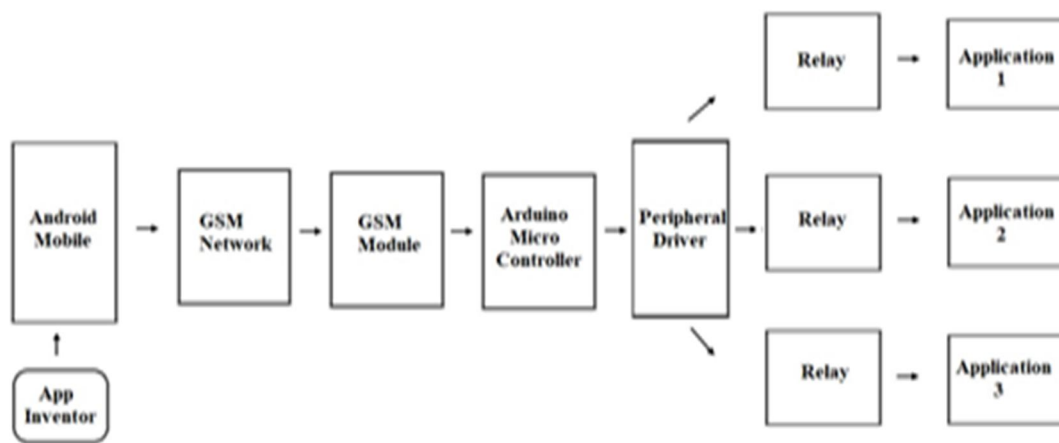
Block Diagram

Fig:- Block diagram of GSM based home automation system using app inventor for android mobile phone

1) *Hardware Required*
a) GSM module
b) Arduino microcontroller
c) Relay module
d) Android mobile
e) Gas sensor

2) *Performance:* The Above Bluetooth and Wi-Fi based home automation system we describe the controlling of appliances is limited to particular range thus the drawback is overcome by GSM based Home automation system where the controlling of appliances from out-door is possible. They uses SIM900 GSM Module – This means the module supports communication in 900MHz band. We are from India and most of the mobile network providers in this country operate in the 900MHZ band. GSM modules are manufactured by different companies. They all have different input power supply specs GSM module requires a 12 volts input. So feed it using a 12V,1A DC power supply GSM modules which require 15 volts and some other types which needs only 5 volts input. They differ with manufacturers. If you are having a 5V module, you can power it directly from Arduino's 5V out.

As the uses GSM Module for sending massages to the controller and receiving massages from the controller, for controlling the home appliances we required the server for the server they uses the mobile app and the app is developed in MIT App Inventory. Due to this system is comfortable for both the in-door controlling as well as out-door controlling is but for the nearly infinite range. Due to massage sending receiving make system complex and cost of the system is expensive.

D. *Home Automation Control Using Bluetooth And Gsm*
The given system created mobile application and interfaced with the device to control home appliances through Bluetooth and GSM for indoor and outdoor controlling respectively. They used Bluetooth and GSM to control the appliances. Where chosen Bluetooth just because of suitable ability to control appliances from indoor and GSM for outdoor Monitoring. The GSM user can effectively control and monitor the appliances from remote places by sending SMS. The microcontroller device is the device through which application interact with home appliances mode is under for selecting either Bluetooth or GSM through which to control the appliances the command will be received based on the mode selecting by the appropriate device from the android application. The LCD display is used to denote the command sent by the android application. The main power supply is connected with the step down transformer. And the Bluetooth and GSM module connected with the pic controller.
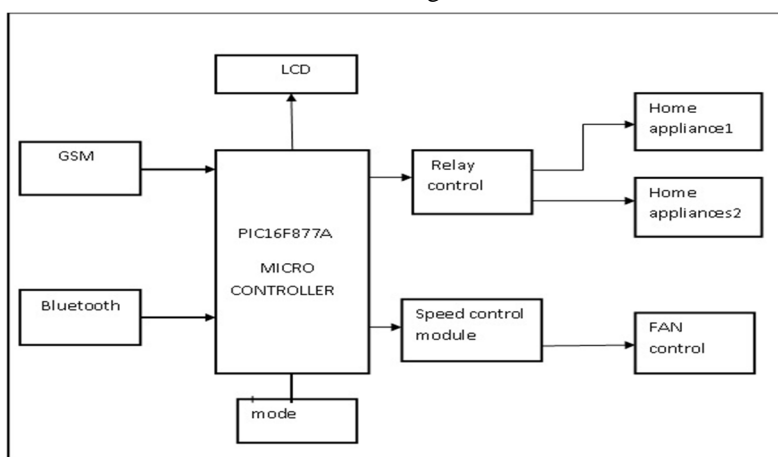
Block Diagram

Fig:-Block diagram of home automation control using Bluetooth and GSM

1) *Hardware Required*
a) PIC16F877A Micro-controller
b) GSM module
c) Bluetooth module
d) Speed control module
e) Liquid crystal display
2) *Performance:* For the GSM and Bluetooth based home automation system HC-05 Bluetooth module is used which gives indoor connectivity and for outdoor connectivity uses GSM Module SIM900.

