

# IOT Based Home Automation using Smart Switch

Prof. Swetav Sharad<sup>1</sup> Krishna Kumar<sup>2</sup> Ashwani Rathore<sup>3</sup> Manas Pandey<sup>4</sup>

<sup>1</sup>Assistant Professor <sup>2,3,4</sup>B. E Scholar

<sup>1,2,3,4</sup>Department of Computer Engineering

<sup>1,2,3,4</sup>Babu Banarasi Das Institute of Technology, India

**Abstract**— The development of a Program for a wise Switch which can management the on-off of any electrical, physical science devices reception by exploitation internet. The smart Switch is connected to internet via Wi-Fi, through a laptop, smart phone, pill or any device with internet access. This association is performed by computer science per-programmed into the smart switch in an exceedingly very applications program like firebox, chrome that is use for load the smart switch server which may open a configuration page to write down the data of the user's network. Then, the user will select in automatic mode the network, the protection kind, and conjointly the user ought to have written a pass phrase. it's a necessity to restart the smart Switch to urge access to internet, from that the user can management the smart Switch just exploit to the device, this technique is finished in essence via internet. As a medium to work to perform operation remotely.

**Keywords:** Home automation, Internet of things, smart switch, Wi-Fi technology

## I. INTRODUCTION

A home automation system (HAS) may be a system that's controlled by a far-off system. so as to activate home appliances and to permit for various ways that of preparation, the house appliances system wants a mechanism for communication between the various devices within the system, and for coordination among the varied processes running on such devices.

Microwave, Oven, TV, and garage door, etc. these home appliances area unit operated remotely. These home appliances area units controlled by remote devices like mobile phones, Desktop. They're connected through a wireless application management protocol. The house appliance system receives the command and this command is manipulated by the user. At that point system dispatch the command to various appliances which will perform associate action. This appliance useful for human want, once the user is extremely hungry, then microwave might have to reply to the user's request that it operate maximally to cook the food because it will as an example if the user is tired, might dawn late, hungry then the system could also be asked to full cook or not and periodic warming up each ten minutes subsequently.

The home appliance is also safe. Once the kitchen appliance ought to currently too hot or widen then the user will mechanically off that system. From anyplace we are able to manage the system. It protects the home from the house of the outsiders. We have a tendency to reside within the world of automation wherever most of the system is obtaining machine-controlled, like industrial automation, homes and alternative business sectors. The house automation system involves automatic dominant of home appliances exploitation totally different technology and controllers over smartphones or tablets.

It saves energy and makes the operation of assorted home appliances additional convenient. It involves the automatic dominance of electrical devices in homes or perhaps remotely through wireless communication. All instrumentality like audio and video system, security system, and kitchen appliances used in-home system is feasible with this method.

## II. INTERNET OF THINGS (IOT) BASIC CONCEPT

The intercommunication between device to device or machine learning connected through the internet with embedded technology systems using wireless sensors, actuators which is remotely controlled, monitor and optimized by the user for automation is referred as Internet of things (IoT). Here the term "Things" means physical devices such as chips, cameras, sensors and other such devices. These physical devices are responsible to communicate, collect information and 2 exchange data by connecting a network. The embedded technology of these physical devices makes this exchange of information each other possible. There are an assortment of home robotization includes that can help making life at home increasingly advantageous and simpler to oversee, particularly for occupied, huge families. Suppose you could consequently manage and control the gadgets that you ordinarily turn on and off each day. With a home computerization framework, you can manage appliances when you're out of the house and wondering if you remembered to turn off light or not, smart system will be there to answer the question. The developing nearness of the Internet of Things in individual's lives has made development and advancement in the savvy home space, enabling clients to associate their gadgets through the web to their phones and tablets, and make better than ever benefits for family units. In addition, as house owner are adjusting their gadgets to one focal application, gadget or centre, they further understand the worth these home robotization items can bring to a family. It is the connectivity apart from the conventional devices using internet such as desktop, laptops, Smartphone, tablets etc.

