

Simulation Of IOT Based Domestic Devices By Saving Their State Of Remote Database Server

Aarti, Pooja Mittal

M.Tech Student

Department of Computer Science & Applications

Maharshi Dayanand University, Rohtak

aartiyadav.yadav0@gmail.com

Assistant Professor

Department of Computer Science & Applications

Maharshi Dayanand University, Rohtak

mpoojamdu@gmail.com

Abstract: In this research we have developed a simulation environment where we would switch on /off house hold devices remotely using our web based application through our mobile or laptops. IoT(Internet of Things) allows objects should be sensed & controlled remotely across existing network infrastructure, create scope for more integration of physical world into computer-based systems, & resulting in improved effectiveness, accuracy & economic benefit. The current status of device would be saved in database created by us along with time. A Calculator would calculate power consumption by reading status of devices & time they were kept on/off. The power consumption & battery backup would be computed.

Keywords: IOT, .NET FRAME WORK, ASP.NET , C#, MATLAB, HOME AUTOMATION, POWER CONSOUMPTION.

[1]INTRODUCTION

It is IoT that allows objects to be sensed & controlled remotely across existing network infrastructure, creating opportunities for more direct integration of physical world into computer-based systems, & resulting in improved efficiency, accuracy & economic benefit. In this research we have integrated Solar based system to implement home automation.[1] The main objective of research is Home automation use to IOT within integration of Solar based energy system. Integration of sensing & actuation systems, connected to Internet, is likely to optimize energy consumption as a whole. It is expected that IoT devices would be integrated into all forms of power consuming devices (switches, power outlets, bulbs, televisions, etc.)[2] & be able to communicate with utility supply company in order to effectively balance power generation & energy usage. Solar Energy System that is properly installed & adequately sized would not really require much in way of management[3].

[2] LITERATURE REVIEW

British entrepreneur Kevin Ashton first coined term in 1999 while working at Auto-ID Labs (really called Auto-ID centers, referring to a global network of objects connected to

radio-frequency identification, of RFID). IoT[4] is expected to offer advanced connectivity of devices, systems, & services that goes beyond machine-to-machine (M2M) communications & covers a variety of protocols, domains, & applications. After that several researches where done in this field

| | |
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| Author | [John A. Stankovic] |
| Title | Research Directions for Internet of Things |
| Description | Today, as sensing, actuation, communication, & control become ever more sophisticated & ubiquitous, there is significant overlap in this communities, fewtimes from slightly different perspectives. Then, eight key research topics are enumerated & research problems within those topics are discussed. one vision of future is that IoT becomes a utility with increased sophistication in sensing, actuation, communications, & in creating knowledge from vast |

| | |
|-------------|---|
| | amounts of data. This would result in qualitatively different lifestyles from today. |
| Author | [Chirag M. Shah, Vamil B. Sangoi & Raj M. Visharia] |
| Title | Smart Security Solutions based on Internet of Things (IoT) |
| Description | The prototype described in this paper had been provision of accepting inputs from a smart card reader or a biometric sensor. These inputs are processed inside controller (TM4C123GXL-based on ARM Cortex-M4). If inputs are found to be valid, access is granted to user & logs are wirelessly transmitted to computer using a WiFi module. Machine learning algorithms are implemented to monitor & analyse collected data. |
| Author | [Armando Roy Delgado, Rich Picking & Vic Grout] |
| Title | Remote-Controlled Home Automation management with Different Network Technologies |
| Description | This paper describes an investigation into potential for more remote controlled operation of home automation systems. This is considers problems with their implementation, discusses possible solutions through different network technology & indicates how to optimize use of such systems. |
| Author | [V. Sathya Narayanan1] |
| Title | Design of Wireless Home automation & security system using PIC Microcontroller |
| Description | The development of new technologies in field of electronics had been brought tremendous changes in day to day life of each human being. The proposed system gives overall framework of hardware & software design, & describes ways to implement system. The paper also explains security system for fire hazards that might occur through smoke sensor & GSM Module that is controlled by same controller that sends SMS to user if smoke is detected. |

The interconnection of these embedded devices is expected to usher in automation in nearly all fields, while also enabling advanced of applications like a smart grid, & expanding to areas such as smart cities.

[3] Tools & Technology Used

Hardware requirement

1. CPU (More than 1 ghz)
2. RAM (More than 1 Gb)
3. Harddisk(More than 5 Gb free space)
4. High resolution monitor

5. Keyboard
6. Mouse
7. Internet Connection

Software Requirement

1. Matlab
2. .Net Frame work
3. Visual Studio
4. Sql server

[4] Proposed Model

In this research we have developed a simulation environment where we would switch on /off house hold devices remotely using our web based application through our mobile or laptops. The current status of device would be saved in database created by us along with time.

