Faculty of Engineering and Technology

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A Minor Project Report on

"IOT AUTOMATION USING THREE TIER ARCHITECTURE"

Submitted in partial fulfilment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

Submitted by

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CERTIFICATE

This is to certify that the project work titled "**IOT HOME AUTOMATION USING THREE TIER ARCHITECTURE**" is carried out by **G. VAISHNAVI (19BTREC054), A. SREE REDDY (19BTREC004), P. MANI VARDHAN (19BTREC028), P. GIRIDHAR REDDY (19BTREC025)**, Bonafide students of Bachelor of Technology at the Faculty of Engineering & Technology, JAIN DEEMED-TO-BE UNIVERSITY, Bengaluru in partial fulfillment for the award of degree in Bachelor of Technology in Electronics and Communication Engineering, during the year 2021-2022.

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DECLARATION

We, G. VAISHNAVI (19BTREC054), A. SREE REDDY (19BTREC004), P. MANI VARDHAN (19BTREC028), P. GIRIDHAR REDDY (19BTREC025)are students of sixth semester B.Tech in Electronics and Communication Engineering, at Faculty of Engineering & Technology, JAIN DEEMED-TO-BE UNIVERSITY, hereby declare that the project titled "**IOT HOME AUTOMATION USING THREE TIER ARCHITECTURE**" has been carried out by us and submitted in partial fulfilment for the award of degree in Bachelor of Technology in Electronics and Communication Engineering during the academic year 2021-2022. Further, the matter presented in the project has not been submitted previously by anybody for the award of any degree or any diploma to any other University, to the best of our knowledge and faith.

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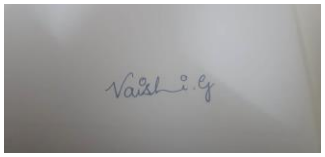

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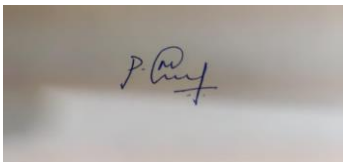

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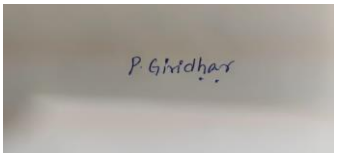

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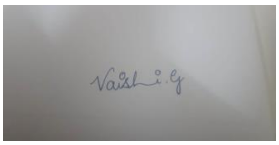
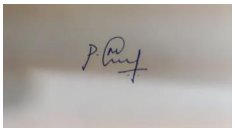
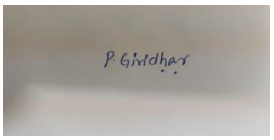
We are also grateful to our family and friends who provided us with every requirement throughout the course. We would like to thank one and all who directly or indirectly helped us in completing the Project work successfully.

Signature of Students



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ABSTRACT

Home automation trade has drawn goodish attention of researchers for quite a decade. The main attraction of any automated system is reducing human labor, effort, time and errors due to human negligence. With the development of modern technology, smart phones have become a necessity for every person on this planet. With the increase in consumption of energy and population, there is a grave need to conserve energy in every way possible. The inability to access and control the appliances from remote locations is one of the major reasons for energy loss.

Home Automation is a way to have things around your home happen automatically. The first thing that comes to mind when folks think of home automation are robots, flashing lights, complicated electronics and a general feeling that their home is less of a warm home and more of a cold science experiment. However, in most homes today, you can easily find some simple forms of automation such as: Garage door openers , Remote Controls ,Irrigation / sprinkler control systems ,Motion activated lights ,Security systems ,Programmable thermostats ,Programmable light timers If you want to keep going, you can throw in dishwasher, clothes washers and dryers, ovens, microwaves, cars, lights and switches…. The list goes on and on. You may not think of a dishwasher or light switch as home automation, but compared to washing dishes by hand and striking a match to light a candle ever time you enter a room, it's defiantly automation. However, each of these things was designed to help us do some complicated, strenuous, unpleasant, or repetitious action automatically. The term 'Home Automation' today applies to the next level of automating home electronics.

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Chapter 1

1. INTRODUCTION

Until fairly recently, automated central control of building-wide systems was found only in larger commercial buildings and expensive homes. Typically involving only lighting, heating, and cooling systems, building automation rarely provided more than basic control, monitoring, and scheduling functions and was accessible only from specific control points within the building itself.

With the advent of ‘Internet of Things’ in the last decade, we have been pushing for ubiquitous computing in all spheres of life. It thus is of extreme importance to simplify human interfacing with technology.

Automation is one such area that aims that achieve simplicity whilst increasing efficiency. Voice-controlled House Automation System aims to further the cause of automation so as to achieve the goal of simplicity.

Where home automation becomes truly "smart" is in the Internet-enabled devices that attach to this network and control it. The classic control unit is the home computer, for which many of the earlier home automation systems were designed.

Today's home automation systems are more likely to distribute programming and monitoring control between a dedicated device in the home, like the control panel of a security system, and a user-friendly app interface that can be accessed via an Internet-enabled PC, smartphone, or tablet. This paper aims to perform a survey of all the existing such systems and compare the available features.

The paper will also compare and contrast all the systems and look at their various features and disadvantages. A wide variety of options are available for home automation systems. \

Home robotization systems are collections of smart bias that enable colorful functions within a house or structure, similar as light and draw control, energy monitoring, temperature metering, air exertion and heating, etc.

1.1 Literature Survey

The concept of development of a smart home system is not an isolated case it has been existing since the term "smart house" was first coined by the American Association of House builders in 1984. Implementation of these systems will not just increase the comfort level of modern generation but also help elderly and physically disabled people.

All researchers are trying to put some handheld device (e.g., mobile or some battery-operated device) in hand on people to increase level. In the real world (outside of research labs and the homes of the rich and famous), home automation most commonly connects simple binary devices.

This includes "on and off" devices such as lights, power outlets and electronic locks, but also devices such as security sensors which have only two states, open and closed. The starting technologies that were used for automation mainly operate one or two devices also specific task can be performed with them which make them very inefficient. Home automation is verified by using the three-tier architecture i.e., client-server architecture where the output is verified using cisco packet tracer and the code is executed in eclipse where the code is written in java.

