A Review on Application of Internet of Things for Home Automation

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Abstract— Home automation or smart home also known as domotics is building automation for home. It involves control & automation of lighting, heating such as smart thermostats, ventilation, air conditioning (HVAC), & security, as well as home appliances such as washer/dryers, ovens or refrigerators/freezers. Wi-Fi is often used for remote monitoring & control. In this review paper we have discussed designing of Home Automation using Wifi within its Pros & cons. We have also discussed Automation & Industrial based Automation in this paper.

Key words: HVAC, TCP, Secruity, GSM, IoT, LAN, MAN, WAN

I. Introduction

Home automation or smart home also known as domestics is building automation for home. It involves control & automation of lighting, heating such as smart thermostats, ventilation, air conditioning & security, as well as home appliances such as washer/dryers, ovens or freezers. Wi-Fi is often used for remote monitoring & control. Home devices, when remotely monitored & controlled via Internet, are an important constituent of Internet of Things. Modern systems generally consist of switches & sensors connected to a central hub sometimes called a gateway from which system is controlled with a user interface that is interacted either within a wall escalate incurable, mobile phone software, tablet computer or a web interface, often but not always via Internet cloud services.

Automation or automatic control is use of various control systems for operating equipment such as machinery, processes in factories, boilers & heat treating ovens, switching on telephone networks, steering & stabilization of ships, aircraft & other applications & vehicles with minimal or reduced human intervention. Some processes have been completely automated.

II. Advantages & Disadvantages Of Home Automation

A. The Main Benefits of Automation are as Follow

1) Increased productivity.
2) Improved predictability of quality.
3) Improved robustness of processes or product.
4) Increased consistency of output.
5) Reduced direct human labour costs & expenses.

B. Major Disadvantages of Automation are as Follow

1) Security Risk

An automated system may have a limited level of intelligence, & is therefore some susceptible to committing issue outside of its immediate scope of knowledge.

2) Changeable development costs

The research & development cost of automating a process might top cost saved by automation itself.

3) High original cost

The automation of a latest product or plant normally needs a very large initial investment in comparison within unit cost of product, although cost of automation should be spread among some products & over time.

III. Literature Review

A. Ahmed ElShafee (2012) Design & Implementation of a WiFi Based Home Automation System

Author would be explain proposes a low cost, secure, ubiquitously accessible, auto-configurable, remotely controlled solution. The approach discussed in research is novel & has achieved target to control home appliances remotely using Wifi technology to connect system parts, satisfying user needs & requirements. Technology of wifi competent solution has show to be controlled remotely, offer home security & is cost-valuable as compared to previously traditional systems. Hence they could conclude that needed aim & objectives of home automation system have been attained. Discussed the system of design & architecture were, & prototype current basic level of home appliance control & remote monitoring has been ismplemented.

B. Faisal Baig(2013) Zigbee Based Home Appliances Controlling Through Spoken Commands Using Handheld Devices

They are explains a wireless based home automation system which could be controlled through spoken commands. In proposed architecture, wireless component is added by GSM & for home networking ZigBee technology is used. For voice command processing an application is developed & installed in mobile phone.

Home automation is a large & assorted area that engross devices as small as hotness, light & motion sensor, & as powerful as modern home appliances. In present world technology is accessible for home automation but these technologies are mismatched with each other & address only communication & physical media, objective of this work is to ease client to control appliances by two customs one is remotely via voice authority, second is using remote control to control appliances which is also an override control.

C. Syed Anwaarulla (2013) RTOS based Home Automation System using Androi

The author has introduced design & implementation of a low cost smartphone based home automation system. This system could be easily manufactured on a large scale for mass adoption owing to its simplicity & ease of design. Another advantage of is that fact that application software is based on Android, which today has largest smartphone base. With development in technology & fact that Android is free & open source, low cost Smart Phones could be used as controller in our project.

D. Thoraya Obaid(2014) Zigbee Technology & Its Application in Wireless Home Automation Systems

Wireless home automation systems have drawn considerable attentions of researchers for more than a decade. The major technologies used to implement these systems include Z-Wave, Instead, Waviness, Bluetooth, Wifi, & ZigBee. These technologies ZigBee based systems have become most useful because of its low cost & low energy consumption. There are two main parts of this research. In first part a brief introduction of ZigBee technology has been presented & in second part a survey work on Zing Bee based wireless Home automation system has been presented. The performances of ZigBee based systems have also been compared with those of other competing technologies based systems.

IV. Application of Home Automation

Heating, aeration & air conditioning it is workable to have remote control of all home power monitors over internet incorporating a simple & friendly user interface.

1) Lighting control system
2) Appliance control & integration within smart grid & a smart meter, taking advantage, for instance, of high solar panel output in middle of day to run washing machines.
3) Household security system amalgamate within a home automation system could given additional services like as remote surveillance of security cameras over Internet, or central locking of all perimeter doors & windows.
4) Leak detection, smoke & CO detectors
5) Indoor positioning systems
6) Home automation for elderly & disabled.

V. Existing Implementations

Consumer Reports found two main concerns for consumers in a review of home automation devices

1) A WiFi network connected to internet could be vulnerable to hacking.
2) Technology is still in its infancy, & consumers could invest in a system that becomes abandonware. In 2014, Google bought company selling Revolv Hub home automation system, integrated it within Nest & in 2016 shut down servers Revolv Hub depended on, rendering hardware useless.

Fig. 1: Home Automation

A. Criticism & Controversies

Home automation undergo from platform disintegration & lack of technical standards a location where diversity of home automation devices, in terms of both hardware variations & differences in software running on them, makes task of developing applications that work consistently between various inconsistent technology ecosystems hard.

B. Industrial Automation

Industrial automation is use of robotic devices to complete manufacturing tasks. In present day age of computers, it is becoming even more significant in manufacturing process because computerized or robotic machines are capable of handling repetitive tasks quickly & efficiently. Machines used in this area are also capable of completing mundane tasks that are not desirable to workers. Company could save money because it does not require to payment for luxurious benefits for this important machinery purpose.

C. Wireless Automation System

Obviously, wireless systems could come to help here. In past few years, wireless technologies reached their breakthrough. Wireless based systems used every day & everywhere, ranges from wireless home networks & mobile phones to garage door openers. As of today, little comparative research of wireless automation standards has been done, although such knowledge would provide valuable information to everyone looking for most suitable system for given requirements.

VI. Challenges of Home Automation System

Home automation systems face four main challenges these are as follow:

1) High cost of ownership: The cost of ownership is too high in case of home automation as devices required to implement such system are costly.
2) Inflexibility: Home automation system usually is dependent on hardware so there is lack of flexibility.
3) Poor manageability: As highly qualified staff is required to manage system so manageability of system is poor.
4) Difficulty achieving security: As this system are wireless & network based so there is always a threat from hackers & cracker. There fore issue of security is always there.

VII. Objective of Research Design

The main objectives of that research is to design & to implement a cheap & open source home automation system that is capable of controlling & automating most of house appliance through an easy manageable web interface to run & maintain home automation system. The new system has a great flexibility by using WiFi technology to interconnect its distributed modules to home automation server. That would decrease deployment cost & would increase ability of upgrading, & system reconfiguration. System would make use of secure wireless LAN connections between distributed hardware modules & server, & secure communication protocols between users & server.

VIII. Future Scope

Heating & air conditioning it is possible to have remote control of all home energy monitors over internet incorporating a simple & friendly user interface. This research is to design & to implement a cheap & open source home automation system that is capable of controlling & automating most of house appliance through an easy

manageable web interface to run & maintain home automation system.

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