#### **RESEARCH ARTICLE**

OPEN ACCESS

# Designing and Implementing Smart Home Using Packet Tracing Tool

# Raghu Ram Chowdary Velevela<sup>[1]</sup>, Dr. Adilakshmi Yannam<sup>[2]</sup>

<sup>[1]</sup> M.Tech Student, <sup>[2]</sup> Associate Professor, Dept. of Computer Science & Engineering, Gudlavalleru Engineering College, Gudlavalleru, Andhra Pradesh - India

# ABSTRACT

Technology plays a major role in all daily activities of the present day. The necessity for the development of technology is to lead human life more comfortable. A home with up-to-date technology is known as smart home that uses currently released IoT for automation. Internet is used to connect this IoT device that allows distant monitoring and controlling of different home appliances like Air Conditioner, Sprinklers, Furnace, Smart Window etc. This can be implemented effectively using a packet tracing tool known as Cisco Packet Tracer as it offers a variety of network components that represent a real network and also allows us to configure the devices. The latest version 8.0 was used because it supports major programming languages like Python, Blocky Programming, Java Script and also supports home security features as well. The IoT smart devices are directly connected to the ports of home gateway and end devices are used for communication. This paper deals with designing and implementing smart home using Packet Tracer version 8.0.

*Keywords:* - IoT technology, home gateway, Internet of Things, IoT server, IoT monitor, Cisco Packet Tracer, Smart devices, DNS server, Smart home.

## I. INTRODUCTION

A home that includes IoT smart objects to improve activities at home in advance and also performs automating activities without users involvement, such monitoring can be condition by different types of the sensors then ventilate based on the sensor information is called smart home, aimed to provide comfort, efficiency and to improve safety[1], [2]. Smart home provides different functions rather than providing safety, it mainly provides more automate security by using various alarm systems like siren, sending alert to the user if an issue is detected by the sensors[3]. By including various sensors in smart home system we can eliminate user involvement in tracking and operating home appliances. All smart devices are registered under the home gateway and are operated through end devices by a legitimate user[4].

The term IoT is the new Internet revolution. It was first announced in 1998 and Kevin Ashton coined the term IoT in 1999[5]. Haller et al[6] defined Internet of Things as "A place where physical things are integrated seamlessly into information network and the physical things can become active in the business process." The present Internet of Things has a capacity to depict various gadgets and sensors to interface with the web.



Fig 1.1 Concept of smart home

# **II. LITERATURE REVIEW**

Alexandria Al-oisi in 2014 considered the connection among WSNs (wireless sensor network) and Internet of Things from ACOAP transport interconnection objects. This standard gives similarity among the interconnection of things and the remote sensing system. For doing this, the primary step is the familiarity on IOT and how sensors can be connected for collecting information taking into account of smart campus. For implementation it uses COAP (communication constrained protocol).

Ahmed Abdi conducted research on IoT in 2018 and initiated the proposal of smart university that uses technology in implementing a campus that can be simplified by replacing the campus components with the smart devices. Cisco packet tracer was utilized for designing the smart office that can be controlled by the staff with the help of their smart phones. Here the gateway allows the connection among the smart office and internet by using cloud. The main motive of this study is to enhance university in a smarter way and to enable sensors and link all devices to the network for controlling. It also permits association of sensors with devices for high standard and technology based architecture in the university (Abdi, 2018) (Marian, 2015).

Miluzzo Choudhury and A. T. Campbell carried a survey on sensors in mobile phones in 2010. The smartphone consist many built-in sensors like motion, GPS, light and sensors used for measuring pressure, humidity and temperature that can be used in many regions of IOT applications. Smart phones are mainly used for controlling IoT devices (Nicholas D. Lane, Emiliano Miluzzo, Hong Lu, Daniel Peebles, Tanzeem Choudhury, & Andrew T. Campbell, 2010) (ALFarsi, Jabbar, & ALSinani, 2018) (AlFarsi & ALSinani, 2017).

