Smart Home With Sun Tracking Solar Panel

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ABSTRACT: ***Home automation is a famous and most used technology in the world.The objective of this project is to develop a home automation system which can be monitored from all over the world. Besides the system will have an individual sun tracking solar panel to supply power.Where it is used for controlling of devices depending on the input given through Wi-Fi technology and supply from solar power which is controlled according to the instructions given by android mobile***

KEY WORDS: ***SMARTHOME, INTERNET ,SMART PHONE, SOLAR PANEL.***

1.INTRODUCTION

The Internet of Things (IoT) is the inter networking of physical devices and other items like actuators, sensors, that enable these objects to collect and exchange data. The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.

One of the most promising renewable energy sources characterized by a huge potential of conversion into electrical power is the solar energy.The point of maximum received energy is reached when the direction of solar radiation is perpendicular on the panel surface. Thus an increase of the output energy of a given PV panel can be obtained by mounting the panel on a solar tracking device that follows the sun trajectory. Unlike the classical fixed PV panels, the mobile ones driven by solar trackers are kept under optimum insolation for all positions of the Sun, boosting thus the PV conversion efficiency of the system.

2.LITERATURE SURVEY

Shopan Dey-et al [1] 2011: Home automation by using arduino, it provides home system accesing remotely saving a lot of time.Another usage is turning of lights fans etc. A voice based control system is proposed that will enable the elderly and disabled people to control appliances remotely. The primary communication is through GSM. An laptop or computer is used to get voice commands and converts Them into text. This is sent via SMS to another phone through the GSM network. This module is connected to Arduinocontroller.This controller interprets the commands and performs appropriate actions.

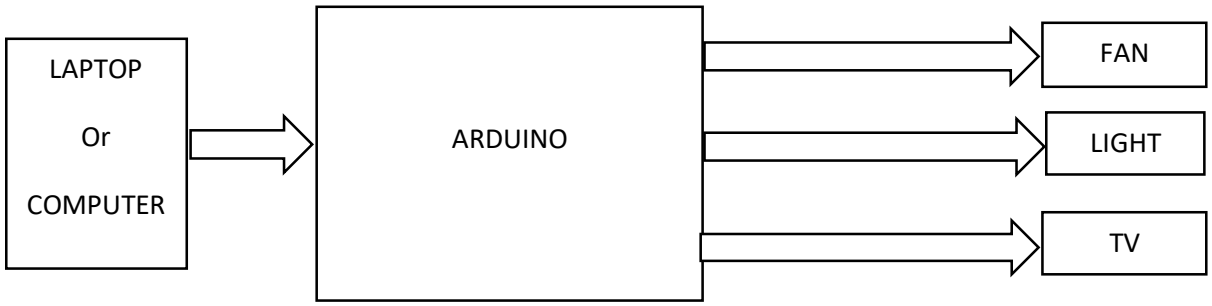


Fig:1. Process of Arduino Microcontroller.

BLUETOOTH BASED HOME AUTOMATION

M.Tazil-et.al [2] 2011. This system uses a cell phone and a Bluetooth technology. Bluetooth technology is secured and low cost. It makes use of Arduino Bluetooth board. An interactive python program is used in the cell phone to provide the user interface. The I/O ports of the Bluetooth board and relays are used for interfacing with the devices which are to be controlled. The Bluetooth is password protected to ensure that the system is secure and not misused by any intruders. The Bluetooth has a range of 10 to 100 meters, 2.4 GHz bandwidth. The client is a PC that is connected via USB to the Bluetooth module. This module is connected to it will allow it to receive commands via Bluetoh.

ZIGBEE BASED HOME AUTOMATION

S. Rajakumari-et.al [3] 2017 .The zigbee wireless communication can be applied for the home automation. This system uses voice recognition for this purpose. The voice commands are taken from the mike. They are compared with the voice stored and processed. The microcontroller then transmits the commands through zigbee to the receiver. It uses relays to control the respective appliances. It has a disadvantage that zigbee is a low range communication medium.It stores a lot of data.