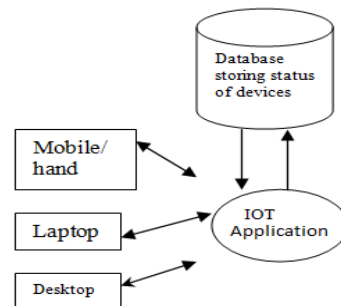


Fig1 Proposed Model

Remote table stateofdevice to store current state of devices

```

CREATE TABLE stateofdevice(TID INT,D1
INT,D2 INT,D3 INT,D4 INT,D5 INT,D6
INT,DATEOFRECORD
DATETIME,OTHERDESCR VARCHAR(200))
  
```

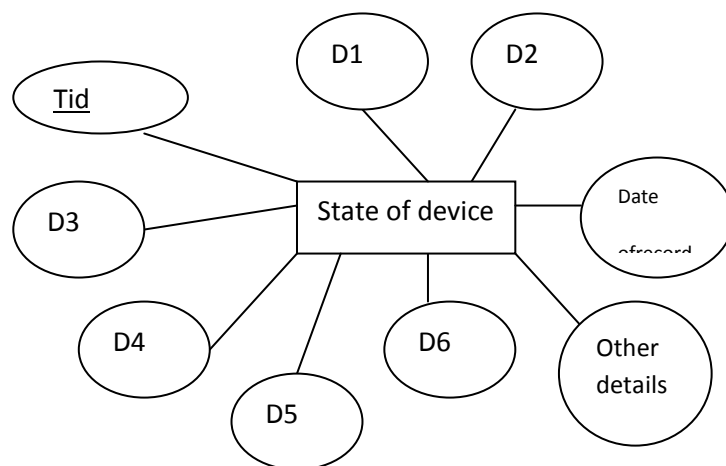
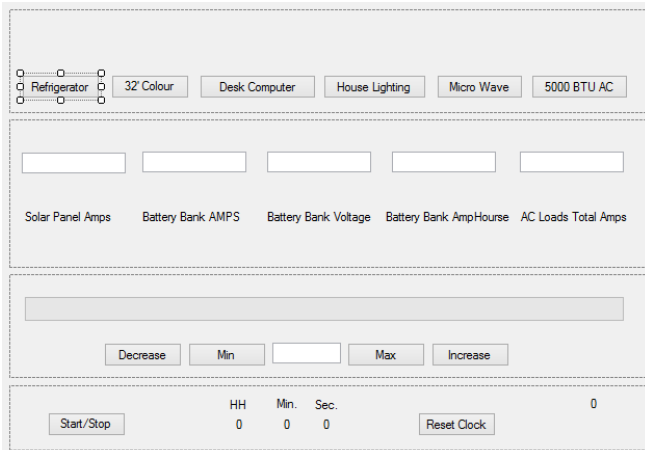


Fig 2 ER DIAGRAM OF STATEOFDEVICE**[5] IMPLEMENTATION****Following is Design of IOT Application****Fig 3 Design of IOT Application****Code to Enable Disable Timer**

This code would start timer if it is disabled & stop if it is enabled

```

if (timer1.Enabled == true)
{
    timer1.Enabled = false;
}
else
{
    timer1.Enabled = true;
}

```

Timer code to update time on IOT APPLICATION

```

private void timer1_Tick(object sender, EventArgs e)
{
    label6.Text = (Convert.ToInt32(label6.Text) +
1).ToString();

    if (Convert.ToInt32(label9.Text) < 59)
    {
        label9.Text = (Convert.ToInt32(label9.Text) +
1).ToString();

```

```

}
else
{
    label9.Text = "0";

    label8.Text = (Convert.ToInt32(label8.Text) +
1).ToString();
}
if (Convert.ToInt32(label8.Text) < 59)
{
}
else
{
    label8.Text = "0";

    label7.Text = (Convert.ToInt32(label7.Text) +
1).ToString();
}
}
}

```

Code to get last Transaction

Following code would get maximum tid (or last transaction id) from state of device.

```

int getmax()
{
    int count = 0;
    SqlConnection cn;
    string str;
    SqlCommand cmd;
    SqlDataReader dr;
    string s = "";

    cn = new
SqlConnection("Server=45.127.101.33;database=IOT;uid=I
OT;pwd=IOT_123456;");

    cn.Open();
    str = "select max(tid) from stateofdevice";
    cmd = new SqlCommand(str, cn);
    dr = cmd.ExecuteReader();

    while (dr.Read())

