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IMPLEMENTING HOME AUTOMATION USING NEURAL BASED EXPERT SYSTEM FOR SOLAR BASED DOMESTIC DEVICES

Gunjan[1], Saurabh Charaya[2]
[1]Research Scholar, Department of Computer Science & Engineering,
Om Institute of Technology And Management, Hisar, gunjan7236@gmail.com
[2]Assistant Professor &HOD, Department of Computer Science & Engineering,
Om Institute of Technology And Management, Hisar, Saurabh.charaya@gmail.com

Abstract: - Cloud services are offering flexible & scalable services. But there is always issue of security. When data is transferred from centrally located server storage to different cloud compromise of person & private data would increase. In our work, we develop Internet centric approach. Conceptual framework integrating ubiquitous sensing devices & applications would be shown in following figure. In order to realize full potential of cloud computing as well as ubiquitous Sensing, combined framework with cloud at center seems to be most viable. This system would allow user to manage his house hold devices remotely.

Keyword:- Cloud Computing, Home Automation, Neural network, Solar System

[1] INTRODUCTION

Cloud Computing

Cloud may be network or internet & it is something that is available at remote place. It provides services over network that are public & private. They are used in wide area network, local area network or virtual private network. Several application like email & web based conferencing executes on cloud.

Platform independency is offered by cloud computing because there is no need to install software on personal computer. So we can say that our business applications are mobile & collaborative due to cloud computing.

There are several services that are making cloud computing more feasible & easily accessible to users.

Cloud computing is providing number of advantages but there are several risks associated with this technology.

Advantages

Cloud computing provides several benefits & they are listed below

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1. User on internet could access remote applications in form of utilities.
2. User at any time can change & configure application online
3. Online development tools are offered by cloud computing.
4. Online deployment tools are provided by cloud computing.
5. Clients are provided platform independent access of cloud resources that are available on internet.

[2] HOME AUTOMATION

Home automation is to make automation for residential so it comprises control & automation of lighting, heating, ventilation, air conditioning (HVAC), & security, as well as home appliances such as washer/dryers, ovens or refrigerators/freezers that use WiFi for remote monitoring. Present systems usually consist of switches & sensors that are connected to a central hub which are called a gateway from which system is controlled within a user interface that is interacted either within a wall-mounted terminal, mobile phone software, tablet computer or a web interface, often but not always internet cloud services. While there are much competing vendors, there are very few world-wide accepted industry standards & smart home space is heavily fragmented.

Manufacturers often prevent independent implementations by withholding documentation & by suing people.

The Home automation has been suffering from fragmentation of platform & shortage of technical standards a situation where variety 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 different inconsistent technology ecosystems hard. Customers might be hesitant to bet their IoT future on proprietary software or hardware that use proprietary protocols that might fade or become difficult to customize & interconnect.

Fig 1 Home automation

[3] LITERATURE REVIEW

In 2014 Abhay Kumar & Neha Tiwari published a research titled "Energy Efficient Smart Home Automation

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System" told about high energy required by home instruments makes our homes one among foremost essential areas for impact of energy consumption on natural surroundings. AIM for planning of a system which would minimize energy waste in home within efficiency managing devices operation modes.

Authors Juan Felipe Corso Arias in 2014 published their research paper heading "**Wireless Sensor System According to Concept of IOT -Internet of Things**"

They tell us about design of a wireless communication system, responding to sensor concept applied to a scaled industrial process where temperature variables used. Sensors are connected to internet to be monitored remotely from anywhere in world. Sensor data is downloaded from cloud using a graphical programming platform to control & communicate system within a programmable logic controller, which perform sactions according to temperature value of sensors.

James Brown & UtzRoedig published a research titled "How Temperature Affects IOT Communication" in which they write that In future they would rely on applications built on top of Internet of Things (IoT). Example applications are smart cities, smart grids & smart healthcare. These IOT applications require a reliable service within predictable quality, & that sensor data & actuator commands are delivered reliably & timely.

[4] NEURAL NETWORK

In machine learning & cognitive science, an artificial neural networ is a network inspired by biological neural networks which are used to estimate or approximate functions that could depend on a lot of inputs that are unknown. Artificial neural networks are specified using three things Architecture explains variables are included in network & their topological relationship. For example variables involved in a neural network might be weights of connections between neurons; along within activities of neurons Activity Rule Most neural network models have short time-scale dynamics local rules explains the activities of neurons change in case of each other. Activity rule depends on weights in network. Learning Rule learning rule specifies way in which neural network's weights change within time. This learning is usually viewed as taking place on a longer time scale than time scale of dynamics under activity rule.