Yin Jie et al proposed the idea of smart home in 2013. He introduced architecture in which we can integrate many applications through the interface. RFID tags are used to ease the transmission among the devices. Primary issues correlated to smart home to be resolved are also involved in this research (Jie, Pie, Jun, Yun, & Wei, 2013).

Jetendra Joshi et al proposed an IoT based smart home that can access, control and monitor multiple devices by using web server from any location and at any time. For monitoring home appliances Arduino and Raspberry and was integrated with Nrf modules. The results and alarms of threats to the user are sent through web server (Jetendra, et al., 2017)

# **III. METHODOLOGY**

For implementing smart home, Cisco Packet Tracer 8.0 variant is utilized that include IoT device with classically networking device [7] [8]. Smart home is created by using the test system which consists of brilliant gadgets, IOT server, DNS server, IOT cloud, cell tower, central office server, ISP server, switches, link modem and end devices. There are two servers Internet of Things server and Domain Name server. The IOT server stores all the recognized data from the working environment and gives customers an endorsed access to the advantages by entering username and password.

#### **3.1 Conceptual Framework**

The layout design of smart home prototype is designed on My Sweet Home 3D software based on the requirements. The prototype design includes master bedroom, bedroom 1, bedroom 2, toilet 1, toilet 2, kitchen, living room, and a porch.



Fig 3.1(a) Smart Home 2D Plan



Fig 3.1(b) Smart Home 3D View



Fig 3.1(c) Smart Home 3D Front View



Fig 3.1(d) Smart Home 3D Top View



Fig 3.1(e) Smart Home 3D Left Side View



Fig 3.1(f) Smart Home 3D Right Side View

# 3.1.1 Algorithm

# Steps for implementing smart home are as follows:

- Step 1: Start the project.
- Step 2: Open the .pkt extension file and save the file.
- Step 3: Add the required components to the work space.
- Step 4: Connect all devices in work space using cables.
- Step 5: Configure the device and setup internet service provider router.
- Step 6: Add Home gateway to the network.
- Step 7: Connect smart Devices to the home gateway.
- Step 8: Add end user device to the network.
- Step 9: Automate the activities in smart home.
- Step 10: Test your simulation.
- Step 11: Stop.

# 3.1.2 Flow Chart

# The flow chart is explained as follows:



## **3.1.2 Flow Chart Representation**

#### 3.2.1 Home Gateway

The IoT smart devices can directly register with the Home gateway IoT service or network database. It offers a wireless service on channel 6 that is provided with the SSID (service set identifier) and 4 Ethernet ports[9]. We can also setup WEP/WPA-PSK/WPA2 passphrase to wireless links for safer connections. The fig 3.2.1(a) indicates that the smart objects are associated to the home gateway by Wireless medium for local and remote control of smart devices. The home gateway is connected through WAN Ethernet port to the internet[10]. We can easily manage the IoT system with the help of home gateway and web interface. The internal IP address for the Home gateway is 192.168.25.10, can also be reached via its IP address in front of the Internet. Home portal can also be used as a DHCP server assigns IP addresses to any, connected smart device[11].



Fig 3.2.1(a) Home gateway with associated Smart objects



Fig 3.2.1(b) Home gateway ports

GLOBAL		Unders Services	
Satirgs Algenterer Settings	583	Handistony	
INTERFACE	Criticity Classer Criticity Range (table v)	20.30	
List List Workhou	Adversario C Dated O VEP O VEXPS & VEXPS O VEX S2010 Sever Setup:	wEPJay PSK Parc Prant	12345678
	P Address Disard Secret	0.000	2
	Dreadon Tate	461	

Fig 3.2.1(c) Home gateway Configuration

# 3.2.2 Smart Phone

In The Smartphone desktop we can found IoT Monitor icon fig 3.2.2(a). The IOT monitor displayed all IoT devices as we see in fig 3.2.2(c) and we can change IoT devices status as we see in fig 3.2.2(d).



