IOT BASED SMART POWER OUTLET

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ABSTRACT

As the use of internet is being increased, it became possible to connect number of appliances together. Home automation use devices connected to internet for monitoring and managing the home systems. Users can remotely control the appliances from anywhere. This paper explores various possibilities by judiciously using wireless fidelity (Wi-Fi) technology and internet of things (IOT) for interlinking smart devices. Internet of things is a growing technology that is used to control hardware appliances through the internet. The system helps in real time monitoring of electric parameters like power, voltage and current. And also it stores these data for a period of one month. In addition, with this it provides continuous speed regulation of fan without energy loss.

KEYWORDS : IOT, IFTTT, MQTT, Adafruit-IO, Home automation

I. INTRODUCTION :

As technology becomes more and more affordable, and with the great percentage of population have internet connected smart phone or home internet, smart technologies are slowly integrating into our homes. Now a day convenience, energy efficiency and security are mostly concentrated through connectivity and interacting.

There are several home automation technologies like Bluetooth, GSM based,

ZigBee [2-4] etc. But these systems were not getting wide acceptability and have many drawbacks. The proposed system is an IOT based home automation [1][5] to control home appliances in an effective way. IOT based home automation is an upcoming application, to control home appliances remotely over the cloud.

Here we use IOT to control home appliances. This automates modern homes through internet. Multiple devices are connected to the internet through Wi-Fi technology. There are various possibilities for interlinking smart devices using Wi-Fi technology. The merit of this interlinkage is the monitoring and controlling smart devices from anywhere around the world with the help of smart phone or a computer having an internet connectivity. It allows voice control of electrical devices such as TV, light, fan etc. The user can also interact with electrical devices with the help of an android app.

II. EXISTING SYSTEMS :

Using Bluetooth
Bluetooth application in the mobile phone provides the interference between mobile and Bluetooth module. This send command signal to microcontroller. Microcontroller receives these commands, compare with predefined value and performs relative operation. The wireless communication between Bluetooth and microcontroller is limited to < 50m and maximum of 100m range [2].

GSM BASED HOME AUTOMATION

In GSM, user will send command via SMS [4] and transfer it to microcontroller. The commands are in the form of 'C' language. After receiving commands by Arduino through GSM, it sends signal to relay. GSM technique consumes more power consumption and provides less speed operation.

ZIGBEE BASED HOME AUTOMATION

ZigBee is a wireless communication technology [3]. A common gateway is used to integrate Wi-Fi network and ZigBee based home automation, it allows network interoperability, remote and flexible user interference and remote access to the system. But its coverage is limited and requires more knowledge for their operation.
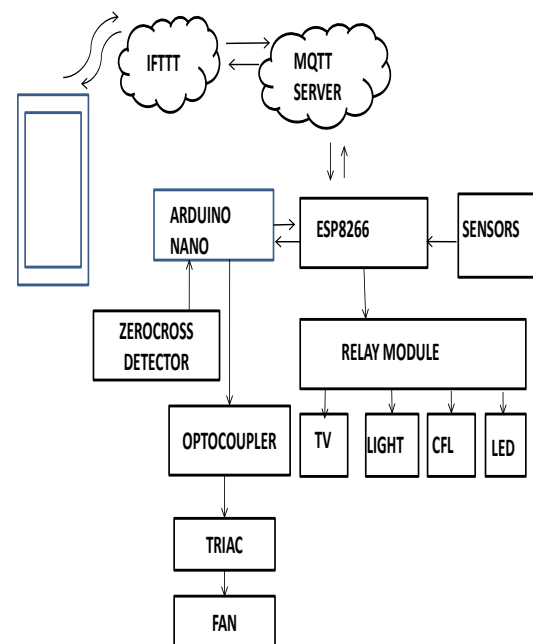
PROPOSED SYSTEM

Fig 1: Proposed system block diagram

Hardware Required

- ESP 8266
- Arduino Nano
- Optocoupler

- BY 139 TRIAC
- Relay module
- ACS 712 current sensor
- BC 547 Transistor
- 4N35 Zero crossing detector
- MOC 3021 Optocoupler IC
- DB 107 Bridge Rectifier
- LED

