

REVIEW ON SMART HOME CONTROL AND MONITOR SYSTEM

Abhijeet Rajurkar, Onkar Shinde, Vinayak Shinde, Bhushan Waghmode,
Prof. Yogesh Thorat

Computer Engineering, Dr D.Y. Patil School of Engineering
Pune, India

Abstract: *In recent years, the use of modern electronic devices has been increases rapidly so as various methods for controlling and monitoring home appliances such as ZigBee, Bluetooth, SMS. With the rapid growth in use of internet it opens all new frontiers to the Home Automation system using power of IoTs. The Proposed System does not require dedicated Java server.*

Home automation systems are collections of interconnected electronic devices for controlling different types of functions within a house, such as temperature monitoring, light control, fire sensor etc. Smart devices are ideal in providing a user friendly interface in a home automation system, due to their portability and their wide range of capabilities. Proposed system has User Friendly GUI and can be access globally from any device which has internet connectivity.

Keywords: *Smart Home, Internet of Things, Home Automation, Remote Control.*

1. INTRODUCTION

The internet of things connects smart object to the internet. IoTs linked smart object and people together and enables new form of communication between them. According to Cisco, the IoTs will consist of 50 billion devices connected to internet by 2020[6]. Building IoTs has advanced significantly in the last few years, number of smart devices and appliances connected to the Internet will increases from 99.4 million in 2011 to 2.1 billion by the year 2021, increasing at a rate of 36% per year. Anyone can connect to anything from anywhere and anytime.

The proposed paper provides a system with a GUI to monitor and control connected devices through embedded micro web server. The system GUI can be accessed by any device which has internet connectivity. The proposed system does not require a standalone java server and provide a communication protocol to monitoring and controlling the home environment with more than just ON/OFF functionality.

2. SYSTEM ARCHITECTURE

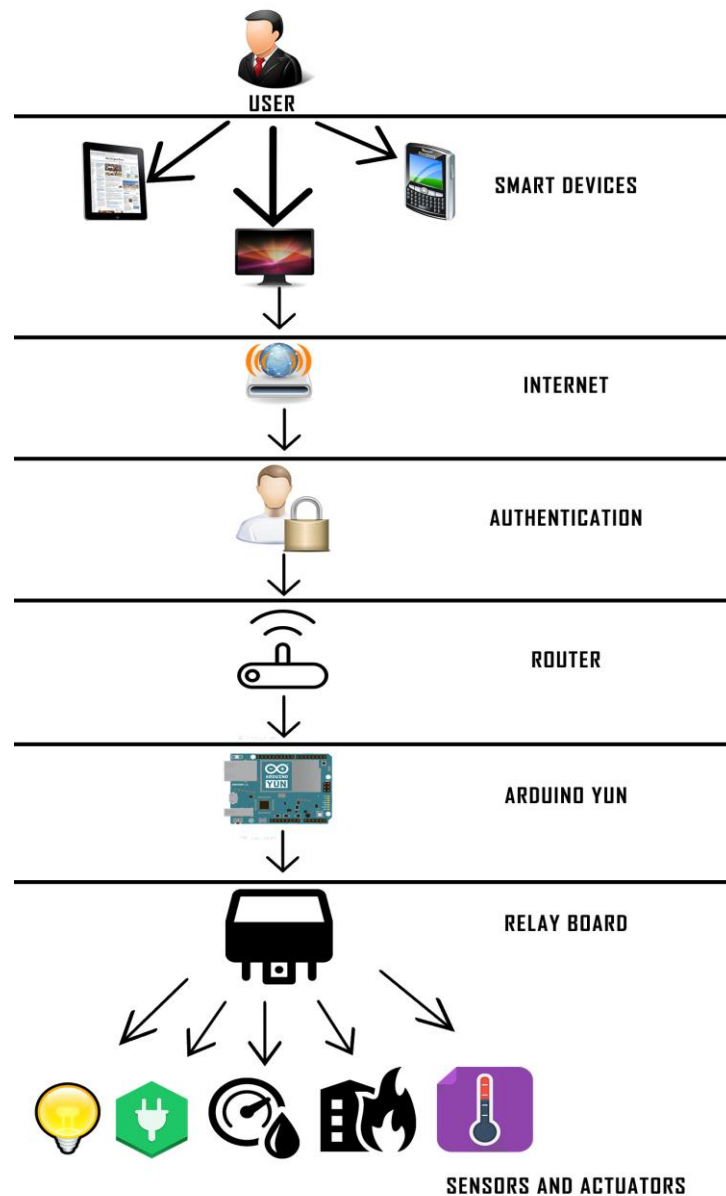


Fig.1. System Architecture

3. DESCRIPTION

The block diagram of smart home control and monitoring system as shown in Fig.1,

- 1) User will access GUI to control and monitor smart home appliances from any smart devices connected to internet.
- 2) Then user needs to enter unique user ID and password to get authorized on smart home control and monitor system.
- 3) After authorization user can able to access smart home appliances.

- 4) All sensors and actuators are connected to Arduino yun through relay board.
- 5) All sensors and actuators will collect data from environment and send it to Arduino yun. Arduino yun will process on collected information and perform operation on it.