Fig 3.2.2(a) Smartphone desktop

f Manning	The content of the first state of the
of Server - Devices	Horse   Conditions   Mater   Log Du
· Charapeliner (****80/00.0026-)	Garage Zoor
• Otamiart (TT1881200c2r)	Laws Summer
+ • Taxanad (****************	Lawn Scimitar
• Clargeridalentering STTORTSTRID-	Water Level Munitor
4 Casedonalationer (PTM2164118)	Brecha Debertor
· Classification	i et
• Commission (PT780/07WRF)	Autoria
+ Chrispet (PTTBETBETLAL)	4C
• • • Fair (FTT001000053-)	Celepter
Debuswing (Propagato)	Weekee
+ • • • • • • • • • • • • • • • • • • •	11/12/au
· Cadosevilledbeladar (FT1001023TT-)	Web Delector
· • Internative Delector (PTT NET 2000)	Walter Delector
+ CLAND Arbeira (************************************	Fatala
	Callery Decele Delectre

Fig 3.2.2(c) List of IoT Monitoring devices

Physical C	ony Deette	Regimning Ambusy	
a distant of			13
-		JoT Serves Addense (10.0.8.253) Uver Name advin Projekted advin Lagin	I.

Fig 3.2.2(b) Smartphone IoT Login page

T Marin	
rT Server - Devices	Home   Conditions   Editor   Log Out
- GeorgeDate (PTT0800KW027)	Garage Orio
On-	-
• Соницант (РТТОВЛахАСУ )	Lawn Sprinkler
Status	-
+ Spreadon 2 (PTT9810145G-)	Lawn Sprinder
Status	
- Cueder/WaterMannier (PTT001010103)	Watte Level Manfar
Water Level	31 cm
• Champellemoinschulactur (P17007106.0006-)	United Definition
Alarm	•
• Gent (PTTRENE-STA.)	Light

Fig 3.2.2(d) Status of IoT devices

# 3.2.3 IoT Server Registration

To login into server we can create username and password figure 3.2.3(b), and we can display the username and password in Services – IoT as shown in the figure 3.2.3(d).





Linte		
Type of Carly In	No Altaba Secularia	
E Martin		
	Registration Server Account Creation	
	Coman John	
	Paumod mer	
	Tests	
	2.40	

Fig 3.2.3(c) User credentials verification

Attraction Defension Carolina			
			R.
Registration Server Login			
Wrang and many or pressand			
Deren			
Sign an			
	Registration Server Login Trag Instance of parameter Communic Community Parameter (Sape 2n) (Sape 2n)	Registration Server Login Trag menant of paramet Communic Communic Parameter Sign Int Sign Int	Rightrathus Server Login Trong natures of partner Commen Parroad Japa 20

Fig 3.2.3(b) Creating an account to register devices

SERVICES		Pagatration Server	
WTDB	Carda	(#) Dr	0.0
CHEP			
THCP/6	Usemane Parsond		
IPTP	1 atom atom		
Bart rat			
444			
ATP			
EMAC			
815			
107			
111 Placegermant			
Refer DAP			
	1.1		
			Deep

Fig 3.2.3(d) Registration Server for IoT services

#### **3.2.4 IoT Device Registration**

This server provides IOT services to the users present at remote. All the IoT smart devices are connected and registered to the the IoT server. To get the service and to control the devices, user needs to login the IoT server by entering username and password. Ip address (10.0.0.253) and its URL(www.ioe.org) of IoT server is entered in the DNS server(having ip address 10.0.0.254) of network. The smart devices were remotely connected to the IoT server sharing the same username and password credentials. Connection also was established by using the static IP of the IoT server hosted in the same IoT network as shown in figure 3.2.4(a) and figure 3.2.4(b).

ILCEAS	Diama late	
Settings	Edward AS P	ε.
Fier .	(8) DHCP	
TRITERPACE	O film	
Streete-sta	Default Enternay	10.19.29.1
Detter	Diff farm	1000.20
	Server DAS P	4
	C Altonate:	
	di Stele	
	Data di Garrage	
	2011 loss	
	tif Sever	
	O forw	
	C Here Serve	
	(#) Forson Serve	•
	Server-Address	1903.20
	Alter Halter	alter.
	Parrent	aber
		Linnari



Fig 3.2.4(a) Registration of device

Fig 3.2.4(b) IoT monitoring in server

# **IV. IMPLEMENTATION**

For implementing smart home I used different sensor, smart device and detector to make smarter. The following figure represents the home architecture that connected each other using wireless and wired medium.