PROBLEM STATEMENT:

In all the above models the major drawbacks are:

- Efficiency is less.
- Internal storage capacity is less.
- It can be accessed to smaller areas.
- In order to run previous system they use to depend on non renewables.
- But,by using fixed solar panels the output will be less.

PROPOSED METHODOLOGY:

Solar tracking system is a method to withdraw maximum power from solar panels. As we know solar panels convert solar energy into electrical energy through photovoltaic phenomenon. Greater the intensity of solar light falls on solar panel, greater output observe at the output of solar panel. So we Need to develop a such method which rotate solar panel according to tracking of sun. So that we can withdraw maximum power from our installed solar panels.

The objective is to expose solar panel to maximum time in front of solar light to get maximum power from solar

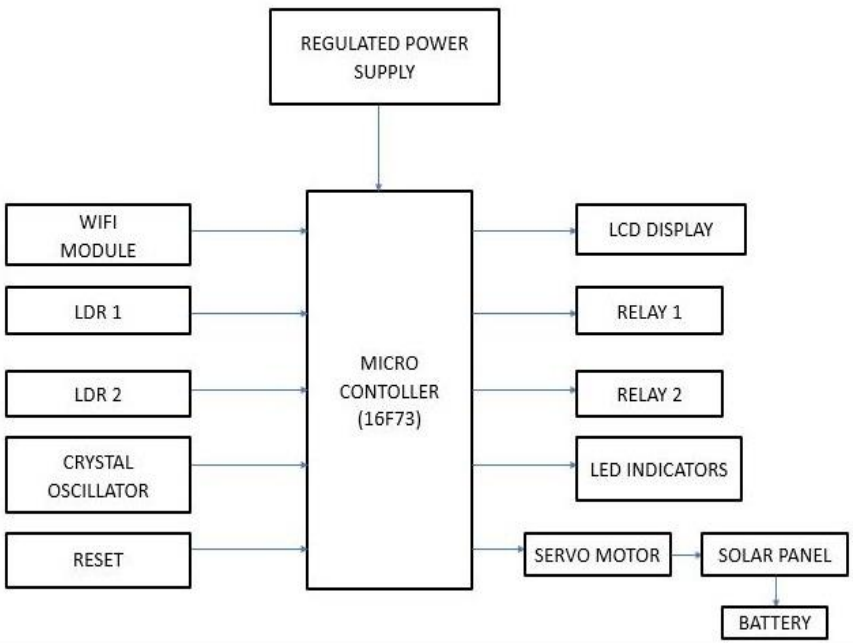


Fig 2. BLOCK DIAGRAM

In this method, we rotate the solar panel with the help of servo motor with the direction of sun light. The main purpose is to expose solar panel maximum to sun light. cease greater the sun light, greater will be the output of solar panel.A servo motor is used to rotate solar panels in the direction of sun light. In this method two lights sensors are used to measure sun light. Light dependent resistors(LDRs) are used for this purpose.

In order to monitor the home appliances, the user need to connect with the wifi provided by the Wi-Fi module. after connecting to the Wi-Fi, we can control the home appliances by means of an IOT web page, the commands regarding home appliances given by the user are sent to the microcontroller through Wi-Fi module.so the microcontroller will process them and performs appropriate action on the device through relays.

