

Home Automation Using Raspberry Pi

¹Rohit B Sakaraji, ²Uzma Khalid Khatib, ³Gaurav D Chaudhary

¹Department Of Information Technology ,
¹Terna Engineering College , Navi Mumbai ,India

Abstract— With evolving technologies automation and computerization, IoT has embarked upon digital technologies making it accepted in countless ways. Home automation reduces human involvement to the least where, home automation refers to dominance of home gadgets and devices using information technology. However with the presence of local amenities such as ZigBee, Java, Bluetooth etc it is possible to monitor our home through a central interface via Internet Gateways. In this paper an attempt is made of building a low cost stand alone device with an aim to design a basic home automation system using Raspberry Pi .

Keywords—Wi-fi , Network , Bluetooth , Raspberry Pi, Sensors

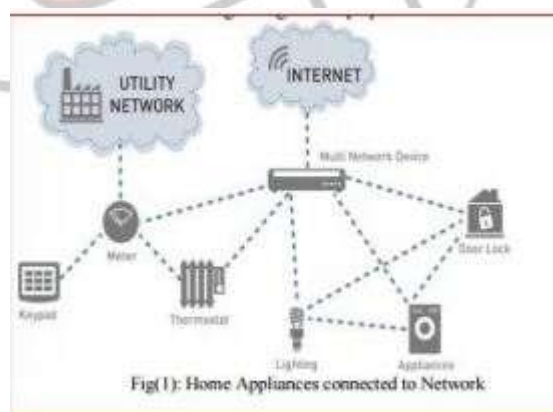
I. INTRODUCTION

The concept of smart homes has immensely emerged with addition of various features and vendors and has been widely accepted making it mostly suitable for domestic appliances. It provides a centralized control of devices with minimal wastage of resources. This system is a combination of various small components embedded with different hardwires making it accessible through a user friendly interface. It also enhances flexibility, scalability with low up gradation costs thus promising not only portability but also authentic security.

It is hugely operated through a Wireless Sensor Network and can also be improvised using RF signals and Transmission Control Protocols (TCP).

The graph of this paper basically deals with android based Home Automation System which is built using Raspberry Pi. It is a credit sized card embedded with algorithms and foundations enabling us with a platform to create a smart home based on end user requirement. The concept of bringing in smart phones is to create configurable smart home systems overcoming the barriers of adapting a new subset of technical activities.

The domain of this research predominantly revolves around microcontrollers and their usage of creating a flexible and yet easy to use commercial system for the end users. With the right Home Automation System and ready to use Internet connection devices this paper provides networking sensors and remote access to home automation systems through development of technical gateways



II. LITERATURE WORK

The proposed system faces four important test trials; these are increased cost of proprietorship, inflexibility, poor manageability and difficulty in achieving reliability. The manifest of this research is to design and implement a system using IoT that of which is capable of controlling the amenities of the house through a web interface. The submitted paper has a greater flexibility by using Wi-Fi to interconnect its sensors to the server hence decreasing the deployment cost and increasing the ability of system configuration.

III. EXISTING SYSTEM

The line of work in Home Automation Systems has always been on rise and the undertaken projects are mostly developed on wireless microcontrollers with a combination of hardware's and software's on both the ends. Making this concept popular, its work varies from controlling home appliances through local networking using GSM/Bluetooth/Java to commercial building by allowing consolidated control of temperatures, aeration and illuminations. However the only limitation to this study has always been the number of inputs being provided to the system. Also if the system is being developed either by microprocessors, sensors or modems it would not only result in high installation costs but also make it impossible to access the system remotely if at all the architecture is Bluetooth based.

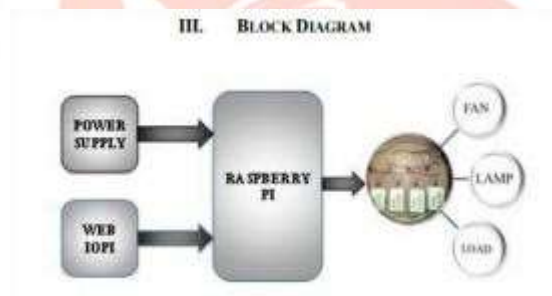
Limitations:

- Maintenance and monitoring services are expensive.
- High installation costs of system up gradation.
- Requires high level programming and understanding of computer systems.
- Privacy is at stake since the technology is mobile-apps and cloud based.