1:2 Limitation of the work

Home automation systems automate so many tasks, thus, making our lives simpler and convenient but still many tasks are there that present technology is unable to automate for instance, assembly of products that demands manual dexterity and it seems that these tasks are best left to human dexterity only. However, if you consider convenience then we hope this limitation soon vanishes and comes a day when literally everything is automated.

The architecture that is used to make home automation possible in this case will sometimes results in cascading changes, especially happens in the top-down direction. If you need to add a feature in the presentation layer, you may need to add code in both the business logic layer and the data access layer to ensure that the design is layered.

1.2 Problem Definition

In this project we are implementing IOT home automation using three tier server architecture the IOT server is connected to the DNS server from the UDP source. the home automation is constructed using three servers accordingly for the different home appliances and then the architecture is built

1.3 Objectives

- Develop a home automation system using three tier architectures
- Use different inner and outer network technologies
- Make it suitable for inexperienced users and even disabled with easy access and without any trouble
- Encourage standardization
- Make it scalable for further add ones

1:5 METHODOLOGY

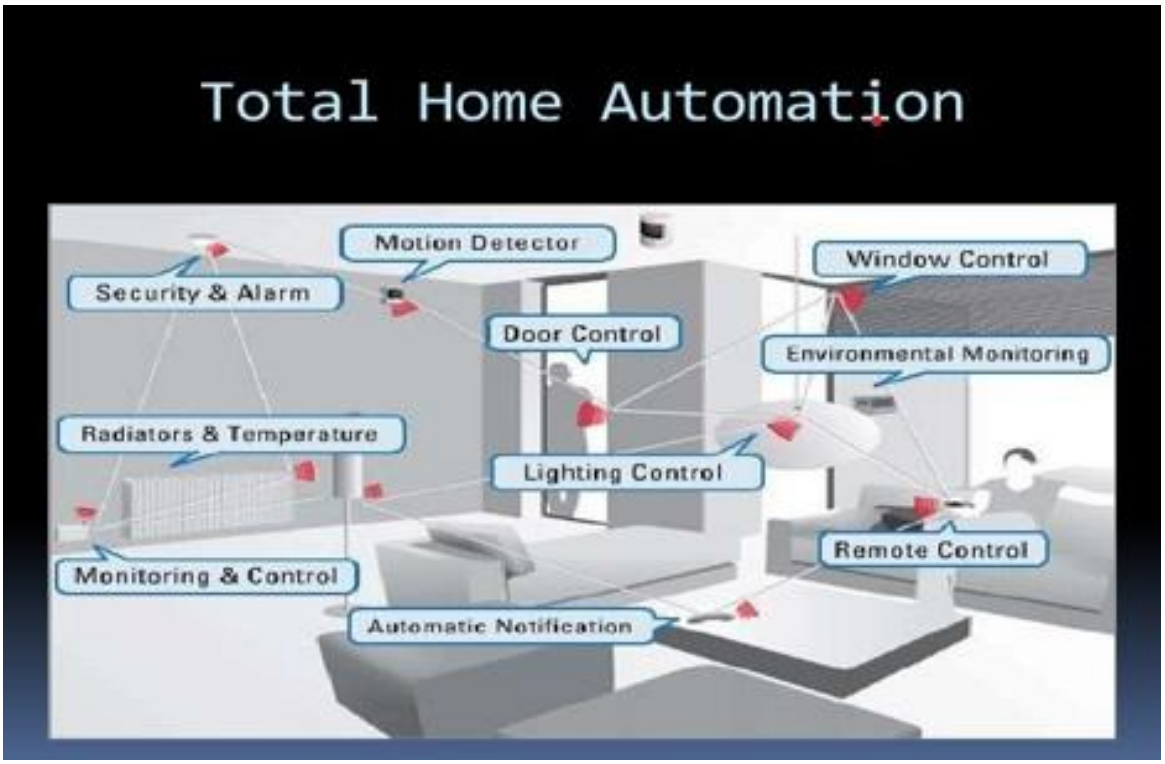


figure 1.1 home automation

Steps involved in this Simulation:

- First, we have to connect all the devices that we want to access virtually in the home via our phone or some other device or with our voice assistance etc.
- Here we use the three-tier architecture where everything is done in three layers.
- These are connected virtually in cisco packet tracer software tool which is used to connect network devices and get the output from there whether our message is been delivered to the end device which we want to control.
- Then we have to open our software that we are using, here in this case it is visual studio and simulating a code which is written in java where the output we get is been accessed by the cisco packet tracer to observe whether our devices are connected.

SOFTWARE TOOL USED:

- Visual studios
- Cisco packet tracer
- Eclipse

CHAPTER 2

2 BASIC THEORY

Home automation gives you access to control devices in your home from a mobile device anywhere in the world. The term may be used for isolated programmable devices, like smart thermostats and sprinkler systems, but home automation more accurately describes homes in which nearly everything-smart light switches, appliances, smart outlets, heating and cooling systems—hook up to a remotely controllable network.

From a home security perspective, this also includes your alarm system, and all of the doors, windows, locks, smoke detectors, surveillance cameras and any other sensors that are linked to it. Until fairly recently, automated central control of building-wide systems was found only in larger commercial buildings and expensive homes. Typically involving only lighting, heating and cooling systems, building automation rarely provided more than basic control, monitoring and scheduling functions and was accessible only from specific control points within the building itself. Home automation is a step toward what is referred to as the Internet of Things, in which everything has an assigned IP address, and can be monitored and accessed remotely.

The first and most obvious beneficiaries of this approach are smart devices and appliances that connect to a local area network, via Ethernet or Wi-Fi. However, electrical systems and even individual points, like light switches and electrical outlets, were also integrated into home automation networks, and businesses have even explored the potential of IP-based inventory tracking.

Although the day is still far off when you'll be able to use your mobile browser to track down a lost sock, home networks are capable of including an increasing number of devices and systems.

Automation

Automation is, unsurprisingly, one of the two main characteristics of home automation. Automation refers to the ability to program and schedule events for the devices on the network. The programming may include time-related commands, such as having your lights turn on or off at specific times each day. It can also include non-scheduled events, such as turning on all the lights in your home when your security system alarm is triggered. Once you start to understand the possibilities of home automation scheduling, you can come up with any number of useful and creative solutions to make your life better.