#### Fig 4 Smart home architecture

## **4.1 Device Configuration**

Assigning hostname and Ip address for ISP router: Router> Router>enable Router#conf term Router(config-if)#int g0/0 Router(config-if)#int g0/0 Router(config-if)#no shutdown Router(config-if)#int g0/2 Router(config-if)#int g0/2 Router(config-if)#in shutdown Router(config-if)#int g0/1 Router(config-if)#int g0/1 Router(config-if)#ip address 209.165.200.225 255.255.255.224 Router(config-if)#no shutdown Router(config-if)#exit **Configurating dhcp server for cell and Home Gateway:** Router(config)#ip dhcp excluded-address 209.165.201.225 209.165.201.229 Router(config)#ip dhcp pool CELL Router(dhcp-config)#network 209.165.201.224 255.255.255.224 Router(dhcp-config)#default-router 209.165.201.225 Router(dhcp-config)#default-router 209.165.201.225 Router(dhcp-config)#dns-server 10.0.0.254 Router(config)#ip dhcp excluded-address 209.165.200.225 209.165.201.229 Router(config)#ip dhcp pool WAN Router(dhcp-config)#network 209.165.200.224 255.255.255.224 Router(dhcp-config)#default-router 209.165.200.225 Router(dhcp-config)#default-router 209.165.200.225

Socilone Selarge
DENKIO DE SERVEZ DE DENKIO DE DENKIO DE
)( )() )()

SLOPAL		kraner Latings	
Satings Algorithm Settings INVERFACE INVERSE UNI NOVEMBE	IF Carityashin (k) 9427 () Base IPut Addess Tubut Hall Schull Garway (1973 Seven	000 900 2000 2000 2000 2000 200 2000 2000	
	093 Seren	NOL24	

## Fig 4.1(a) ISP server provides IP to Central office server

Die .



Carilyamo		
DIDHOP	# 9ax	
PolAsien	1400258	
Labout Musli	0.85, 255, 255, 0	
Infault Entering	148.021	
NG Server	1851.04	
Pul Comproter-		
C for each	15 SH	
Pré Addes		W
ad Landblitters	100.30573Y (Lat. 92)	
televitien and the second		
AG Server		
NE D'		
The BRIX Secula		
ulerhein 📧		
herone		
wind.		



#### 4.2 Connect all IOT devices one by one to the home wireless

## Steps for connecting IoT devices with home gateway wireless:

- Step 1: Click on the IOT device.
- Step 2: Go to advanced setting.
- Step 3: Go to the I/O config.
- Step 4: Select PT-IOT-NM-1W(for wireless connection).
- Step 5: Go to config.
- Step 6: Select wireless (in wireless connection).
- Step 7: Enter passkey of the wifi network.

ULOBAL Bellinge Algerition Bellinge Pring Introduce Distriction	Port Distant E-sculturally MAC Aukdemen BIND		ANY DESCRIPTION	with y	E as
Serves Look	Auflinette soon O tooldeer O tool te o tool te o tool te Freegolies Type	O will ≝ satisciese O istN3 Materi	WEFTee Part Poor Please Use ID Parisonal Use None Parisonal ART	172345678	
	1 <sup>44</sup> Condiguesdan 1 <sup>46</sup> DHCP C 1 State 1 <sup>44</sup> States States Mask		000000	2	
	Herd Condigation Conditionals Relationals Poli Soldanne Link Lanad Addesse	TENE 202 MAT /E	40 (594)	ж	

Fig 4.2 Connection of devices through home gateway

#### 4.3 Register all IOT devices in IoT server

# Steps for registering IoT devices in IoT server:

- Step 1: Click on the IoT devices.
- Step 2: Click on the config.

