

ABSTRACT

The main goal of this paper is to describe the systems which automatically control the devices through mobile. The various implemented systems are use in the house to control appliances like fan, light, and water pump by just turn ON or OFF the switch from mobile phone.

KEYWORDS: Internet of things (IOT), Smart home, Blue-tooth, Zigbee, Arduino, Raspberry pi.

INTRODUCTION

In the recent years various technologies are developed which helps people to get self control systems. These systems first sense the data from the sensor and by processing on that provide output for controlling. And this control action is taken by the mobile application as it provides a much faster alternative than mobile web browsing. It has made human life more easier and comfortable. Now we are going to familiar with these technologies.

SURVEY ON EXISTING TECHNOLOGIES

1. Pooja N.Pawar, Shruti Ramachandran has shown in their survey paper, Home automation using bluetooth module. In A Survey on Internet of Things Based Home Automation System, Wireless communication is used by the user to send messages via Bluetooth for switching purpose.
2. Carelin Felix, I. Jacob Raglend, "Home Automation Using GSM", Proceedings of 2011 International Conference on Signal Processing, Communication, Computing and Networking Technologies (ICSCCN 2011) presented the GSM and Zigbee based home automation.
3. In Smart Home Automation using IOT, Dhakad Kunal, Dhake Tushar, Undegaonkar Pooja, presented system using arduino, but this development board contains less number of GPIO pins.

IMPLEMENTED SYSTEM BASED ON THE VARIOUS WIRELESS SYSTEM

The existing system of home automation using bluetooth. In this, wireless personal area network (WPAN) specified as bluetooth is interfaced with 8051 microcontroller. The devices which have to control are physically connected to the bluetooth controller which is then accessed & controlled by the smart phone using built-in Bluetooth connectivity [1]. Communication between the Blue tooth module and the 8051 takes place serially. Program is written in 8051 micro controller. On the basis of command received from the Blue tooth, the micro controller automatically switches the electrical loads from ON to OFF or OFF to ON.

In the system where GSM and Zigbee technology used the device is connected to a ZigBee Transmitter and receiver. And it communicates with each and every node present inside home. From the mobile phone, command is send via SMS to the Controller, which in turn translate the command and then turn ON and OFF the required 'electric switch' to control the electrical item.[2] The liability of this system is that, at the remote places there should be a full coverage of GSM mobile signal. And zigbee system has less signal rate than Bluetooth or Wi-Fi. Home automation using Wi-Fi used for exchanging information between two or more devices without any physical connectivity that is wire or cable. Wi-Fi module is used to obtain commands from internet and then connected to the controller for performing controlling action. The user can send the commands through allocated IP and then send to Wi-Fi module. This Wi-Fi module is interfaced with output load.

Table-2 Comparison Table of various Development board

Parameters	Bluetooth	Zigbee	Wifi
Frequency band	2.4 GHZ	868/915MHZ, 2.4GHZ	2.4GHZ, 5GHZ
Maximum signal Rate	1Mb/Ps	250Kb/Ps	54Mb/Ps
Nominal range	10m	10m-100m	100m
Channel Bandwidth	1MHZ	0.3/0.6MHZ, 2MHZ	22MHZ
No. of RF channels	79	1/10, 16	14 (2.4GHZ)
Max no. of Cell Nodes	8	>65000	2007

Implemented system based on the various Development Board system

1.Arduino UNO:

Arduino UNO is an open wellspring prototyping podium based on Atmega328 micro controller. It has 14 digital input/output pins,6 analog inputs. The existing system with Arduino has drawback of it doesn't have inbuilt Wi-Fi, SD card slot and flash memory of 32kb only. It requires operating voltage 7 to 12 V. So this board is only affordable but not practically useful.

2.Intel Edison:

The Home Automation using Intel Edison development board uses Wi-Fi for controlling the home appliances. Disadvantage of this board is it has high cost.

3.Raspberry pi:

To enhance the capability of the system we want to develop same system using raspberry pi unit. The Raspberry pi 3 development board, have built in Wi-Fi port to which the card is inserted, is acts as web server. Automation of the machine is access from the web of any local Pc or mobile phone Connected to the internet through IP address. Wi-Fi is chosen for improves system security and to increase mobility and scalability.

As we studied the various systems of Smart Home using different wireless system and development board. But all have a definite limitations, like short range, large voltage requirement, small signal rate, high cost etc. To overcome this we use the Raspberry pi module which bound these drawbacks.

Raspberry pi module has inbuilt Wi-Fi and Micro SD card slot. We can control the home appliances like fan, light, and water pump. The controlling action takes place through relay which is interface with raspberry pi GPIO pins.

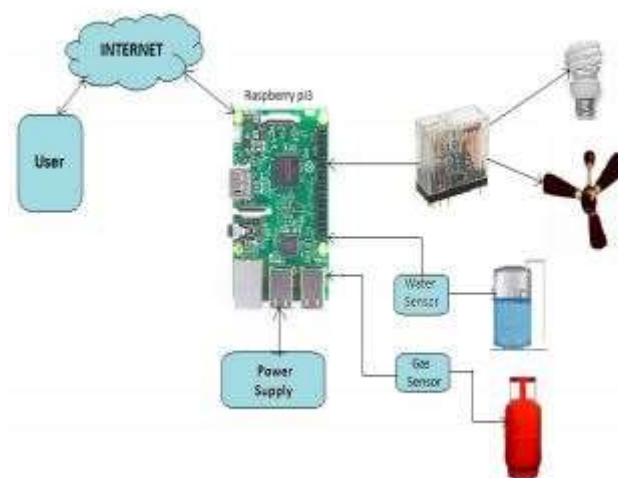


Fig.1 Block diagram of Home Automation Using Raspberry Pi module

Table 4.2 Comparison Table of various Development board

Parameters	Arduino	Intel Edison	Raspberry pi
Price	Rs 1500	Rs 9375	Rs 2849
Memory	0.002MB	1GB	512MB
Clock Speed	16MHz	500MHz,100MHz	700MHz
Size	7.6 X 1.9 X6.4 cm	3.55 X 2.5 X.39cm	8.5 X 5.6 X 1.7 cm
GPIO	14	40	40
Input Voltage	7 to 12 V	3.3 to 4.5 V	5 V
Flash Memory	32KB	4GB eMMC	Micro SD Card
Multitasking	No	Yes	Yes
USB	One, input only	Four, peripherals OK	One, peripherals OK

SOFTWARE LANGUAGES USED

For arduino board the basic language of computer that is c/c++ is used. It is very easy for beginners but have some limitation in high level development. For raspberry pi board require python language which is very easy to learn and implement. Python is a high level programming language accessible for many operational systems. And Java programming is used for developing Android application using android studio software.

CONCLUSION

In this paper, we have provided a various security and control system and discussed various methods to implement this project. By using a high-fidelity devices we can implement a better system. As these systems are wireless system, so easy to carry out everyday by working people.

FUTURE SCOPE

In future in home automation using Raspberry pi we can implement CCTV camera to protect our house from robbery as it continuously monitor and send information to our mobile. And also develop the Android application to easily access the system operation.

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