Is that west-facing window letting in too much light? Plug your motorized blinds into a smart outlet and program it to close at noon each day. Do you have someone come by at the same time each day to walk the dog? Program your home automation system to unlock the front door for them, and lock it up again when they're done.

Remote control

The other main characteristic of cutting-edge home automation is remote monitoring and access. While a limited amount of one-way remote monitoring has been possible for some time, it's only since the rise in smartphones and tablets that we've had the ability to truly connect to our home networks while we're away. With the right home automation system, you can use any Internet-connected device to view and control the system itself and any attached devices.

Monitoring apps can provide a wealth of information about your home, from the status of the current moment to a detailed history of what has happened up to now. You can check your security system's status, whether the lights are on, whether the doors are locked, what the current temperature of your home is and much more. With cameras as part of your home automation system, you can even pull up real-time video feeds and literally see what's going on in your home while you're away.

Even simple notifications can be used to perform many important tasks. You can program your system to send you a text message or email whenever your security system registers a potential problem, from severe weather alerts to motion detector warnings to fire alarms. You can also get notified for more mundane events, such as programming your smart lock to let you know when your child returns home from school.

The real hands-on control comes in when you start interacting with the home automation system from your remote app. In addition to arming and disarming your security system, you can reprogram the scheduling, lock and unlock doors, reset the thermostat and adjust the lights all from your phone, from anywhere in the world. AS manufacturers are creating more and more smart devices and appliances all the time, the possibilities for home automation are virtually limitless.

Home automation components

What kinds of things can be part of a home automation system? Ideally, anything that can be connected to a network can be automated and controlled remotely. In the real world (outside of research labs and the homes of the rich and famous), home automation most commonly connects simple binary devices.

This includes "on and off" devices such as lights, power outlets and electronic locks, but also devices such as security sensors which have only two states, open and closed. Where home automation becomes truly smart is in the Internet-enabled devices that attach to this network and control it. The classic control unit is the home computer, for which many of the earlier home automation systems were designed.

Today's home automation systems are more likely to distribute programming and monitoring control between a dedicated device in the home, like the control panel of a security system, and a user-friendly app interface that can be accessed via an Internet-enabled PC, smartphone or tablet. Manufacturers have produced a wide variety of smart devices, many of which are full of innovative features but few of which offer the kind of integration needed to be part of a complete home automation system. Much of the problem has been that each manufacturer has a different idea of how these devices should be connected and controlled.

So, while you may have a smart TV, washing machine, refrigerator, thermostat, coffee maker or any of the other Internet-ready household devices on the market, the end result is usually a separate control scheme for each device. IN the near future, home automation may be standardized to let us truly take advantage of all of these additional possibilities. For the time being, the home security providers that specialize in home automation have focused on the most critical and useful parts of a connected home.

At a basic level, this means the doors and windows and environmental devices (thermostat, smoke detectors, temperature, humidity, fire and carbon dioxide sensors) that keep you safe and comfortable. For additional real-time security, convenience and control, home automation systems from security providers should also include options for video cameras. With the best systems, you'll also be able to include lights and individual electrical outlets into your home automation package.

Energy efficiency

One clear advantage of home automation is the unmatched potential for energy savings, and therefore cost savings. Your thermostat is already smart in the sense that it uses a temperature threshold to govern the home's heating and cooling system. IN most cases, thermostats can also be programmed with different target temperatures in order to keep energy usage at a minimum during the hours when you're least likely to benefit from the heating and cooling.

At the most basic level, home automation extends that scheduled programmability to lighting, so that you can suit your energy usage to your usual daily schedule. With more flexible home automation systems, electrical outlets or even individual devices can also be automatically powered down during hours of the day when they're not needed. As with isolated devices like thermostats and sprinkler systems, the scheduling can be further broken down to distinguish between weekends and even seasons of the year, in some cases.

Set schedules are helpful, but many of us keep different hours from day to day. Energy costs can be even further reduced by programming "routines" into the system and controlling it remotely whenever needed. IN other words, you could set up a "coming home" event that turns on lights and heating as you're driving home after work, for example, and activate it all with one tap on your smartphone. An opposite "leaving home" event could save you from wasting energy on forgotten lights and appliances once you've left for the day.

CLIENT SERVER TECHNOLOGY

Client-Server In the information technology, client-server is a system architecture model consisting of two parts, client systems, and server systems, both communicating over a computer network. A client-server application is a category of a distributed system made up of both client and server software. The client server application provides an enhanced way to share the workload. The client process continuously launches a connection to the server, while the server process still expects for requests from any client. A client is a computer hardware device with software that accesses a service made available by a server.

A server is a computer, a dedicated software run on it and provide services to serve the needs of other machines. Depending on the service that is running, it could be a file server, database server, home media server, print server, web server, or even cloud servers that holding virtual machines. The client-server model explained how a server provides services and resources to one or more clients. Each of these servers provides response to client devices, such as laptop, desktop, tablets, or Smartphone. Generally, a one-to many relationships exists between server and clients, meaning a single server can supply internet resources to multiple clients at a single time.

When a client requests a link to a server, the server can either accept or reject the link. If the link is allowed, the server establishes and maintains a connection with the client over a specific protocol. Client-server architecture The client-server architecture categorized into four types: -.One tier architecture, two-tier architecture, three-tier architecture, and N-tier architecture.

One tier application or standalone application has all the layers such as presentation, business, and data access layers in a single software package. Applications which handle all the three tiers such as MP3 player, MS Office comes under one tier application. Two-tier architecture application architecture is divided into two parts client application (client tier) and database (data tier). Client system handles both presentations, and application layers and server system handle the database layer.

It is also known as a desktop-based client-server application. The communication takes place between the client and the server. The client device sends the request to the server and the server processes the request and, sends back the request data to the client system.

Three tier architecture or web-based application architecture is divided into three parts the presentation layer (client tier), the application layer (business tier), and a database layer (data tier). Client system handles the presentation layer, and the application server manages the application layer, and the database server system handles the database layer. Another layer is N-tier application. N-tier application distributed the application. It is similar to three-tier architecture, but the number of application servers is increased and represented in individual tiers to distribute the business logic so that the logic will be distributed.

The above figure describes about the three-tier client and server architecture. Components of the client-server system divided into two major categories: - physical and logical components described in the above table.