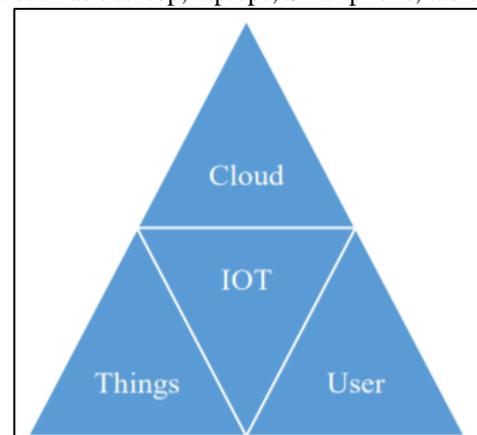


Fig. 1.1: IoT Basic Concept

### III. IOT CHARACTERISTICS

The characteristic of IoT includes the synthesis of hardware and software abiding by complex algorithms and computation techniques in which intelligence authorizes them to behave and act accordingly to the situations. The connectivity of IoT devices allows connecting various objects by creating a network and comprehensive intelligence systems. The dynamic nature of IoT devices tells the state of the device whether it is on or off. An IoT device also collects dynamic change of data information from its neighbouring environment. The essence of IoT is diversity and heterogeneity because of using distinct platforms and networks. Finally, security issues of IoT are being very important because of its delicate information and enormous action being taken to prevent security problems. In the future, IoT components enormity will increase at such level so that it becomes very difficult to deal or manage it.

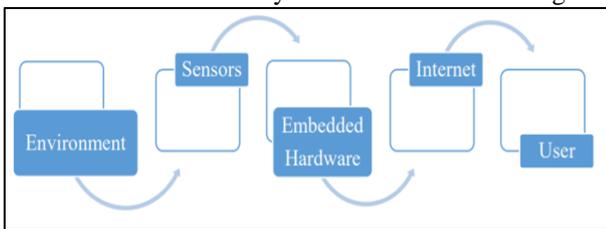


Fig. 2:

### IV. LITERATURE REVIEW

Living in the age of internet, life has become smarter and more convenient for us today. The internet has brought unthinkable and remarkable options for the human being that is connecting us with the think of building an automatic smart system. The automatic smart system concept that came from the rapid spread of the internet can reduce the danger in any system as well as human involvement. The worldwide researches are going on to consume the power of an electrical system or device efficiently so that the waste of it made by human involvement manually can be reduced. The efficiency of such an energy management system can take us to the appropriate goal of the automation system that can be used continuously with safety without the involvement of human beings. For this worldwide promising concept in the electrical sector, planning was going in your mind to work on this that can be useful in this area. The Internet of Things (IoT) system has a vast area to research or work on. The home automation system is one of the most talkative, promising and worldwide researching sectors of IoT. This home automation system has already created a significant impact in our technological area that is now looking for reducing the total power wastage reduction theory. Home Energy Management System (HEMS) is now in the headline to conduct a reduction of the loss of power, dangerous system disaster and the life loss of human beings. So, many research papers and some projects from IEEE and online published sides share the broad and major idea on these things that how we can save our energy and reduce the danger of the system. These concepts and their research made us think about the vision of our research more widely. That's how the mission and goals to work on for this research paper has been aimed. These papers and journal

concepts visualized the details of IoT, its applications and vast area of research, home automation, smart appliances at home, home energy management system, smart meters, scheduling with smart appliances, the difference between supplied power and solar power, the power consumption of our country. All these concepts are effective for this thesis paper to come to a conclusion and make a decision on the project of total energy-saving management.

### V. BLOCK DIAGRAM

The figure shows the block diagram of smart energy management using the automation system of IOT. In this block diagram, several types of sensors being used inside the abode like smoke-detector, gas detector, temperature, ultrasonic, for diverse purpose and all these are connected directly to Arduino microcontroller. All the appliances are connected through the relay circuit to the controller. Some basic loads are managed by green solar energy with a 12V DC battery and sometimes suggested appliances can be used through this power when critical peak price is high. This prototype is energized in two different way either solar energy or normal grid. Most importantly the prime amenities in this prototype system is that it is connected to the internet so the full system would be controlled, monitored and managed from any place of the world if it is connected to the internet.