## Step 3: Enter IOT server IP address, username, password.

Codings .	Gaming Chil Pro	í.	
Files.	18 304DF		
INTERFACE	Transferration in the second second		
Diretrott	Diff. Invest Statistic		
	Gamin CHI Po		
	C Alkynatt		
	# 946		
	Detail Galency		
	Deti: Server		
	Alf Server		
	C Ree		
	C) Hone Galeria	é.	
	B Planate Server		
	SeverAddens	14264251	
	May News	abor	
	Percent	aba	
		- Reserves	

Fig 4.3 Registration of IOT devices in IoT server

#### 4.4 Enable DNS services like HTTP, DNS

## Steps for enabling DNS services like HTTP, DNS:

- Step 1: Click on the DNS server.
- Step 2: Click on the service.
- Step 3: Enable different services like HTTP, DNS etc.



Fig 4.4 Enabling DNS service



Steps for assigning IP address to DNS server statically:

- Step 1: Click on the DNS server.
- Step 2: Click on the config.
- Step 3: Select static.
- Step 4: Assign IP address to DNS server.

Settinge	Gabel Service	
INTERFALS	Display Marine (2003 Samere	
wetfrierien)	Linearing (Dird) (Post	
	I Ciate	
	Dolast Totoma 910.0 1	
	DH11 Server (10.00.254	
	Doloal Tolorea (943 Server	
	- la management de la companya de la	

Fig 4.5(a) Assigning IP address to DNS server

Steps for assigning IP address to DNS server statically:

Step 1: Click on the IoT server.

- Step 2: Click on the config.
- Step 3: Select static.
- Step 4: Assign IP address to IoT server.

Fig 4.5(b) Assigning IP address to IoT server

# 4.6 Monitoring and controlling IoT devices through remote devices

## Steps for controlling and monitoring IoT devices:

- Step 1: Click on the remote device like smartphone, laptop, tablet or PC.
- Step 2: Select IoT monitor application from the device desktop.
- Step 3: Register if new user and enter IP address and login credentials.
- Step 4: Control and monitor your IoT devices.



Fig 4.6(a) Applications on PC desktop

Physical	Config Deal	Regioning Anibum	
of House		IoT Server Address: www.lot.org User Nasse: Passivord: Legin	

Fig 4.6(b) IoT server login through PC





# Fig 4.6(c) IoT Server Web page

a.	
holid Early Datity Popurang Mitbalia	
California de la companya de la comp	
of Sarver - Devices	mane ( Conditions 1 20/Ker ) Loo Dut
+ Ownerfair (PT00-00/00)	Taraga Con-
+      special (PTTETSXA(W))	Laver Spreeduar
· • toward pression	Lawy ignored
+ Commissioner PTIECOVIEL	Water Lovel Mandar
• Campetiniene) Alexand (PT 1007 Alexand)	Strate Delector
• • • Line (PTTDE DE TA 1	Let .
+ Comunication (PTTD) (CTTD) (CTTD)	Apatiente
• CLANSIC #TTHEHITLAN	10
• • • Caral and the second second	Called Fair
+ Opinion (PTTOTESTA	To day
Contractivities (PTTE: 00/000)	
• Contractivitationactae (PTI)(#122171)	WetDeleter
• • International of the same	Water Delector
• • (vegfunnen (********)	forma
	Cardy a Parinte Delector