Software Required

- Arduino IDE
- IFTTT
- MQTT

Based on the existing systems main issues are, it requires more knowledge for operation, more power consumption, less speed etc. Therefore in this paper we proposed a new system that can overcome these limitations of existing systems. The proposed system support more elasticity, comfort, capacity and safety. The system is designed to control and monitor various home appliances through internet. Main control unit of the system is ESP8266 microcontroller which has an inbuilt Wi-Fi facility. The appliances are connected to the microcontroller with the help of relay module. These relays are attached to the digital input/output pin of the microcontroller. For monitoring various electrical parameters such as voltage, current and power, numerous sensors like ACS712 current sensor, voltage sensor are used. And these sensors are connected to the microcontroller. Another feature of the system is, it can control speed of the fan by the help of a PWM based TRIAC switching circuit. In order to control appliances over network, the microcontroller is connected with Adafruit IO platform (web cloud), which uses MQTT protocol for the communication. It is possible to connect our system with OK Google service and Amazon Alexa. This enables us to control the device using voice. To connect both Amazon Alexa and ok Google service with Adafruit IO service. IFTTT (if this then that) service is used .as a result of this. The system can also have linked with several services. Different sections of the system are

SWITCHING AND MONITORING OF APPLIANCES THROUGH WEB CLOUD

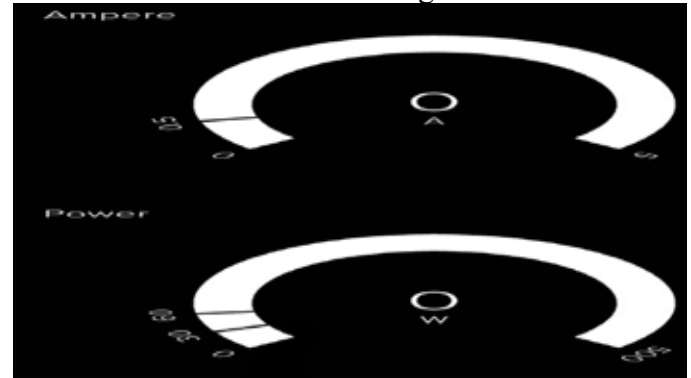ESP8266 Wi-Fi module is programmed using Arduino IDE for communicating with

Fig 2: Remote controlling switch

the MQTT server. MQTT server consists of two parts. That is subscription part and publishing part. The subscription part is used to send data from web cloud (Adafruit IO) to the micro controller and the publishing part is used to send data from micro controller to web cloud.
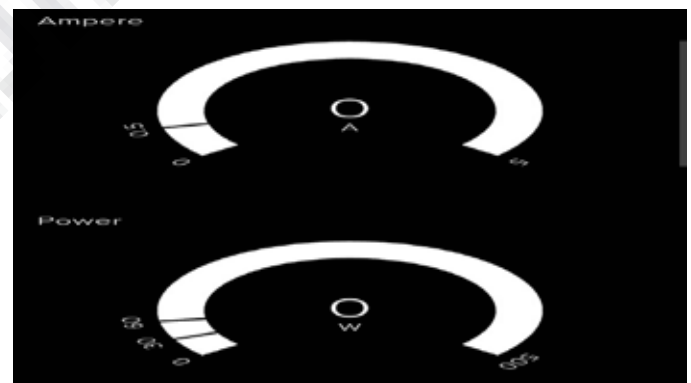

Fig 3: Monitoring of electrical parameters

When the data is received in the micro controller, then it will check those data with the program and if the condition is satisfied, the corresponding digital output pin will be high.

To monitor the voltage, current and power two types of sensors are used. They are: -ACS712 current sensor and voltage sensor. The micro controllers read this sensor value and publish to the web cloud. Power is calculated by this voltage and current. Hence the system provides real time monitoring of these parameters; similarly gas leakage sensor is used for

sensing the gas leakage.

SPEED CONTROL OF FAN

Arduino Nano is used as a micro controller for speed regulation of fan. Both Arduino Nano and ESP8266 Wi-Fi module communicates through I2C (inter integrated circuit) protocol. Where ESP8266 act as master and Arduino Nano act as slave. When the zero crossing detector detects the zero crossing point, Arduino Nano produces a PWM signal. The duty ratio of the signal changes by changing the speed from the web cloud. According to the PWM signal, the opto-coupler IC provides a gate current to the TRIAC. Hence output voltage of the TRIAC is varying with PWM signal. This output voltage is proportional to the speed.