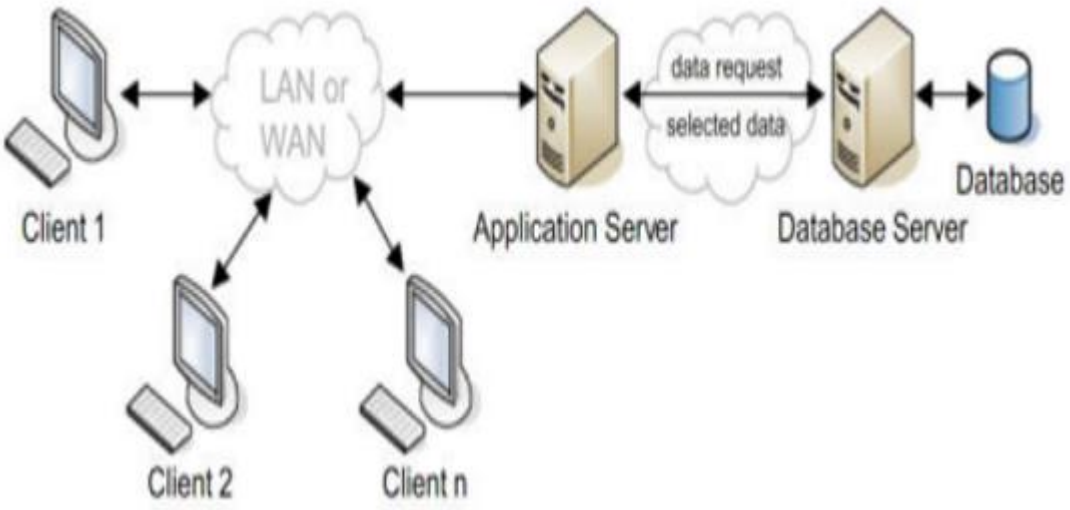


Figure 2.1 for client server technology

Physical Components	Server Device, Client Device, Network, Input/ Output Device, Power supply Web Server, Database Server, Application Server, Proxy Server.
Logical Components	Program (HTML, Script), Session time, Weblog, Cookies, Ports, Protocol (TCT/IP, http, https, FTP, SSL, TSL, SMTP, POP) API (JDBC, ODBC) Database (RDBMS, SQL, NoSQL)

Table 2.2 is components and example

Client: A client application is a process or program that sends a job request to a server via the communication network. Those jobs request the server to perform a particular task, such as looking up a record in a database or returning a portion or customized report. Examples of clients are a web browser, thin client, remote desktop, emulator, front-end application, mobile app, etc.

Server: The server is a collection of the programmer, listens for client requests that are transmitted via the communication network. Servers perform actions such as database queries or reading files. Server processes typically run-on dominant PCs, workstations or mainframe computers.

Web server: A web server is a particular type of server that delivers services or content to client computers. A web server is a server with a server operating system and assists http or https communication. A web server is also recognized as an internet server.

Some web servers are Apache, Microsoft's Internet Information Server (IIS), Novell's NetWare server, Google Web Server (GWS), and IBM's Domino servers.

Application server: An application server is a component-based product that resides in the middle-tier of a server-centric architecture. The application server provides middleware services for state maintenance and security, along with data access. Java application server on of example, it is based on the Java 2 Platform, Enterprise Edition (J2EE) is one of an examples of the application server**.**

Database Server: A database server is a type of server that provides services related to accessing and retrieving data from a database. Generally, RDBMS, Data files installed here and data can assess using ODBC or JDBC APIs.

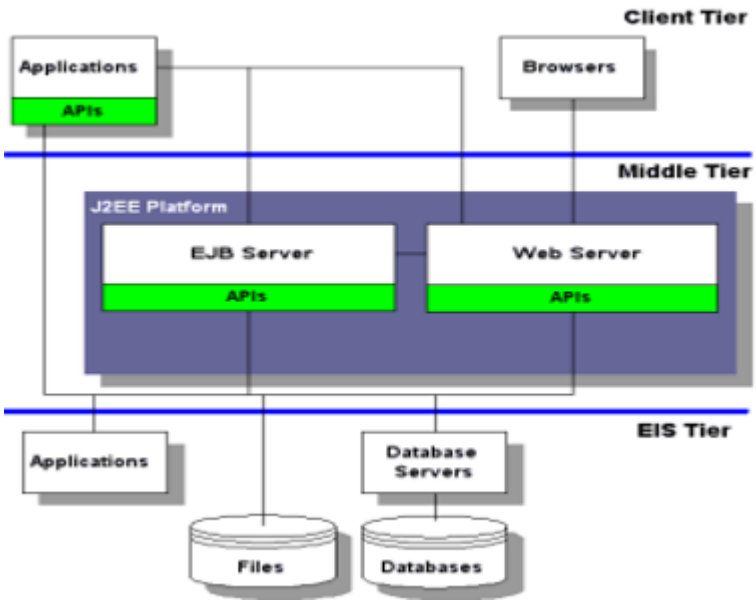


Figure 2.3 for representation of teirs

Three-Layer IoT Architecture

The most basic architecture associated with the IoT is known as a “three-layered” architecture. Introduced in the early stages of research into this topic, it consists of the perception, network, and application layers.

The Perception Layer – This is the physical layer. It has sensors for finding and gathering information about an environment, including the ability to identify other smart objects.

The Network Layer – This layer is responsible for actually connecting to other smart objects, including servers, network devices, and more. It can also transmit and process sensor data.

The Application Layer – This layer is responsible for actually providing application-specific services to the user. It does so by defining ways for the IoT to be deployed, such as in smart homes or smart cars.