The main blocks of this system are "Wi-Fi module". Wi-Fi module acts as router and provides internet connection and is is used to monitor the status of the devices. Here the commands which we send are AT(Attention) commands. When power supply is ON, blue LED blinks which indicate the functioning of the system. Whenever the system is ON the following are displayed in the LCD:

1. IOT based home automation
2. Initialising
3. System ready

In this project we are controlling three devices

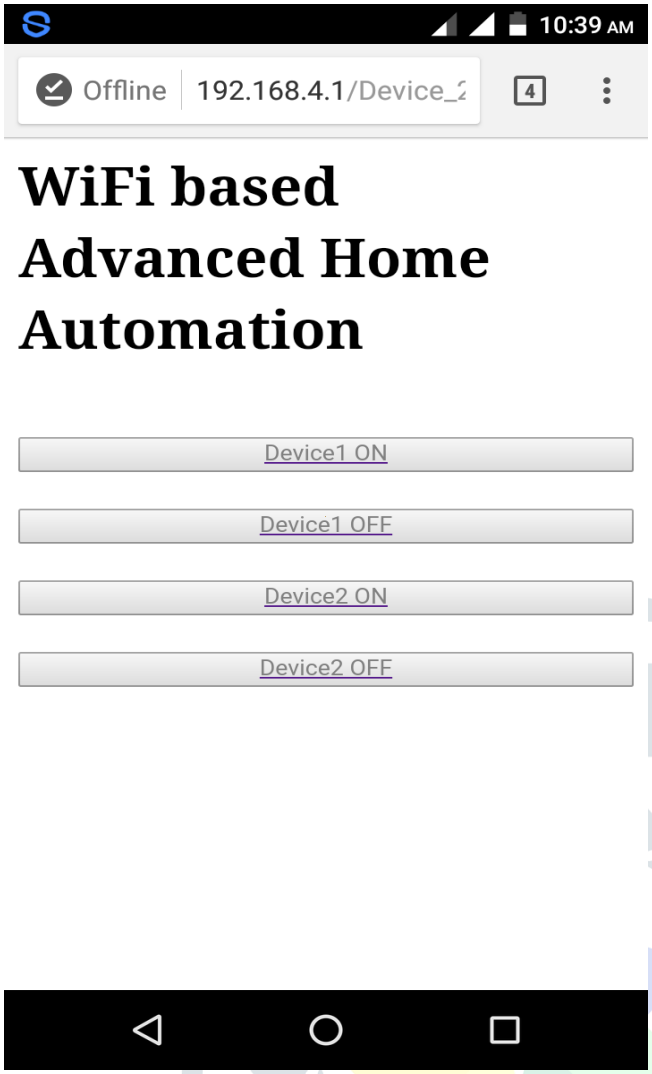
Device 1-Light

Device 2-Fan

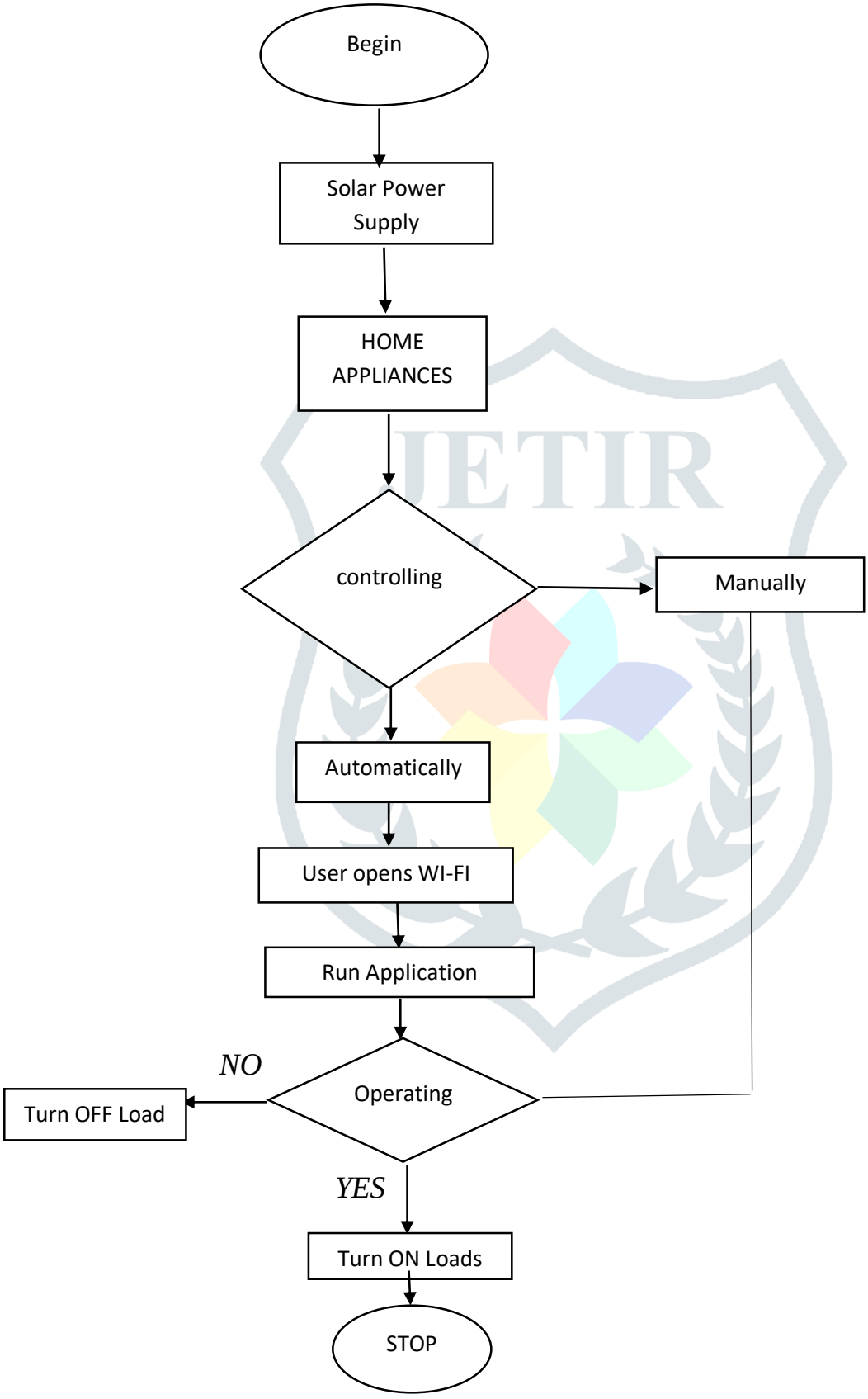
dev1on/dev2 on/dev1off/dev2off

For example,when we tap on dev1on then light is going to ON and same for the remaining devices. Status of the devices can be monitored by following the below steps:

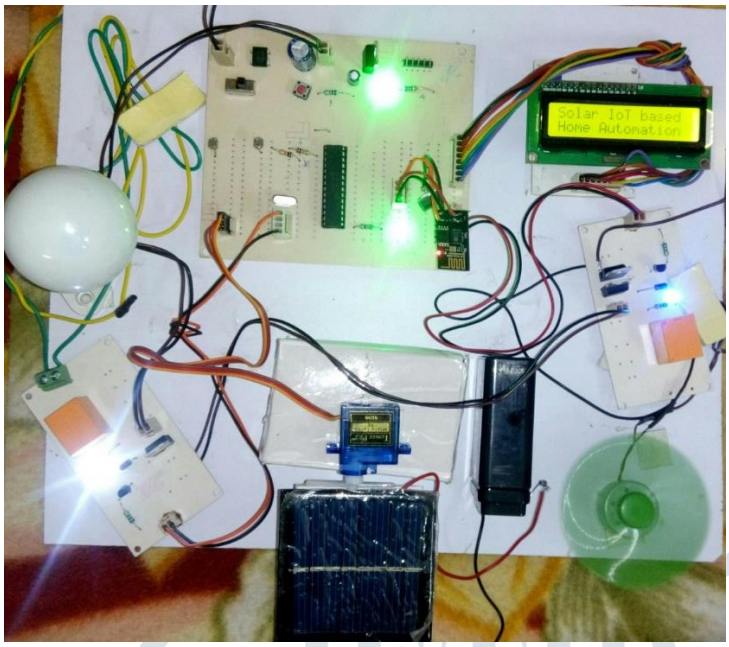
1. Activate the Wi-Fi in the mobile by entering the password
2. Connect Wi-Fi to "project"
3. Open Google
4. Type 192.168.4.1 in the URL
5. Then automatically it shows the status of the devices.
6. 192.168.4.1 is the IP address of this system.
7. In case of power failure, we are using an alternative source through solar tracker. For this purpose, we are using "microcontroller based solar tracking using servomotor".it is mainly intended to track the sun direction in order to get maximum output. This project consists of solar panel, LDRs and a servomotor. The microcontroller is programmed in such a weathered the controller takes the decision to rotate the solar plate towards sun direction with the help of LDRs. the direction of the solar panel will be displayed in the LCD screen which is interfaced with the microcontroller. The electrical energy which is generated from the solar panel will be stored in battery. This stored energy used as an alternative supply for the whole kit in case of power failure.