Fig 4.6(e) Monitoring, controlling IoT devices

#### Fig 4.6(d) IoT server login with user credentials

Thinks				10000000000000000000000000000000000000
of server -	Device Co	oddaes	Hone	Canditions   Editor   Lap O
Actions	hashied	Name	Condition	Actions
Edt Ratione	Vec	On Battellary	GarderWaterHonitsh Viater Lavel + 9.0.091	Det Sprinkler I. Status to true het Sprinkler I Status to true
Esti Recove	Vet	Opel liarage	GerageSmokeDetector Lavel >> 0.00	het thragelloor (h) to the
Edt Return	Vec	Circle Badrearts Nicodos	Bedrasmills/Exerctor Wind to true	Set Budrocer/Window On to Adve
Ectil Ramova	Vec :	On Sines	NitzFanStrokeDatector Lovel >= 11.04	Net Sires On to true
Edit. Rettole	Viet	Uvingment Ac	UvingRemperatureMonitor Temperature := 18.0 °C	Set shring AC (In to true
Ech. Remove	944	Living Furnance On	UvingStemperatureMonitor Temperature <= 18.0 °C	Net Derightmance On to Stue
Edit. Rettole	vies	Uveq #Coff	UvingTemperatureMoritor Temperature <= 20.0 PC	Set LivingAC (In to have
Edit Nameya	100	siving Ranance Off	LivingRespectorettoritor Temperature >+ 18.0 °C	Set Gelegiumanos Do to Talas
Ell	Yes	On Salar AC	Battery Analable pover >= 25 %	Set Bedroom4C Dr. to true



S.no	Device	Function
1	Central office server	Used for connecting cellular system to the router.
2	Router	Used to interconnect home with cellular network.
3	Cable modem	Used for connecting home with internet.
4	IoT server	To control registered smart IoT devices.
5	End devices	Connect to home getaway to access smart object.
6	Home Gateway	Used for registering and providing IP address for IoT devices.
7	Fan	Used for ventilation.

4.7 List of components used for implementation

8	Webcam	Records the environment.
9	Siren	Alerts for an event in home.
10	Light	Provide light.
11	Motion detector	Detects a motion.
12	Smart door	Connect to home gateway and provides function based event.
13	Cell tower	Provide coverage for user to control home appliance from remote area.
14	Co2 detector	Detects level of co2 in the home.
15	Water level monitor	Used for detection of water level.
16	Lawn sprinkler	Used to sprinkle water.
17	Smoke sensor	Used for sensing the level of smoke.
18	Bluetooth speaker	Used to simulate when connected to bluetooth supported device.
19	Temperature sensor	Used for sensing the temperature.
20	Old car	Used to simulate different scenario in home design since it affect, co, co2 and smoke level.
21	Air Conditioner	Used to cool the home.
22	Smart window	Controlling the window remotely.
23	Wind detector	Detects wind in the environment.
24	Music player	Plays music through Bluetooth capabilities.
25	Humidifier	Controls humidity in the atmosphere.
26	Power meter	Read the power being transmitted on a line.
27	Battery	Send power to other devices.
28	Furnace	Produces hot temperature inorder to reduce cold temperature
29	RFID Reader	Read the ID of an RFID Card.
30	RFID Card	Interacts with the RFID reader.
31	Solar Panel	Generates power when exposed to sun rays.

# V. RESULTS

The smart home environment offers automation along with smart control and monitoring of smart devices:

Conditions   Editor   Log Out
Conditions   Editor   Log Out -
A second s
Datage Deck
-
Lown Sprinkler
-
Lawn Sprinder
$\longrightarrow$
Watter Level Member
31.00
Union Defector
•
00000
uge

Fig 5 Monitoring and controlling smart devices

1. Lawn sprinklers automation when water level is low.

Lawn Sprinkler Sprinkler1	25.10 Water Level Monitor GardenWaterMonitor	Laven Sprinkler
Lawn Sprinkler Sprinkler	4.82 Water Level Monitor GardenWaterAmitor	Lawn Sprinkler Sprinkler2

Fig 5.1 Lawn sprinkler on and off based on the water level

The fig 5.1 shows the lawn sprinkler is set to on based on the condition made on Home gateway that is if water level is more than 5 cm the lawn sprinkler on else off.

2. Kitchen window opens automatically when carbondioxide level is high in kitchen.



Fig 5.2 Kitchen window open and close based on the co2 level

The figure 5.2 shows the window is opened when the carbondioxide is detected. To detect carbon dioxide, carbon dioxide detector is used. For the simulation scenario an old car is used due to lot of problem by increasing the co2.