The three-layer architecture outlined above defines much of what you can find on the Internet of Things. That said, it does not provide suitable insight into researching the IoT. This is a big reason behind proposing some other

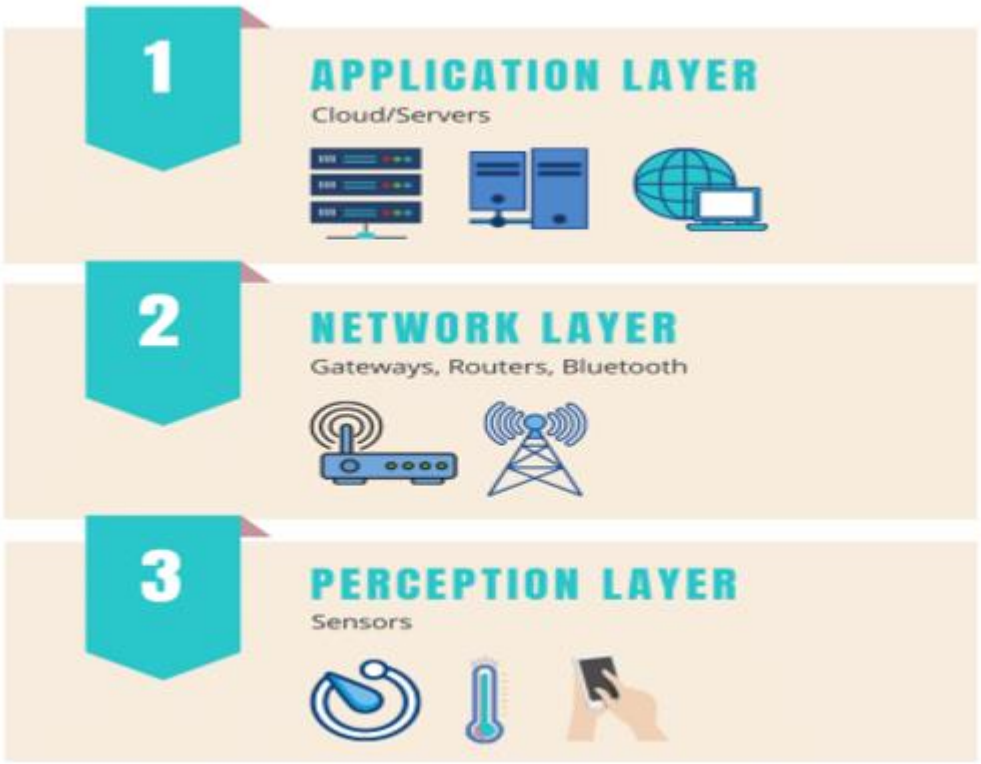


Figure 2.4 is the three layer architecture

The Perception Layer

Also known as the sensor layer, this layer acts much like a person's eyes, nose or ears would. It is responsible for identifying objects and collecting information from them using RFID, 2-D barcodes, and other types of sensors. Data collected by these sensors can include everything from motion and location info to changes in the air or environment**.**

These sensors are a popular target among attackers, whose goal is often to replace them with a sensor of their own. Common security threats associated with the perception layer include:

Eavesdropping – This is an unauthorized attack that takes place in real-time. During this attack, private communications such as phone calls, text messages, video conferences, and faxes are seized by the attacker. This data is ultimately intercepted over a network, which may or may not is secured.

Node Capture – This is one of many harmful attacks that can affect the perception layer of IoT devices. Through node capture, an attacker can gain full control over a key node, such as a gateway node. This allows the attacker to leak a variety of communications between the sender and receiver while gaining access to information stored in the device's memory.

Fake Node and Malicious – This is when an attacker adds a node to a system that is designed to input fake data. This attack aims to stop the node from transmitting real information, consuming energy from authentic nodes, and potentially destroying the network.

Replay Attack – Also referred to as a "playback attack," this is where an attacker eavesdrops on a conversation between a sender and receiver and steals information from the sender. They then send this information to the victim in an attempt to prove their authenticity or as "proof" of their identity. Once they've assumed the real sender's identity, they can then entice the recipient to perform any number of actions.

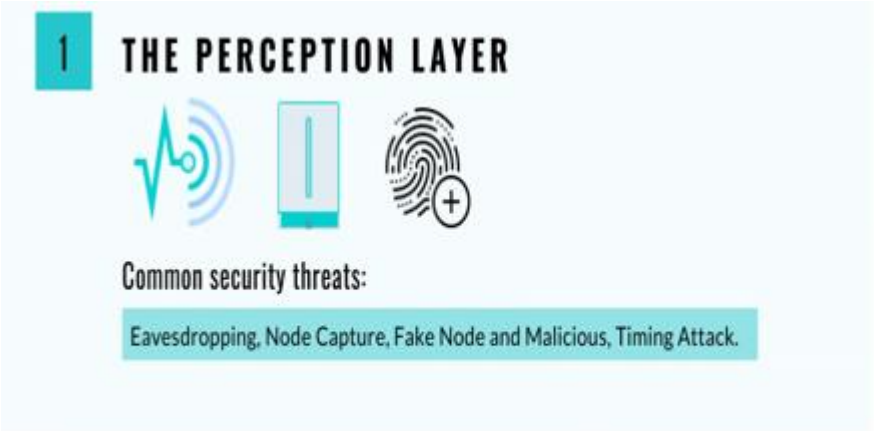


Figure 2.5 perception layer

The Network Layer

Also commonly referred to as the “transmission layer,” the network layer acts as a sort of bridge between the application and perception layers. Typically, it carries and/or transmits data collected by the sensors via wired or wireless means. It is also responsible for connecting the various “smart” items, networks, and network devices to one another. This causes it to suffer from many security issues related to information authentication and integrity.

Common security threats associated with the network layer include:

Denial of Service (DoS) Attack – DoS attacks attempt to prevent users from accessing their devices or other network resources. It is most often accomplished by flooding targeted devices with so many requests that it becomes impossible for users to actually filter them.

Main-in-The-Middle (MiTM) Attack – MiTM attacks take place when a third-party intercepts and then alters communications between a receiver and a sender, changing the messages to suit their own needs. This signifies a major security breach, as it allows the attacker to manipulate information in real-time.

Storage Attack – A user’s information is usually only stored in the cloud or in various storage devices. Both of these can be attacked by outsiders, with users changing information at will. Data can also be replicated in order to facilitate any number of other attacks.

Exploit Attack – This is where an attacker takes advantage of security weaknesses in a system, application, or hardware. The goal is most often to steal information stored on a specific network.