```

```

    {
        cn.Close();
    }
    try
    {
        count = Convert.ToInt32(dr[0].ToString());
    }
    catch
    {
        count = 0;
    }
}
dr.Close();
cn.Close();

return count+1;
}

```

Code to save status of device with time stamp

Following code would save current status of device in remote database server. If device is on status saved would be 1 & if device is off then status saved would be 0. D1 TO D6 are current status of devices. When user switch device on then status of device got 1 & when he switch off device status is set to 0. this code would save record of state of devices as user switch on or off device. Status of all devices would be stored in database with time & so on.

```

void savestate()
{
    SqlConnection cn;
    string str;
    SqlCommand cmd;
    SqlDataReader dr;
    int sno = getmax();

    cn = new
    SqlConnection("Server=45.127.101.33;database=IOT;uid=I
    OT;pwd=IOT_123456;");

    cn.Open();

    str = "insert into stateofdevice values (" + (getmax()+1) + ","
    +D1.Text + "," +D2.Text + "," +D3.Text + "," +D4.Text +
    "," +D5.Text + "," +D6.Text + "," + DateTime.Now() + ")";

    cmd = new SqlCommand(str, cn);

    cmd.ExecuteNonQuery();
}

```

Code to get last status of devices

Following code would get current status of device whether it is on or off. If device is on status would be 1 & if device is off then status would be 0.

```

void getstatus()
{
    int count = 1;
    SqlConnection cn;
    string str;
    SqlCommand cmd;
    SqlDataReader dr;

    string s = "";

    cn = new
    SqlConnection("Server=45.127.101.33;database=IOT;uid=I
    OT;pwd=IOT_123456;");

    cn.Open();

    str = "select from stateofdevice order by tid desc";

    cmd = new SqlCommand(str, cn);

    dr = cmd.ExecuteReader();

    while (dr.Read())
    {
        D1.Text=dr[1].ToString();
        D2.Text = dr[2].ToString();
        D3.Text = dr[3].ToString();
        D4.Text = dr[4].ToString();
        D5.Text=dr[5].ToString();
        D6.Text=dr[6].ToString();
    }

    dr.Close();
    cn.Close();

    // return s;
}

```

}

[7]RESULTS**Matlab code to save readings at different sun intensity levels**

```
function soutput(acload, fname)
fid=fopen(fname, 'w');
for i=0:1:7
fprintf(fid, '%d %d %d\n', i, 8*i, (8*i)-
acload);

```

```
end
fclose(fid)
end
```

Matlab code to plot readings at different sun intensity levels

```
function plotf(f, j)
fid=fopen(f, 'r');
C=textscan(fid, '%d%d%d');
a=C{1};
b=C{2};
c=C{3};
plot(a, b, 'r+');
hold on
plot(a, c, 'b+');
title(strcat('Simulation result ',
j), 'Interpreter', 'none');
xlabel('Sun Intensity');
ylabel('Amps');
end
```

Input command to store result in file at different sun intensity level

```
soutput(8, 's1.txt');
```

Plotting Command to read data from file for plotting

```
plotf('s1.txt', 'when AC load is 8');
```

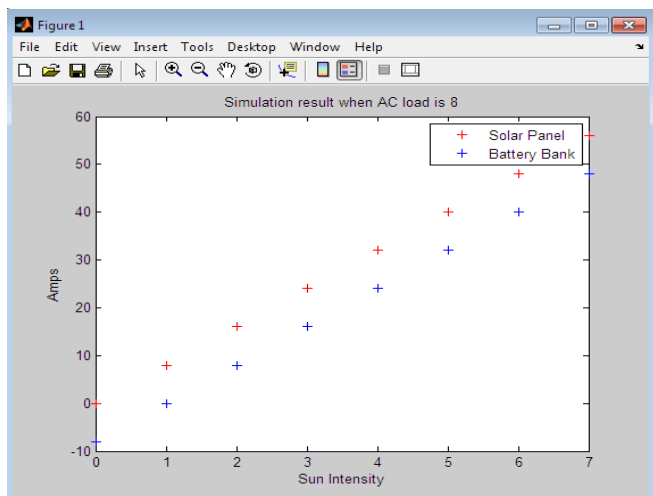


Fig 4 When AC load is 8

Input command to store result in file

```
soutput(16, 's2.txt');
```

Plotting Command to read data from file for plotting

```
plotf('s2.txt', 'when AC load is 16');
```