IFTTT Service

It is a web based service to create chain of simple conditional statements, called applets. It is used to link Google service to Adafruit IO. It consists of an 'if part' and a 'then part'. 'if part' is connected to Google service and 'then part' is connected to Adafruit IO.
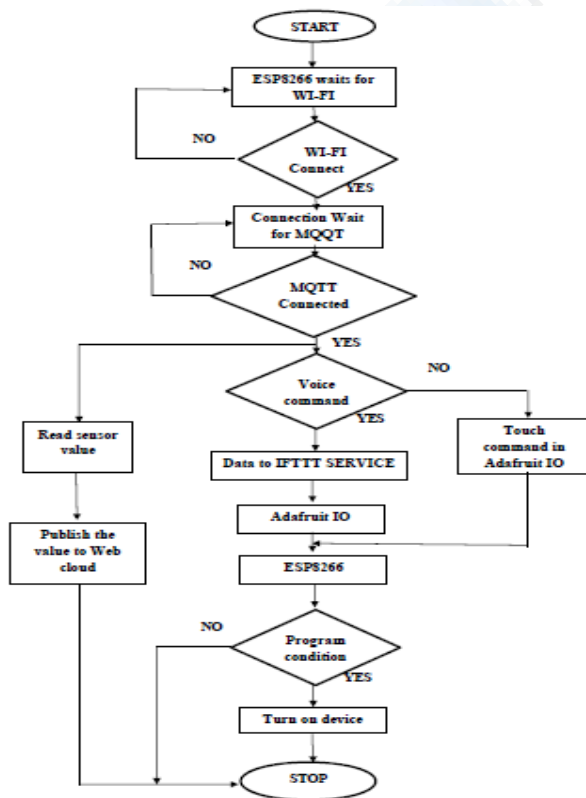

Fig 4: Working Flowchart

IV.   FUTURE SCOPE :

Home security, energy management are some of the common problems we are facing today, smart power outlet system is the best solution. . We often forget to switch off our home appliances. Our system allows to control all the electronics from anywhere through mobile application.

Now a days the use of internet increases rapidly and we cannot think about a life without internet and smart phone .The world has changed in more ways than we could imagine until few years back. And the changes and advancement will continue in future as well, in fact IOT will shape our future. IOT based home automation is more user friendly design compared to other existing technologies like ZigBee, GSM [3-4] etc .So home automation using IOT is an efficient method of controlling home appliances in our busy life.

V.   CONCLUSION :

The home automation using IOT, we can control the electrical appliances successfully through internet. This technique can be easily installed to the existing systems. User can control and monitor appliances remotely from anywhere using a smart phone. The different sensors like motion sensor and gas sensor are used for safety precaution. In addition to this it provides continuous speed regulation of fan without energy loss, in a cost effective method. This method improves the quality of life by providing safety and security. Also it provides great support for physically disabled individuals who face a lot of challenges in their day to day life.

VI.   REFERENCES :

1. D. Pavithra and R. Balakrishnan, "IOT based monitoring and control system for home automation," *2015 Global Conference on Communication Technologies (GCCT)*, Thuckalay, 2015, pp. 169-173. R. Piyare and M. Tazil, "Bluetooth based home automation system using cell phone," *2011 IEEE 15th International Symposium on Consumer Electronics (ISCE)*, Singapore, 2011, pp. 192-195.

2. M. M. Hasan and K. Arshad, "Robust home automation scheme using cognitive ZigBee network," *ICT 2013*, Casablanca, 2013, pp. 1-4.

3. S. Rajadurai, P. P. Nehru and R. Selvarasu, "Android mobile based home security and device control using GSM," *2015 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)*, Coimbatore, 2015, pp. 1-5.

4. Dr. S. Rabiyathul Basariya, and Dr. Ramyar Rzgar Ahmed, 2019. "The Influence of 'Adventure Tourism Activities' in promoting tourism business in mountain stations", African Journal of Hospitality, Tourism and Leisure, Volume 8 (2).

5. Dr. S. Rabiyathul Basariya, and Dr. Ramyar Rzgar Ahmed, Nov 2018. "A Study On consumer satisfaction and preference of colour TV brands in Chennai city", International Research Journal of Management and Commerce, Volume4, Issue 10.

6. Ramyar rzgar Ahmed and Rahim Jafar Mahammad Sharif, 2018. "The Effect of Tuition Fees on University Applications and Attendance: Evidence from the Kurdistan Region private Universities", Qalaai Zanist Journal, Volume 3, Issue 4.

7. Dr. S. Rabiyathul Basariya, and Dr. Ramyar Rzgar Ahmed, "A Study on Attrition: Turnover intentions of employees", Jan 2019. International Journal of Civil Engineering and Technology (IJCIET), Volume 10, Issue 9.

8. Dr. S. Rabiyathul Basariya, and Dr. Nabaz Nawzad Abdullah, Dec 2018. "A STUDY ON CUSTOMER'S SATISFACTION TOWARDS E-BANKING", International Research Journal of Management and Commerce, Volume 5, Issue 12,

9. Dr. S. Rabiyathul Basariya, "Attracting and maintaining personnel: The position of Branding and industry photograph", Journal of Innovative Research and solutions, Vol 2, Issue.2, Jul-Dec 2016