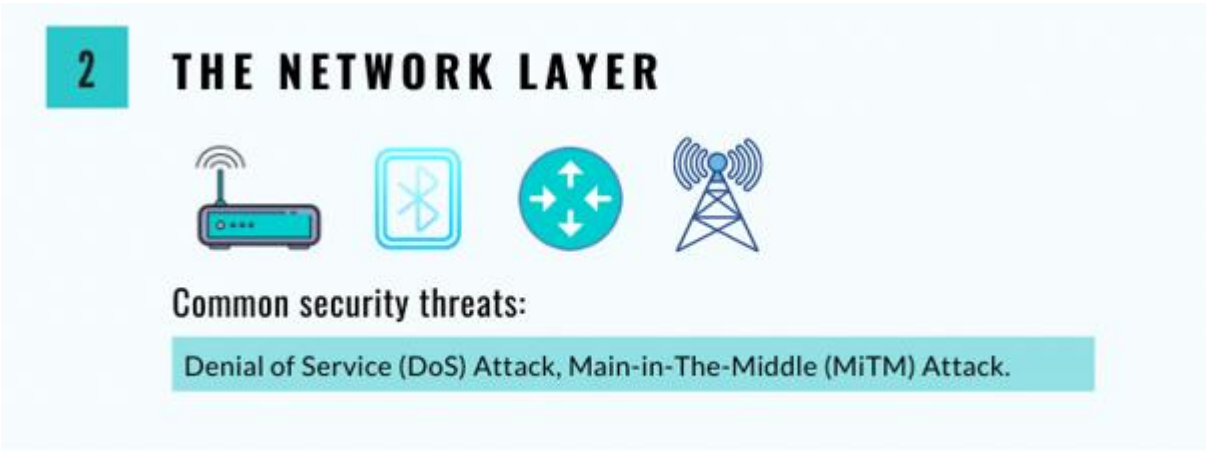


Figure 2.6 network layer

The Application Layer

The Application layer defines all of the applications that utilize IoT technology or in which the IoT is deployed. This includes smart homes, smart cities, etc. Its goal is to provide services to the various applications as demanded by the sensory information. The application layer suffers from various security issues, particularly in the cases of smart homes and smart offices. This is especially true of smart devices that have weak computational power and low storage capabilities.

Common security threats associated with the application layer include:

Cross-Site Scripting – This is an injection attack that enables a third party to insert a client-side script in a trusted site. This eventually allows the attacker to change the application's contents according to their needs or to use the original data illegally.

Malicious Code Attack – This is code embedded in software designed to cause damage to the system. It is extremely common and can often be blocked by antivirus or anti-malware programs.

Figure 2.7 Application layer

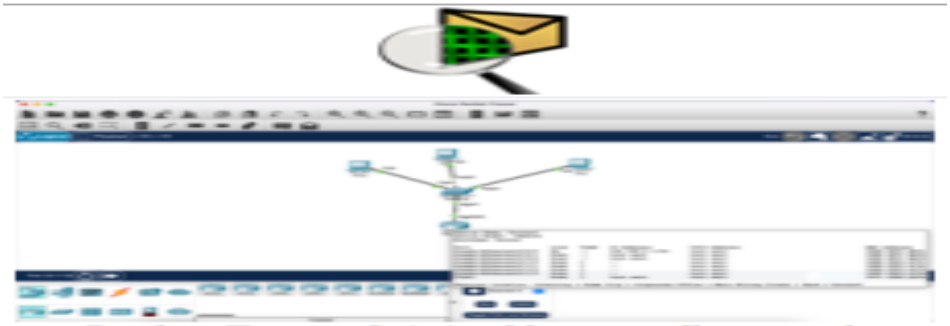
CHAPTER 3

3 TOOL DESCRIPTION

CISCO PACKET TRACER

Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

The software is mainly focused towards Cisco Networking Academy students as an educational tool for helping them learn fundamental CCNA concepts. Previously students enrolled in a CCNA Academy program could freely download and use the tool free of charge for educational use.



Packet Tracer 8.1.1 with a small network configured

Developer(s)	Cisco Systems
Stable release	8.1.1[1] / January 2022[1]
Operating system	Linux, Android 4.2+, iOS 8+, Microsoft Windows, macOS[2]
Platform	Windows, Linux, Android (operating system), iOS, macOS[2]
Size	305 MB on Linux, 225 MB on Windows, 256 MB on macOS
Available in	English
Type	Network simulation
License	Proprietary
Website	www.netacad.com /courses/packet-tracer (https://www.netacad.com/courses/packet-tracer)

figure/table 3.1 of cisco packet tracer

Similar Android and iOS apps are also available. Packet Tracer allows users to create simulated network topologies by dragging and dropping routers, switches and various other types of network devices. A physical connection between devices is represented by a 'cable' item. Packet Tracer supports an array of simulated Application Layer protocols, as well as basic routing with RIP, OSPF, EIGRP, BGP, to the extents required by the current CCNA curriculum.

As of version, Packet Tracer also supports the Border Gateway Protocol. In addition to simulating certain aspects of computer networks, Packet Tracer can also be used for collaboration. As of Packet Tracer, Packet Tracer supports a multi-user system that enables multiple users to connect multiple topologies together over a computer network. Packet Tracer also allows Contents Overview instructors to create activities that students have to complete. Packet Tracer is often used in educational settings as a learning aid. Cisco Systems claims that Packet Tracer is useful for network experimentation.

VISUAL STUDIOS

Visual Studio Tools for Applications was announced by Microsoft with the release of Visual Studio 2005. The first Community Technology Preview (CTP) of Visual Studio for Application was released in April 2006. Version 1.0 was released to manufacturing along with Office 2007.Visual Studio Tools for Applications 2.0 is the current version.

VSTA is included with Microsoft Office 2007 for use by end-users and business application developers, and the SDK is available separately for ISVs.It is however integrated in Microsoft InfoPath only, as other applications in the suite use Visual Basic for Applications instead. Visual Studio Tools for Applications (VSTA) is based on the .NET Framework and is built on the same architecture as Visual Studio Tools for Office (VSTO).

Visual Studio 2005 Tools for Applications is based on the .NET 2.0 framework and Visual Studio 2005, while Visual Studio Tools for Applications v 2.0 is based on the .NET 3.5 SP1 framework and Visual Studio 2008. Some of the technology developed for Visual Studio for Application (VSA) was incorporated within Visual Studio Tools for Applications.