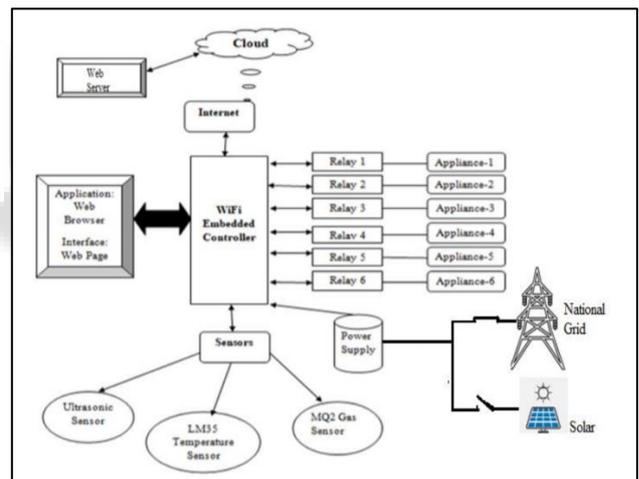


Fig. 3: Block Diagram of HAS using IOT

## VI. SCHEMATIC SIMULATION DIAGRAM

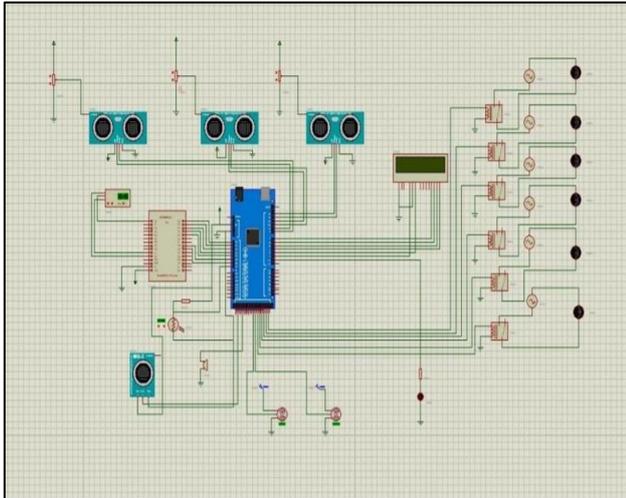


Fig. 4: Schematic Simulation Circuit

## VII. HARDWARE ELEMENTS WE NEED

### A. ESP 8266 NodeMCU

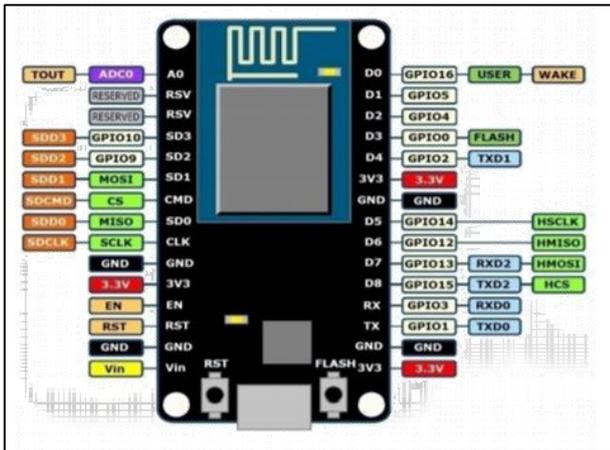


Fig. 5: ESP8266 Node MCU

- 1) **Specification:**
  - Voltage: 3.3V.
  - Wi-Fi Direct (P2P), soft-AP. 27
  - Current consumption: 10uA~170mA.
  - Flash memory attachable: 16MB max (512K normal).
  - Integrated TCP/IP protocol stack.
  - Processor: Ten silical106 32-bit.
  - Processor speed: 80~160MHz.
  - RAM: 32K + 80K.
  - GPIOs: 17 (multiplexed with other functions).
  - Analogue to Digital: 1 input with 1024 step resolution.
  - +19.5dBm output power in 802.11b mode
  - 802.11 support: b/g/n.
  - Maximum concurrent TCP connections: 5.