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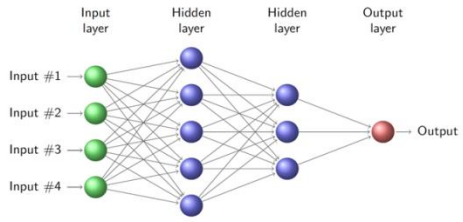

Fig 2 Neural Network

[5] PROPOSED WORK

In our work, we develop Internet centric approach. Conceptual framework integrating ubiquitous sensing devices & applications would be shown in following figure. For full potential of cloud computing and ubiquitous Sensing a merged framework with cloud at center is considered most viable. This system would allow user to manage his house hold devices remotely.

1) He would be able to access control of devices through his hand held devices that is running on remote cloud.
2) Cloud server would host database representing status of devices.
3) User would give command to cloud server in order to manage these devices.
4) Neural based expert system would run in background of application.
5) Data base would be connected to actuators that would switch on/off devices.

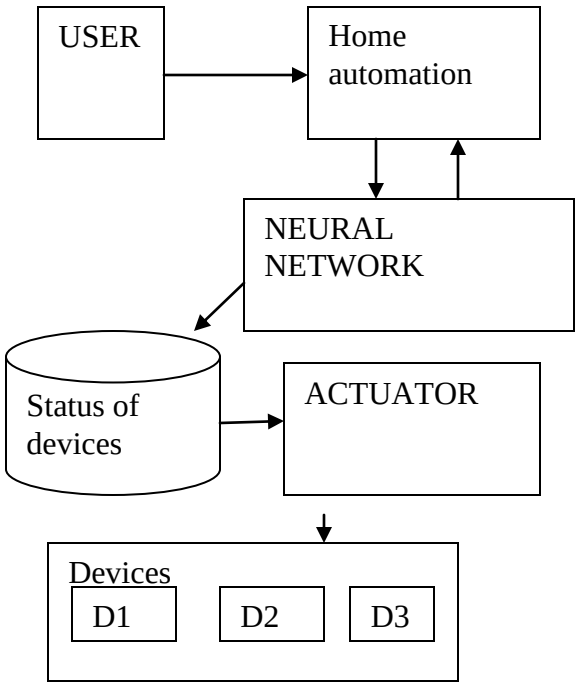

Fig 3Proposed model

[6] CASE STUDY

CASE 1

Refrigerator is on & sun intensity is 3

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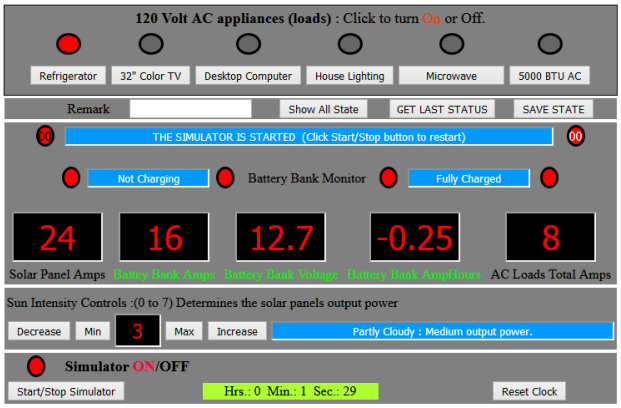