10:39 AM
Offline
192.168.4.1/Device_2
WiFi based Advanced Home Automation
Device1 ON
Device1 OFF
Device2 ON
Device2 OFF

FLOW CHART OF PROPOSED SYSTEM



EXPERIMENTAL SETUP

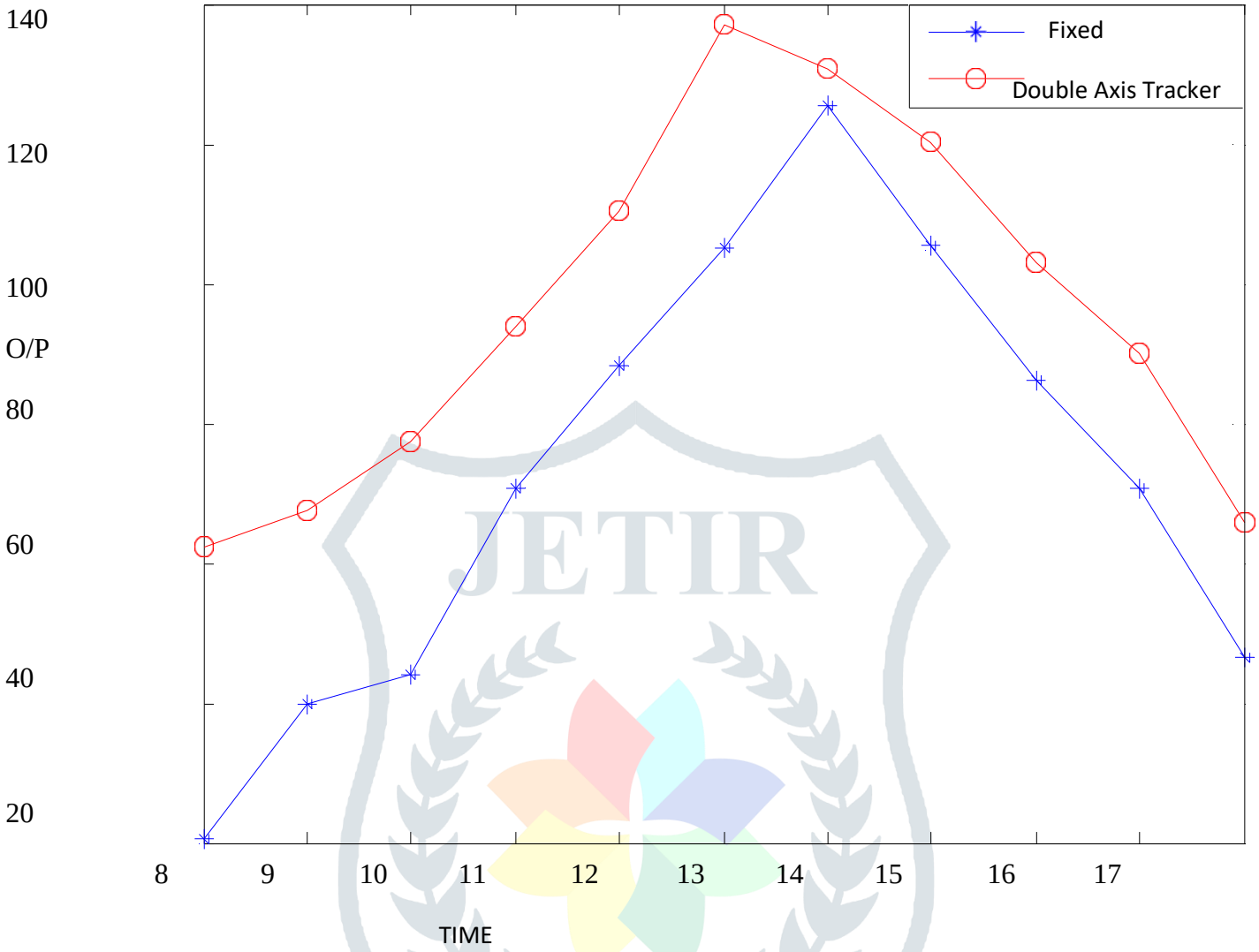


RESULTS:

The project "**SMART HOME WITH SUN TRACKING SOLAR PANEL**" was designed such that any device of electrical home appliances at homes can be operated through webpage. The controlling of electrical appliances is done wirelessly through Wi-Fi technology. In this smart home we are running two loads one is fan and other is light they are operated wirelessly using source from solar tracker. Thus a smart home can be made in ecofriendly manner.

Hours	Static Panel			Solar Tracking (Dual Axis)		
	V	mA	mW	V	mA	mW
08.00 AM	08.4	0.60	05.04	10.20	2.93	29.88
09.00 AM	08.5	1.17	09.94	10.35	3.02	31.25
10.00 AM	08.6	1.25	10.75	10.42	3.00	31.26
11.00 AM	09.7	1.82	17.65	10.51	3.23	33.94
12.00 PM	09.9	2.22	21.97	10.60	3.20	33.92
01.00 PM	10.3	2.56	26.36	10.80	3.35	36.18
02.00 PM	10.5	2.97	31.18	10.73	3.41	36.58
03.00 PM	09.7	2.71	26.28	10.40	3.29	34.21
04.00 PM	08.6	2.50	21.5	10.55	3.30	34.81
05.00 PM	08.3	2.14	17.76	10.36	3.12	32.32
06.00 PM	08.1	1.43	11.58	10.29	2.82	29.01
Average Power			18.18			33.03

PRPOSED MODEL GRAPH:



