

A Review Paper on Home Automation System Based on Internet of Things

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Abstract: The Smart homes are the fundamental blocks of Smart cities. Interestingly, there is no standard definition of Smart City in the literature and policy statements. A Smart City can be different in different geographies, say in Europe and India. In this paper, we will limit ourselves to Indian context and will follow the definitional boundaries as stated by the Government of India. There are no requirements espoused by the government to make these homes support the Smart city infrastructural features. Internet of Things (IoT) is an extension of current internet to provide communication, connection and internetworking between various devices. The IoT consists of smart machines interacting and communicating with other machines, objects, environments and infrastructures. Now a day's every person is connected to each other through communication way, where most popular communication way is internet so in another word we can say that internet which connect peoples can connect things too.

Key Words: Home automation, system, intelligent system, GSM, GPRS, IoT, Wi-Fi, Raspberry pi.

INTRODUCTION

The Internet of things can be defined as connecting the various types of objects like smart phones, personal computer and Tablets to internet which brings in a new revolution in the field of communication between things and people and also between things. With the introduction of IoTs, the research and development of home automation are becoming popular in the recent days. Many of the devices are controlled and monitored to help the human being. Additionally various wireless technologies help in connecting from remote places to improve the intelligence of home environment. An advanced network of IoT is being formed when a human being is in need of connecting with other things. IoTs technology is used to come in with innovative idea and great growth for smart homes to improve the living standards of life. Internet helps us to bring in with immediate solution for many

problems and also able to connect from any of the remote places which contributes to overall cost reduction and energy consumption.

Home automation system represents the status of the connected devices in an intuitive, user-friendly interface allowing the user to interact and control various devices with the touch of a few buttons. Some of the major communication technologies used by today's home automation system include Bluetooth, Wi-MAX and Wireless LAN (Wi-Fi), ZigBee and Global System for Mobile Communication. It offers the user complete access control of the appliances through a remote interface. Automation is the use of control systems and information technology to control equipment, industrial machinery and processes reducing the need for the human intervention.

The wide variety of potential IoT applications needs a software development environment that ties together

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the applications, the command, control and routing processing and the security of the node and system. While the importance of software in MCU solutions has increased during the past few years for MCUs supporting the IoT, even more software, tools and enablement will be needed. A broad ecosystem with easily accessible support is the key to enable the development of embedded processing nodes.



Figure 1: Remote Controlling of the Smart Home

MOTIVATION

Nowadays IoT is everywhere in the world to make the smarter world. Due to IoT we can see many smart devices around us [4]. Many people, including myself, hold the view that cities and the world itself will be overlaid with sensing and actuation and many embedded things creating what is referred to as a smart world. For example, today many buildings

already have sensors used to save energy. Home automation such as cars, taxis and traffic lights have devices to try and improve safety and transportation; people have smart phones with sensors for running many useful apps; industrial plants are connecting to the Internet; and healthcare services are relying on increased home sensing to support remote medicine and wellness. One possibility is a global sensing and actuation utility connected to the Internet. Electricity and water are two utilities that can be used for a myriad of purposes. Sensing and actuation in the form of an IoT platform will become a utility. IoT will not be seen as individual systems but as a critical, integrated infrastructure upon which many applications and services can run [5]. Some applications will be personalized such as digitizing daily life activities others will be city-wide such as efficient, delay-free transportation and others will be worldwide such as global delivery systems. In cities perhaps there will be no traffic lights and even 3D transportation vehicles.

APPLICATIONS OF IoT



Figure 2: Applications of IoT

ACCOMMODATING SMART SOLUTIONS

The Smart City features are targeted to be achieved through Area-based development in the Smart Cities [6]. These developments can be in the form of “Smart Solutions”. The strategic area based development components are city improvement, city renewal (redevelopment) and city extension. Added to these three developments, city-wide initiatives will be launched in which Smart Solutions will be covering larger parts of the city [7]. Smart solutions can be any intelligent solutions delivering common good and not restricted to the list mentioned in Table given below:

Table 1: Smart Solutions for a Smart City

Area	Applications
E-governance	Public Information, Electronic Service Delivery, Citizen Engagement, Video Crime Monitoring
Energy Management	Smart Meters & Management, Renewable Sources of Energy, Energy Efficient & Green Buildings
Waste Management	Waste of Energy & fuel, Waste water to be treated, Recycling and Reduction of Waste
Water Management	Smart Meters and Management, Leakage identification, Preventive Maintenance, Water Quality Monitoring
Others	Tele-Medicine & Tele Education, Incubation, Trade Facilitation Centre, Skill Development Centre

ARCHITECTURAL AND ENGINEERING REQUIREMENTS

Greenfield development and Redevelopment need architectural inputs and warrants more inputs from the engineering disciplines, though architectural inputs are ruled out in case of retrofitting, but the scale is expected to be less.

Table 2: Architectural Inputs for Smart Homes

Components of Smart City	Architectural Contributions
Adequate water supply	Rainwater harvesting
Assured Electric supply	Green building
IT connectivity	Zoning for better line of sight Sustainable
Sustainable Environment	Green Zone, Green Buildings
Safety	CCTV grids

PROBLEMS IN PREVIOUS RESEARCH

In Existing system such as GSM based Home automation system if GPRS connection is not available then full system will not work. Cost effective: As we know most of systems using GPRS system are expensive as compare to Wi-Fi. Data Pack requirement: Some systems are based on GPRS so for those system there is need of Data pack which need to be recharged every month. Some architecture are using Wi-Fi concept but those architecture are mostly Raspberry pi which is expensive [8]. Still home automation system is not having some basic features like automatic control of outside light. Home automation systems also don't have notification facility; in which user can easily take action according to that notification. Public utilities like

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drainage, sewerage, electricity, communication cables to be placed underground. For green field projects these must be centrally controlled. Meters for electricity, water, gas to be installed in apartments. Water meter need to be mandated in both apartments and homes.

FUTURE OBJECTIVE

As we already see that there are lots of issues in previous existing approaches. In this section we are primarily focusing on, the use of IoT for the advance, energy efficient and self learning home automation system. The main objective is to design and implement cost effective and smart home automated system. We are using Wi-Fi based approach for communication between Server and Home appliances. This smart home automated system will design with the implementation of related software and hardware [9][10]. This paper proposes an implementation of IoT (Internet of Things) based smart home automated system to remotely control the home appliances using Wi-Fi.

CONCLUSION

It is imperative that Smart homes being the fundamental block of Smart cities needs to build, modified and planned in such a way to support the Smart City features and infrastructural requirements. Except the support of individual dwelling unit it will be difficult to sustain a smart city. To make the homes, irrespective of individual stand alone duplex or complexes, the support towards Smart city should be inbuilt in design. This is only possible if there are Smart city specific building Codes developed in lines with National Building Codes or Local Urban Bodies building codes. Such codes are available internationally, which speaks only on building codes for Smart cities in European countries. While

developing the codes both architectural and engineering issues to be addressed, as Smart city features are dependent on both architectural and engineering inputs. Issues like green buildings needs regulations for both architectural and engineering side. Heating, ventilation, illumination all affect green building, so only architectural inputs will not suffice, engineering regulations are also required during the designing and approval phase. Only such mandated building codes will ensure that the required infrastructural issues are addressed in the homes and apartments creating a sustainable safe and healthy city as espoused by the Smart City initiative. In this paper, we observed what home automation is and the issues that still need to be solved. So basically we study about internet of things and did the comparative study on home automation technique. There are still lots of future scope on home automation using IoT.

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