Fig 4 Refrigerator is on & sun intensity is 3

Case 2

Refrigerator & tv is on & sun intensity is 3

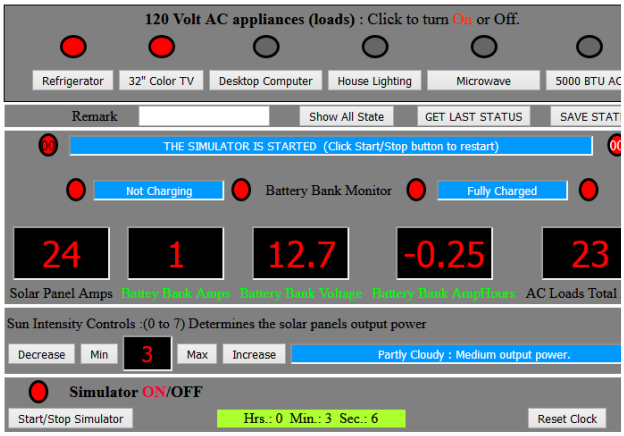

Fig 5 Refrigerator & TV is on & sun intensity is 3

Case 3: Refrigerator, TV, Desk computer is on & sun intensity is 3

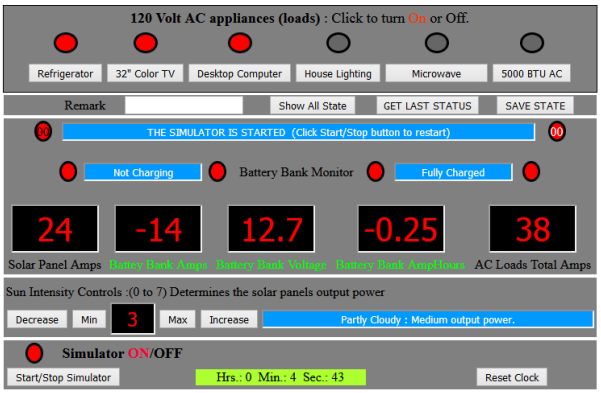

Fig 6 Refrigerator, TV, Desk computer is on & sun intensity is 3

Case 4: Refrigerator, TV, Desk computer & house lighting is on & sun intensity is 3

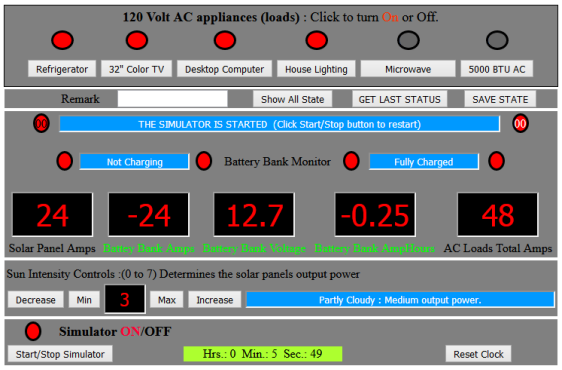

Fig 7 Refrigerator, TV, Desk computer & house lighting is on & sun intensity is 3

[7] RESULT & DISCUSSION

Refrigerator is on

Sun intensity	Solar Panel Amp	Battery Bank Amps
0	0	-8
1	8	0

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2	16	8
3	24	16
4	32	24
5	40	32
6	48	40
7	56	48

```
>> sun_int=[0 1 2 3 4 5 6 7]
sun_int =
    0    1    2    3    4    5    6    7
>> Solar_panel_Amp=[0 8 16 24 32 40 48 56]
Solar_panel_Amp =
    0    8   16   24   32   40   48   56
>> Battery_Bank_Amps=[-8 0 8 16 24 32 40 48]
Battery_Bank_Amps =
   -8    0    8   16   24   32   40   48
>> plot(sun_int,Solar_panel_Amp,'r+-')
>> hold on
>> plot(sun_int,Battery_Bank_Amps,'b*-')
```

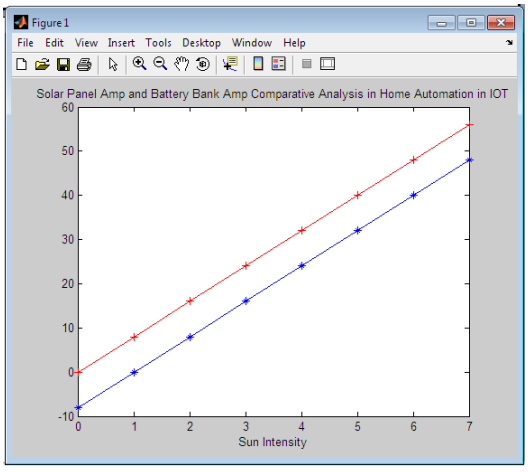

Fig 8 Solar Panel & Battery Bank Amp Comparative Analysis in Home Automation in IOT

[8] CONCLUSION

This system would allow user to manage his house hold devices such as TV, microware, AC, Laptop, ceiling fan, tube lights remotely. User would be able to access control of devices through his hand held devices that is running on remote cloud. Here we have used specifies way in which neural network's weights change within time. This learning is usually viewed as taking place on a longer time scale than time scale of dynamics under activity rule. Hybrid cloud is a composition multiple clouds that remain distinct entities but are bound together, offering benefits of multiple deployment models.

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