REFERENCES

[1] Soumya and Sandeep Kumar, "Health Care Monitoring Based on Internet of Things" the International Conference on Artificial Intelligence & Cognitive Computing (AICC), 2018.

[2] Sandeep Kumar & Hemlata Dalmia, "A Study on Internet of Things Applications and Related Issues", International Journal of Applied and Advanced Scientific Research, Vol. 2, No. 2, pp. 273-277, 2017 with ISSN: 2456-3080.

[3] Rajakumari, S., S. Azhagumeena, A. Brindha Devi, and M. Ananthi. "Upgraded living think-IoT and big data." In Computing and Communications Technologies (ICCCT), 2017 2nd International Conference on, pp. 181-184. IEEE, 2017.

[4] Kodali, Ravi Kishore, Vishal Jain, Suvadeep Bose, and Lakshmi Boppana. "IoT based smart security and home automation system." In IEEE International Conference on Computing, Communication and Automation (ICCCA), pp. 1286-1289, 2016.

[5] Bhat, Abhishek, Satvik Sharma, and K. R. Pranav. "Home Automation Using Internet Of Things." (2017).

[6] Ren, Honglei, You Song, Siyu Yang, and Fangling Situ. "Secure smart home: A voiceprint and internet based authentication system for remote accessing." In 11th IEEE International Conference on, Computer Science & Education (ICCSE), pp. 247-251, 2016.