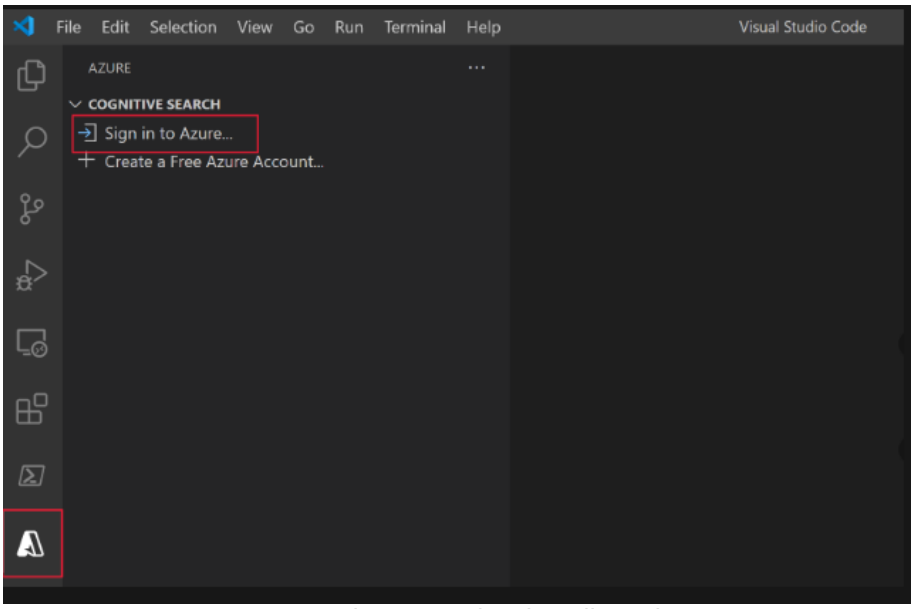


Figure 3.2 visual studio code

CHAPTER 4

4 IMPLEMENTATIONS

Software Design and Implementation

Writing and simulating the code:

Client side implementation :

```
// Java program to illustrate Client-side
// Implementation using DatagramSocket
import java.io.IOException;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
import java.net.InetAddress;
import java.util.Scanner;
public class udpBaseClient
{
public static void main(String args[]) throws IOException
{
Scanner sc = new Scanner(System.in);
// Step 1:Create the socket object for
// carrying the data.
DatagramSocket ds = new DatagramSocket();
InetAddress ip = InetAddress.getLocalHost();
byte buf[] = null;
// loop while the user not enter "bye"
while (true){
```

```
String inp = sc.nextLine();
// convert the String input into the byte array.
buf = inp.getBytes();
// Step 2: Create the datagram packet for sending
// the data.
DatagramPacket DpSend =
new DatagramPacket(buf, buf.length, ip, 1234);
// Step 3: invoke the send call to send
// the data.
ds.send(DpSend);
// break the loop if the user enters "bye"
if (inp.equals("bye"))
break;
}
}
}
```

Output

Hello

I am client

……

bye

Server-side implementation:

```
// Java program to illustrate Server side
// Implementation using DatagramSocket
import java.io.IOException;
import java.net.DatagramPacket;
import java.net.DatagramSocket;
import java.net.InetAddress;
import java.net.SocketException;
public class udpBaseServer_2
	{
	public static void main(String[] args) throws IOException
	{
	// Step 1 : Create a socket to listen at port 1234
	DatagramSocket ds = new DatagramSocket(1234);
	byte[] receive = new byte[65535];
	DatagramPacket DpReceive = null;
	while (true)
	{
	// Step 2 : create a DatgramPacket to receive the data.
	DpReceive = new DatagramPacket(receive, receive.length);
	// Step 3 : revieve the data in byte buffer.
	ds.receive(DpReceive);
	System.out.println("Client:-" + data(receive));
	// Exit the server if the client sends "bye"
	if (data(receive).toString().equals("bye"))
```

```
{
System.out.println("Client sent bye.....EXITING");
break;
}
// Clear the buffer after every message.
receive = new byte[65535];
}
}
// A utility method to convert the byte array
// data into a string representation.
public static StringBuilder data(byte[] a)
{
if (a == null)
return null;
StringBuilder ret = new StringBuilder();
int i = 0;
while (a[i] != 0)
{
ret.append((char) a[i]);
i++;
}
return ret;
}
}
```

Output

Client: hello

Client: I as client

……

Client bye

Client sent bye…. Existing

CISCO PACKET TRACER :

EXPECTED OUTPUT :