4. RELATED WORK

Khusvinder Gill, Shuang-Hua Yang, Fang Yao,Xin Lu [2] proposed a ZigBee based implementation for home automation which was good, stand alone, low-cost and flexible. The architecture lessens the complexity of system and lower the cost of system. Hence, system does not require expensive and complex component like high end personal computer. The system is flexible and scalable, allows home appliances designed by multiple vendors, to safely and securely added to the network with minimum efforts. The system provides a ZigBee based remote control and using any Wi-Fi enabled device which support java, the administrator can monitor and control connected devices using various controls. To fulfill the household's high data rate needs, a Wi-Fi network is implemented. PAN ID is used to decide which network to join which increases its effectiveness. To join the network a request must be sent to network coordinator. The request is sent on desired network which shares the best signal with the node which can be directly to the coordinator or through a neighboring router. The coordinator permits the request permission to join the home automation network. A private key is used to encrypt the requests to join the home network and all the device communication to improve the security of the proposed system. To successfully connect to the home network devices must have correct private key.

Kwang Ye Lee', Jae Weon Choi [3] proposed a Remote-Controlled Home Automation System Via Bluetooth Home Network with a low cost and it is simple to implement in an existing home. Bluetooth was designed as a wireless technology for sharing the data between electronic devices in a short range. For home wireless networking environment the feature of Bluetooth makes it best fit. Home appliances consist of many devices interconnected different ways. Sensor modules communicate between a measured sensor value and actuators with communicating simple data collection units (I/O or a command). They basically communicate with an interface board attached Bluetooth through the PC. The device attached Bluetooth can be controlled both manually via the local switches and remotely via the server Bluetooth. The controller interface supports the browsing, the detection of network devices, context structures, and the user can interact with individual devices on the Bluetooth network. For accessing local home automation network hardware interface is used from a desktop PC with attached device module and Bluetooth module. Any computers which have internet access can be used to provide access and control services to home network.

This study was conducted with main objective to develop a remote control system over the simulations for monitoring temperature in the Bluetooth home network is performed. C++ language was used to develop the software program. The controller i.e., server Bluetooth controls device module such as a curtain, lighting, heater and air conditioner. The sensor module transmits to server, a measured sensor value as a sampling Time, Each Bluetooth is connected with an integrated device and sensor module. This method is useful to increase a Bluetooth communication compare with each sensors and devices attached with each Bluetooth module. It needs a less Bluetooth module to control many devices.

Carelin Felix, I.Jacob Raglend [4] proposed a novel, stand alone, low-cost, flexible GSM-ZigBee based home automation system. The architecture is designed to lessen the system's complexity and less fiscal costs. Hence, the system try not to incorporate complex and expensive components, such as a high end PC where possible. The system is flexible and scalable, allowing additional home appliances designed by multiple vendors, to be securely and safely added to the home network with the less efforts. The system allows administrator to monitor as well as control connected devices in the home, including a ZigBee based remote control. Users may remotely monitor their home appliances using GSM.

Sunny Home Manager [7] proposed seamless plant monitoring, smart energy management and an integrated energy management solution, the SMA Smart Home. PV plant operators will always have an overview of all energy flows in the home. Using the individualized recommended actions, they can make decisions about when to use their solar energy best. Using the SMA radio-controlled sockets, controllable loads such as washing machines can be start automatically, if necessary. Thus, the Sunny Home Manager increases the self-consumption which is an important factor in Germany.

Yoga [8] is an intelligent smart home platform that connects and interconnects anything you can think of: wired and wireless security sensors, cameras, thermostats, smart plugs, lights, entertainment systems, locks and appliances. Moreover, Yoga manages these items from anywhere and with any device possessing an internet connection. Drawbacks of Yoga System are: High Cost Equipment up to \$223 approx. Monthly subscription fee of 16\$. It is available only through licensed provider which is not available globally for most of the countries.

5. COMPARISON OF GSM,ZIGBEE,BLUETOOTH

ZigBee released in 2004 by ZigBee Alliance standardized as IEEE 802.15.4 while GSM in 1982 by European Telecommunication standards institute standardized as IEEE 802.21 and Bluetooth in 1994 by Smartlabs Inc. standardized as IEEE 802.11[5]. The communication modes of ZigBee is RF while GSM uses GSM, UMTS and LTE and Bluetooth uses RF and ISM band. ZigBee uses 128 bit AES Encryption while Bluetooth uses 64 and 128 bit encryption and GSM uses over the air encryption. ZigBee uses very low power consumption while Bluetooth uses medium power consumption and GSM uses low power consumption. ZigBee and Bluetooth operates on same frequency i.e. 2.4 GHz while GSM operates between 850-1900 MHz for 2G, and for 3G it operates in 2100 MHz.

6. OUTCOME OF THE REVIEW

The Proposed system overcomes the drawbacks and flaws of the implementation of previous technologies In Smart Home Control and Monitor System in following aspects: Proposed System supports high data transfer rate as compared to other technology. User can able to control or monitor connected home appliance globally from anywhere in the world. This architecture provides high security. This system provides user friendly GUI.A user

doesn't have to remember which buttons to press for the control of connected devices. System requires low cost.

7. CONCLUSION AND FUTURE SCOPE

The proposed system overcomes the drawbacks of the past implemented systems. In this paper we discuss about smart home control and monitor system from several aspects such as Bluetooth, ZigBee etc. Several researchers have proposed different methods for home automation. In smart home control and monitor system, IOTs perform better than Bluetooth, ZigBee, GSM and SMS. In future proposed system will be very helpful to save energy in smart way and also it will be very useful for disabled peoples to control home smartly using any smart device. This proposed system will perform vital role in making India digital. It will also contribute up to some extent in government based "Digital India" project. This project can be further extends to voice controlled feature.

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