### B. Arduino MEGA

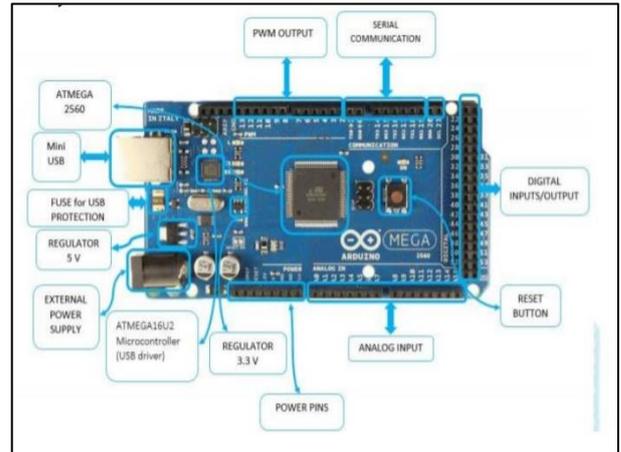


Fig. 6: Arduino MEGA

#### 1) Specification:

- 1) 8-Bit Microcontroller
- 2) High Performance, Low Power 28
- 3) Advanced RISC Architecture
  - 135 Powerful Instructions
  - Most Single Clock Cycle Execution 2
  - 32 × 8 General Purpose Working Registers
  - Fully Static Operation
  - Up to 16 MIPS Throughput at 16MHz
  - On-Chip 2-cycle Multiplier

#### High Endurance Non-volatile Memory Segments

- 64K/128K/256KBytes of In-System Self-Programmable Flash 4Kbytes EEPROM
- 8Kbytes Internal SRAM
- Write/Erase Cycles: 10,000 Flash/100,000 EEPROM
- Optional Boot Code Section with Independent Lock Bits

### C. Ultrasonic Sensor

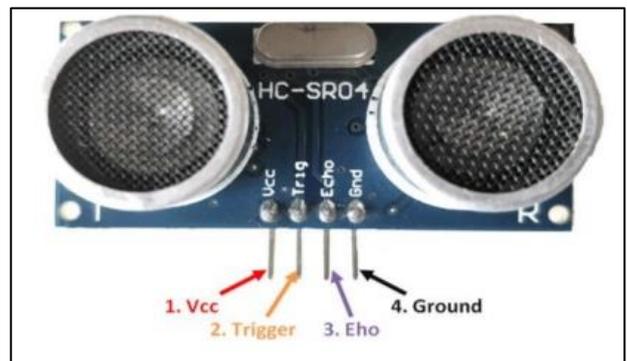


Fig. 7: Ultrasonic Sensor

#### 1) Ultrasonic Sensor Pin Configuration

Pin Number	Pin Name	Description
1	Vcc	The Vcc pin powers the sensor, typically with +5V
2	Trigger	Trigger pin is an Input pin. This pin has to be kept high for 10us to initialize measurement by sending US wave.
3	Echo	Echo pin is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor.
4	Ground	This pin is connected to the Ground of the system.

#### 2) Sensor Features

- Operating voltage: +5V



## VIII. CONCLUSION

This project depicts the home energy management by using systematic usages of home appliances in a smart home. It is a novel proposed model that we implemented at the minimum-cost system to determine an authentic smart home by using its intelligent management of home appliances inefficient manner. The home mechanization framework includes a lot of systems and diverse technology. Home customization innovation looks to decrease your worry by guaranteeing your house is secure notwithstanding when you are far away. It is additionally intended to lessen the measure of exertion you put each day into running your family so you can concentrate more on yourself and the general within it. Envision if your home could naturally set aside save you cash, time and exertion. With a large number of these effectively settled and effectively improving frameworks, these aspirations are conceivable. We accomplished this project into two steps through the utilization of solar power beside the grid line in a skilful way and a user-friendly dedicated authentic webpage to monitor and operate the apparatus that will make a busy life more pleasant and hassle-free. The leading goal of this project is to use home energy-inefficient form by abating unnecessary energy waste, money and improve a user-friendly home appliance management. The efficiency of the cost management system in this project inferior enough compared to any other automatic methods available in the market. Additionally, we also implement a different type of appliances in this circuit. It will help to operate the household smoothly.

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