3. Siren in the living room is set to activate incase of smoke detection from the kitchen.





Fig 5.3 Siren in the living room is set to on when smoke level is increased in the kitchen

The figure 5.3 shows the siren is on when the smoke level in the kitchen increases to prevent the fire accidents. To detect smoke, smoke detector is used. For simulation scenario an old car is used.

# 4. Garage door is automatically opened and closed when car passes.





Fig 5.4 Garage door automation based on the smoke level

The figure 5.4 shows garage automation when the smoke level is 0.01 .When the smoke level reaches to its extent the garage door automatically opens.

# 5. Air Conditioner and Furnace are automated based on the temperature.



Fig 5.5 Automation of Air conditioner and Furnace based on the temperature

In figure 5.5 when the living room temperature is above 20 C air conditioner is automatically power on and when the temperature is below 20 C furnace is switched on.

## 6. Security is increased by using Radio Frequency Identifier(RFID) smart cards

In figure 5.6 I have used RFID reader for extra security. If the RFID card is original only we can access the main door. A fake RFID card does not permit inside the main door.





20115.6

Fig 5.6 Automation of Air conditioner and Furnace based on the temperature

# 7. Bedroom Air Conditioner is automated based on the solar power.



# Fig 5.7 Bedroom Air Conditioner is power on based on the solar power generated through solar panel

In figure 5.7 if the battery level is greater than 20% the Air Conditioner switches on. Here the solar power is transmitted to the battery.

#### 8. Music player is connected to the bluetooth(BLE)





Fig 5.8 The portable music player is connected to the Bluetooth speaker, plays music through Bluetooth speaker

In figure 5.8 we had a bluetooth connectivity to the bluetooth speaker from the portable music player.

- Wind Detector Wind Detector
- 9. Bedroom window is automatically closed if wind is detected.



Fig 5.9 Bedroom window automatically closes if wind is detected by the wind detector

The figure 5.9 shows the bedroom window is closed when the wind detector placed at the window nearby detects wind flow.

# 10. Webcam recording is automated based on motion sensor.



The figure 5.10 for intruder detection, the web cam automatically starts recording when motion is detected.

# 11. Street lamp detects motion and turns on automatically when light falls



Fig 5.11 Street Lamp that has both light and motion detection

The figure 5.11 the street lamp automatically goes on when the light falls and also capable of motion detection.

# VI. CONCLUSION AND FUTURE WORK

The main aim of this paper was to design and implement IoT based home automation system. The motivation behind the work is due to the innovative technology and hike in smart device usage. The security measures are very expository and IoT technology makes our surroundings more smart. In this paper cisco packet tracer is utilized provides various opportunities for making simulation easy. The netcad sessions and previous research analysis are very beneficial for the implementation process of smart home. From the outcome of the paper we can convey that the IoT devices can be monitored and controlled through end devices of the user and there is a chance to apply this smart home model in real life.

Cisco packet tracer also includes microcontroller that can be used to make communication between devices. We can use python or java script language to program the microcontroller. in this way if a microcontroller is used in the IOE system then work will be more faster and reliable.

# REFERENCES

[1] Garima Jain, Nasreen Noorani, Nisha Kiran, Sourabh Sharma, "Designing & simulation of topology network using Packet Tracer", International Research Journal of Engineering and Technology (IRJET), 2015. [2] S. Raja Gopal, P. Saleem Akram, S. Sriram, T. Pavan Koushik, V. Mohana Krishna, "Design and Analysis of Heterogeneous Hybrid topology for VLAN configuration", International Journal of Emerging Trends in Engineering Research, Vol 7, No 11, PP 487-491, 2019. [3] www.wikipedia.org/wiki/computer\_networks, Retrieved 10th October, 2016. [4] Kenan Xu, "Device Deployment Strategies for Large-scale Wireless Sensor Networks", 2018 [5] (IOT). July 2014 Copyright © 2014 GSM

[6] S. Haller S. Karnouskos and C. Schroth "The Internet of Things in an Enterprise Context

in Future Internet-FIS 2008 Lecture Notes in Computer Science Vol. 5468 2009 pp 14-28.