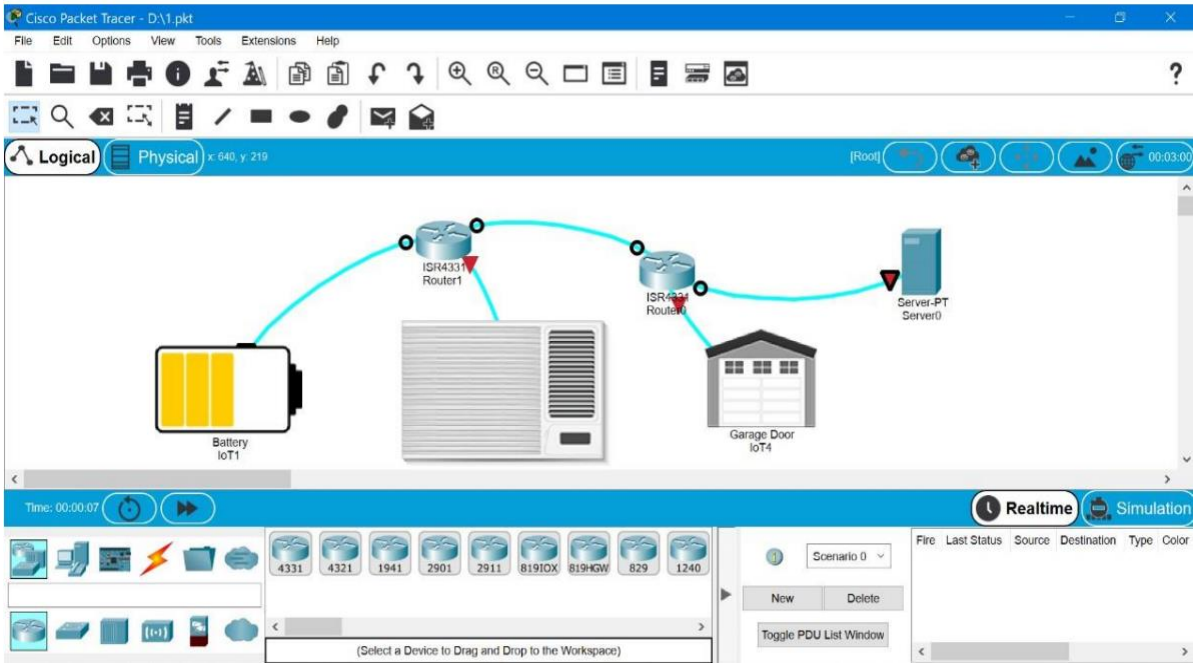


Figure 3.3 expected output

Chapter 5

5.1 RESULTS AND DISCUSSION

This paper also gives a brief idea of home automation systems described. All these systems use a basic underlying communications technology. The advantages and drawbacks of the system derive from this underlying technology. All the systems have a control circuitry that is used to interface with the electrical appliances. There has to be a common command system that will be used to issue commands to the control circuits. The next important feature of the system is the user interface.

This determines how the user will interact with the system and extent of control the user exerts over the system. This influences the usability of the system. Most systems also have security features to ensure only authorized access. Wireless automation systems can use a host of wireless communication techniques. Certain bands of the spectrum are in demand while the unlicensed bands are used by many other applications.

There is the possibility of interference. This compromises the security of the system. Many systems exist that use a combination of the methodologies to compensate for the drawbacks of each. Such a composite implementation can lead to sound systems. The only thing that may affect such systems is the cost of the systems and the possibility of redundancy.

5.2 CONCLUSIONS AND FUTURESCOPE

n this project, a simple demo of home automation system based on the three tier architecture devices are design and implemented. Both client server architecture is supported. The result is not good enough because of the three-tier architecture used is not showing the proper output as it is complex to implement. However, this is still a quite promising standard in home automation. The regular user might not be able to feel the difference between, but for the system administrator and the software programmer, it simplifies the work since there are tons on existed tools can be used.

In the future, new architecture or technology along with the device's application protocol stack will be design to provide more stability. It will be easier to integrated the device into the system with own protocol stack and improve the performance. Meanwhile, more work in home automation can be studied. This project work only uses the three-layer architecture as its base. There are other features of the architecture that can be studied and used in home automation system design and implement.

In the present study, we explained the client-server system and its various components; Client-server architecture, physical and logical components of client-server architecture, implementation plan. We also enlightened some real-life examples of client-server. In present circumstances performance, reliability, trusted system design and secure system development are some area emerging fields for research and development.

REFERENCES

- R. Al-Ali and M. Al-Rousan. Java-based home automation system. IEEE Transactions on Consumer Electronics, 50(498-504), 2004.

- Fang Yao Xin Lu Khusvinder Gill, Shuang-Hua Yang. A zigbee-based home automation system. IEEE Transactions on Consumer Electronics, (422-430), 2009.
- S. Ok and H. Park. Implementation of initial provisioning function for home gateway based on open service gateway initiative platform. The 8th International Conference on Advanced Communication Technology, (1517- 1520), 2006.
- Novi Sad Serbia ; Mrazovac B. ; Teslic N. ; Papp I. Bjelica, M.Z. ; RTRK Comput. Based Syst. Cloud-enabled home automation gateway with the support for upnp over ipv4/ipv6 and 6lowpan. Consumer Electronics (ICCE), 2012 IEEE International Conference, (520-521), 2012.
- Jafar Saniie Thomas Gonnot. User defined interactions between devices on a 6lowpan network for home automation. Technology Management Conference (ITMC), 2014 IEEE International, (1-4), 2014.
- Mohamed Abd El-LatifMowad, Ahmed Fathy, Ahmed Hafez "Smart Home Automated Control System Using Android Application and Microcontroller" International Journal of Scientific & Engineering Research, Volume 5, Issue 5, May-2014 ISSN 22295518 .
- Obaid, T. et al. 2014. "ZIGBEE BASED VOICE CONTROLLED WIRELESS SMART HOME SYSTEM", International Journal of Wireless & Mobile Networks (IJWMN), Vol. 6, No. 1, Pg. 47-5.
- Rosslin John Robles1 and Tai-hoon Kim1" Applications, Systems and Methods in Smart Home Technology: AReview" International Journal of Advanced Science and Technology Vol. 15, February, 2010.pp 37-47.
- Sook-Ling Chua and Stephen Marsland and HansW. Guesgen" Beha viour Recognition in Smart Homes Sook" Proceedings of the TwentySecond International Joint Conference on Artificial Intelligence 2011.
- Alheraish, "Design and Implementation of Home Automation System", 2004, IEEE Transactions on Consumer Electronics ,Vol. 50(4) , pp. 1087-1092.
- M.Van Der Werff, X. Gui and W.L. Xu, "A Mobile based Home Automation System, Applications and Systems", 2005, 2nd International Conference on Mobile Technology, Guangzhou, pp.5.
- Mahesh.N.Jivani, "GSM Based Home Automation System Using App Inventor for Android Mobile Phone", 2014, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering,Vol. 3(9), pp. 12121-12128.
- S.R.Bharanialankar, C.S.Manikanda Babu, "Intelligent HomeApliance Status Intimation Control and System Using GSM", 2014, International Journal of Advanced Research in Computer Science and Software Engineering, Vol. 4(4), pp.554 - 556.
- Rozita Teymourzadef, Salah Addin Ahmed, Kok Wai Chan, Mok Vee Hoong, "Smart GSM Based Home Automation System", 2013, IEEE Conference on Systems, Process & Control, Kuala Lumpur, Malaysia, pp.306 - 309.
- R.Piyare,M.Tazil, " Bluetooth Based Home Automation System Using Cell Phone", 2011 ,IEEE 15th International Symposium on Consumer Electronics, Singapore, pp. 192 - 195.
- Home Automation System via Bluetooth Home Network", 2003, SICE Annual Conference, Fukui, Vol. 3, pp. 2824 - 2829.
- H. Brooke Stauffer "Smart Enabling System for Home automation", 1991, IEEE Transactions on Consumer Electronics, Vol. 37(2) , pp. 29-35.
- Eddie M C Wong, "A Phone Based Remote Controller for Home and Office Automation", 1994, IEEE Transactions on Consumer Electronics, Vol. 40(1), pp. 28-34.

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