IV. PROPOSED SYSTEM

The sphere of Home Automation System has lately been evolving by researchers and students giving them a platform to run their system with low costs eg, Raspberry –Pi, Arduino and other controllers.

The end user of existing systems would want to add more of flexible amenities to run the application via android. Hence the proposed system is built with compatibility and security factors into consideration and is achieved working with android phones. The interface consists of servers and sensors easy to configure with a Wi-Fi card port which is to be inserted and acts as a web server. The system can be accessed by the web browser through a Smartphone as well as a local PC using the server IP. Wifi hence used provides a secured connection between the devices. The system provides the end users to control their devices/appliances through Smartphone thereby making the system free from wired connections. The information will however be routed through the Wi-Fi and accordingly the raspberry pi will be configured in a relay circuit as per the request from the user. The notifications can also be read through mails created by algorithms on raspberry pi.



Advantages of the proposed system

- Easily accessible and user friendly.
- High level security and authentication.
- Vendors and features can be added as requirement.
- Good range of scalability.

V. REQUIREMENTS

Hardware:

- Raspberry Pi2
- USB Wi-Fi.
- USB keyboard and mouse.
- HDMI monitor and cable.
- Micro USB power adapter (Smartphone charger).
- PIR motion sensor.
- Male-female and male-male jumpers.
- Breadboard.
- BC547 transistor.
- 5V SPDT relay and 1n4001 diode.
- LED and 220Ohm resistor.

Software:

Raspbian Os

It is a free Debian based operating system on Raspberry Pi hardware. It is a set of basic programs and utilities that make your hardware run. However it is more than just an OS which not only has APIs and packages but also a precompiled software bundled in a nice format for easy installation on your Raspberry Pi. It provides a Raspbian image which is listed as an officially supported operating system.

It is maintained by Mike Thompson and Peter Green which completed the initial build in June 2012. The operating system is still under active development.

VI.CONCLUSION

With emerging technologies where everything is reduced to computations and comforting the lives of people IoT based smart home systems help in achieving the objectives via raspberry pi. Any Smartphone device can be used to control and monitor the appliances and its respective environment. Making use of raspberry pi in this proposed system not only makes the implementation economical but also wastage of electricity and is completely less time consuming.

VII.REFERENCES

- [1] Sirsath N. S, Dhole P. S, Mohire N. P, Naik S. C & Ratnaparkhi N.S Department of Computer Engineering, 44, Vidyanagari, Parvati, Pune-411009, India University of Pune, "Home Automation using Cloud Network and Mobile Devices"
- [2] Deepali Javale, Mohd. Mohsin, Shreerang Nandanwar "Home Automation and Security System Using Android ADK" in International Journal of Electronics Communication and Computer Technology (IJECCCT) Volume 3 Issue 2 (March 2013)
- [3] Charith Perera, Student Member, IEEE, Arkady Zaslavsky, Member, IEEE, Peter Christen, and Dimitrios Georgakopoulos, Member, IEEE "Context Aware Computing for The Internet of Things: A Survey". IEEE COMMUNICATIONS SURVEYS & TUTORIAL
- [4] Charith Perera_y, Arkady Zaslavskyy, Peter Christen_ and Dimitrios Georgakopoulosy Research School of Computer Science, The Australian National University, Canberra, ACT 0200, Australia yCSIRO ICT Center, Canberra, ACT 2601, Australia " CA4IOT: Context Awareness for Internet of Things"
- [5] Bill N. Schilit, Norman Adams, and Roy Want, "Context-Aware Computing Applications"
- [6] Jayavardhana Gubbi, Rajkumar Buyya, Slaven Marusic, a Marimuthu Palaniswamia, "Internet of Things (IoT): A Vision, Architectural Elements, and Future Directions"