[7] Qin, X. U. E. "Simulation Experimental Teaching of Computer Network Based on Packet Tracer [J]." Research and Exploration in Laboratory 2 (2010): 57-59.

[8] http://www.packettracernetwork.com/internetofthings/ pt7-iot-devicesconfiguration.html

[9] Muzammil Parvez M., Shanmugam J., Mohan Rao K.R.R., Lakshmana C., Shameem S..

Alive node and network lifetime analysis of DEEC protocol and EDDEEC protocol

,2018, International Journal of Engineering and Technology(UAE) ,Vol: 7 ,Issue: ,pp:

661 to:: 664 ,DOI: ,ISSN: 2227524X

[10] Pavithra T., Sastry J.K.R.Strategies to handle heterogeneity prevalent within an IOT

based network —, 2018, International Journal of Engineering and Technology(UAE)

,Vol: 7 ,Issue: 2 ,pp: 203 to:: 208 ,DOI: 10.14419/ijet.v7i2.7.10293 ,ISSN: 2227524X

[11] Devi Susmitha, N., Sowmya, S., Akram, P.S.Ramana, T. V. (2017). Tuning of L-C

Association

meta-material structure for antenna applications. Paper presented at the International Conference on Signal Processing, Communication, Power and Embedded System, SCOPES2016-Proceedings, 1845-1850. DoI:10.1109/SCOPES.2016.7955764 [12] Chattoraj, Subhankar, "Smart Home Automation based on different sensors and Arduino as the master controller", International Journal of Scientific and Research Publications, 2015 [13] Sun, Liangxu, et al. "Comparison between physical devices and simulator software for Cisco network technology teaching." Computer Science & Education (ICCSE), 2013 8th International Conference on. IEEE, 2013. [14] https://ieeexplore.ieee.org/document/7029576/ The Internet of Things: An overview and new perspectives in systems design [15] Narayana M.V., Dusarlapudi K., Uday Kiran K., Sakthi Kumar B., IoT based real time neonate monitoring system using arduino,2017 Journal of Advanced Research in Dynamical and Control Systems, Vol:9, issue: Special issue 14,pp: 1764-1772,DOI: ,ISSN: 1943023X [16] "The Internet of Things in an Enterprise Context" in Future Internet-FIS 2008 Lecture Notes in Computer Science Vol. 5468 2009 [17] Smart home system based on iot

technologies." Computational and Information Sciences (ICCIS), 2013 Fifth International Conference on.

(ICCIS), 2013 Fifth International Conference on. IEEE

- [18]. Bala Brahmeswara. Kadaru et al. "A Novel Ensemble decision tree classifier using
- hybrid feature selection measures for Parkinson's disease prediction", Int. J. Data Science
- (IJDS), ISSN: 2053-082X, Vol.3, No.4, 2018.

[19] Journal of electrical and computer engineering, "Internet of Things: Architectures, Protocols, and Applications ", Pallavi Sethi and Smruti R. Sarangi Department of

Computer Science, IIT Delhi, New Delhi, India

[20] IoT smart home concept, David Vasicek, Jakub Jalowiczor, Lukas Sevcik and Miroslav

Voznak, Senior Member, IEEE 26th Telecommunications forum TELFOR 2018

[21] Alexandria, A. (2014). Enabling communication between wireless sensor networks and the internet of things-ACOAP communication stacks. International journal of Science and Engineering, 6-7 Vol.5.

[22] ALFarsi, G., Jabbar, J., & ALSinani, M. (2018). Implementing a Mobile Application News Tool for Disseminating Messages and Events of AlBuraimi University College. International Journal of Interactive Mobile Technologies (iJIM), 12(7).

[23] Adilakshmi.Y, "A Privacy Protecting Locality supervising System for Wireless sensor Network", International Journal Of Emerging Trends In Engineering And Development (IJETED), Vol 5, Issue 2, Page No: 328-337, July 2012., Impact Factor: 2.87