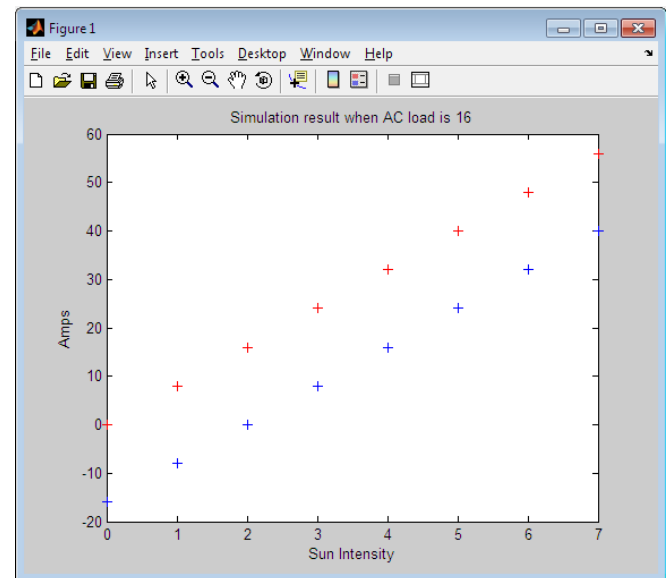


Fig 5 When AC load is 16

Input command to store result in file

```
soutput(32, 's3.txt');
```

Plotting Command to read data from file for plotting

```
plotf('s3.txt', 'when AC load is 32');
```

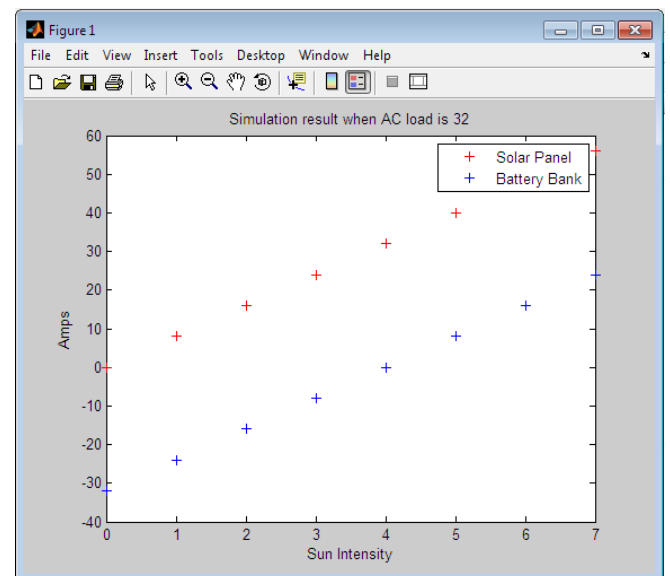


Fig 6 When AC load is 32

Input command to store result in file

```
soutput(48,'s4.txt');
```

Plotting Command to read data from file for plotting

```
plotf('s4.txt',' when AC load is 48');
```

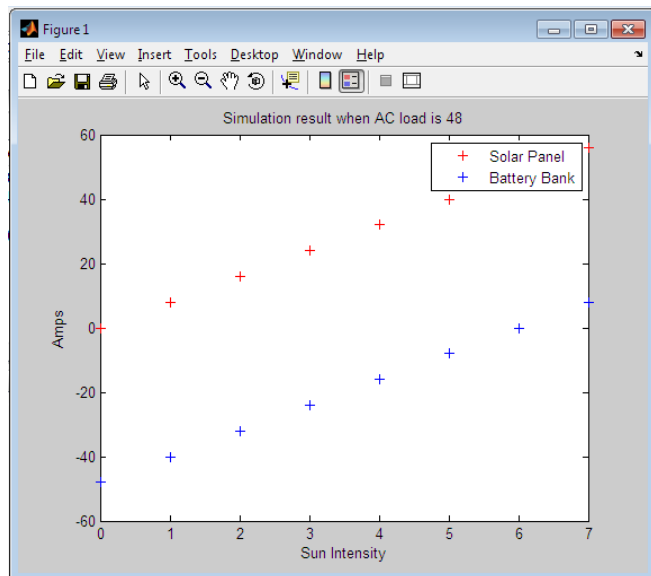


Fig 5 When AC load is 48

[8] CONCLUSION

IoT allows objects should be sensed & controlled remotely across existing network range, creating opportunities for more direct addition of physical world into computer-based systems, & resulting in improved effectiveness, accuracy & economic benefit[5]. The current status of device would be saved in database created by us along with time. A Calculator would calculate power consumption by reading status of devices & time they were kept on/off. The power consumption & battery backup would be computed.

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