The system uses Bluetooth module which are connected to thePIC16F877A Microcontroller. Where the HC-05 is Bluetooth module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup.PIC16F877Ais powerful (200 nanosecond instruction execution) yet easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller packs Microchip's powerful PIC® architecture into an 40- or 44-pin package and is

upwards compatible with the PIC16C5X, PIC12CXXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self-programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog to Digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit (I²C™) bus and a Universal Asynchronous Receiver Transmitter (USART). All of these features make it ideal for more advanced level A/D applications in automotive, industrial, appliances and consumer applications.
By using both Bluetooth and GSM Module make user to control appliances from indoor and outdoor comfortable the Bluetooth provides connectivity when the GSM Module is Not in Working. Though using Bluetooth and GSM Module the system is still complex and not user friendly.

E. Cloud Based Low Cost Home Monitoring And Automation System

A cloud based low coast home automation system implemented using the digilent chipKIT uno 32 and arduino Uno R3 the controlling of system is connected to internet by which the they can monitor the system at home which can be used for control and safety
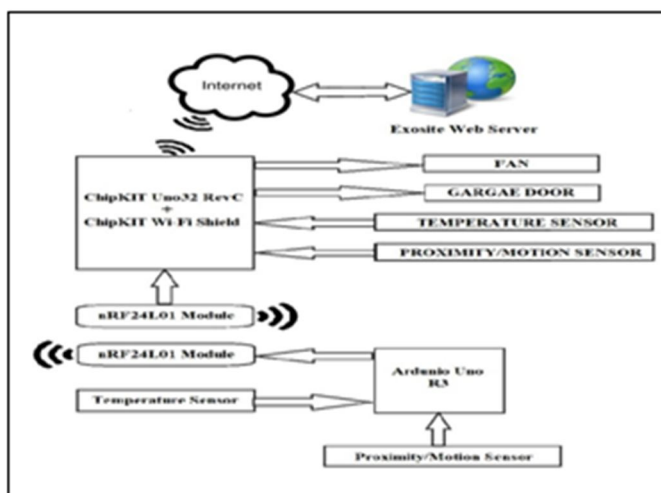
Block Diagram

Fig: - Cloud Based Low Cost Home Monitoring and Automation System

1) *Hardware Required*
a) Chipkit UNO32
b) Wi-Fi Shield MRF24WG0MA
c) Proximity sensor
d) Arduino uno
e) nRF24L01 module

2) *Performance:* In this system cloud based low cost home automation system implemented using the digilent chipkit UNO32 and Arduino uno. The presented prototype aims to use as few resources as possible to demonstrate a simple and low cost home connected. It consist of base node connected to cloud service (hosted externally).where we can check the status of different appliances and sensor at home .here use a PIC32MX320F128H microcontroller was used as base node and an ATMEGA328 used to demonstrate a room connected to base node via RF.

An arduino in this system is locally connected to the chipkit uno32 using RF transceiver modules. one is on the base node a chipkit uno32 and another is on the arduino uno which is a node installed in a different room of the house. This publishes to the cloud. The cloud has control switches to turn off/on the appliances at home to open /close the garage door etc.

III.   CONCLUSION

In this paper we present the comparative study of different type of home automation system. Where the objective of most of the system, to help handicapped person and increase the abilities and benefits. In above given system made with different kind of microcontroller and in which some of can operated as indoor and outdoor. With study we find that all system Possess some drawbacks and some of the system having cost high.

REFERENCE

[1] Anandhavalli d, noorul s. Mubina,bharthi mubina. smart home automation control using Bluetooth and gsm. ISSN(Online):2347-1697 international journal of informative & futuristic research (ijifr) volume -2 issue-8 april 2015

[2] Shruthi raghvan and girima s.tewolde.cloud based low cost home monitoring and automation system. proceeding of the 2015 ASEE North Central Section Conference .american society of engineering Education

[3] R.HArinath et al, International journal of computer science and mobile computing, vol.4 issue4,april-2015,pg 158-167

[4] R.arvindhan,M.ramnathan,D.sanjalkumar,R.kishor home automation using Wi-Fi interconnection. International Research journal of engineering and technology(IRJET) Volume-04issue03-MAR-2017 e-ISSN:2395-0056,p-ISSN:2395-0072.www.irjet.net

[5] Prof.H.B.Shinde, Abhay Chaudhari,prafull chaure,mayor chandgude, smart home automation system using android application International Research journal of engineering and technology(IRJET) Volume-04issue04-APR-2017 e-ISSN:2395-0056,p-ISSN:2395-0072. www.irjet.net

[6] Bhavik pandya ,Mihir Mehta,Nilesh Jain, Sandhya Kadam android based home automation system using Bluetooth and voice command- Implementation. International Research journal of engineering and technology(IRJET) Volume-03-issue04-APR-2016 e-ISSN:2395-0056,p-ISSN:2395-0072. www.irjet.net

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