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IOT Intelligence and Automation with Thinger.IO

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Abstract

A home automation is nothing other than regulating household appliances like electrical or electronics appliances, which also include household alarm and security systems and safety including entry control, burglar and fire alarm systems, and robber security warning and detection system. On obtaining Internet access, household appliances are really an essential component of the IoT. For labor-saving computers, modern home automation started. Home automatic coffee maker or fuel-oriented household appliances were feasible with electrical power link in the 1900s and contributed to the invention of washers in 1904, heaters in 1889, refrigerator, sewing machine, washing machine and dryer. The home automation network links devices that are regulated to a main hub. Automated household system using IOT is a methodology that enables basic home electrical appliances to be controlled by machines from any geographical position such as ON and Off of Water, fridge, fans, television, light, Air conditioner. We can control all this home appliances with help of special devise called Node MCU ESP8266, Internet Link, Android Software. The accessibility of Node MCU ESP8266 is explored in this article. We link to any of the above house applications such as fan, lamp, fuel and water pump, planting with coding and by using Thinger.io It is an online web server. All the home electrical appliances are handled by Mobile android application or my using laptop connected with internet

Keywords; *NodeMCU ESP8266, Mobile or laptop, tinger.io.*

I. INTRODUCTION

Now, in recent years, the internet of things has become every human being's lifestyle with high potential. Even it concentrates on different tasks that require the use of human intelligence on a daily basis. IoT has created a great forum for today's human life to meet the needs of all human needs in their daily lives.. If we see an example such as buying goods, controlling resources from any geographical location and controlling them. When you think of an environment as a personal refrigerator, you will be given a list of all the things you need for the next few days based on your current use. Only considering our smart device being integrated with home automation refers to tracking home tasks and performing the requisite actuation. Home electrical appliances such as water heater, refrigerator machine, TV, lamp, air con, etc. A specific IP address is allocated and connected to the web via a common household Wi-Fi. The home electrical appliances or gained controlled and controlled from any laptop connected with internet, mobile having internet connection. This can usually reduce power usage and boost the living conditions and the protection of the interior. [1].

With the rapid technological transition, electrical appliances have become smarter in recent decades. For AI and rapid computing power, they are

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produced in the real-world devices so they can organize themselves appropriately. The primary sensors and actuators attached to embedded systems together with the low power consumption of wireless networking can be adaptable to regulate and control the devices privately. This provides an integral part of the IoT network. The Internet of Things also helps a lot in transmitting data from defined sensors via wireless connection, ensuring data identification and formation data transfer in an open computer network. Things we use in our everyday lives have become smart with the existing technologies, but it's not enough till we link them to function with the dynamic environment to create their own inter network, i.e. machine-to-machine interaction. Objects such as electronic equipment, software, sensors, actuators, household appliances and automobiles are linked to a wireless connection. The IoT is a wireless connection of such objects and can send and receive data.Compact protocols such as MQTT, CoAP and so on. There are many broadcast modules that are commonly used for Mobile networks, 3 G, WiFi, wireless Bluetooth, ZigBee, Node MCU etc. Though, due to the increasing amount of Wireless networks and adequate range to conduct the control and monitoring required, WiFi is selected as the means of communication throughout the design and the systems are monitored via Tinger.io web sight adopted using ESP8266 Node MCU.

II. LITERATURE REVIEW

At present days the smart cities are mainly based on Internet of Things network new technologies are advancing quicker and more advanced. Main aim of Internet of Things network to link electrical and electronic modules to internet by using Wi-Fi. Instead, the IoT easily links sensors to the network, gets the information to and from the network generated by the systems Smart Cities designed to reduce any use of energy and carbon dioxide emissions throughout the cities using related information. In reality, the project is designed to generate and provide energy-related data including environment, emissions, traffic, etc. But does not involve important things like health monitoring care, smart farming etc. And why doesn't it allow a reasoning machine to be built by the company compare Internet of Things data. The Smart city project are being implementing four towns such as Amsterdam, Bologna, Miami and Rio. To define and predict traffic jams, they are using semantic web techniques. Six large and diverse sources were used according to the design: road conditions, weather data, Dublin buses channel, reports for social networks, roadworks and restoration, and activities in the area. They have used the principles of Semantic Web Rule Translation like high traffic stream. The project focuses primarily on the investigative process of traffic. The City Pulse system was planned for the measurement of availability of public parking spaces, real-time travel plans, counter measures to environmental pollution, and effective roads and public transfers the project is targeted at analysing wide scale and processing in real time. The Smart Santander project has installed 20,000 sensors for tracking parks and landscapes irrigation calculating hotness, humidity, dust, CO and NO2, outside parking, traffic frequency control, and intelligent calibration.[13]

III. IOT ARCHITECTURE

The physical layer is made up of modules to be used controlled. The sensors which are to be used to sense the layer is also linked to the environmental conditions surrounding it. The data link layer comprises of a router for the IoT gateway., we have used Node MCU as a router gateway, device manager and various communication protocols this layer connects the household appliances via Wi-Fi interacted communication to the web server or cloud. Raspberry pi is being used to store the data as a personal server and it also sends information to end users on request. Raspberry pi falls below the database / server layer in this program. The app and OSI layer consists of web protocols. This layer helps in designing A webpage to connect the wireless devices the perception layer through a laptop or

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computer or building an android or iOS mobile application.

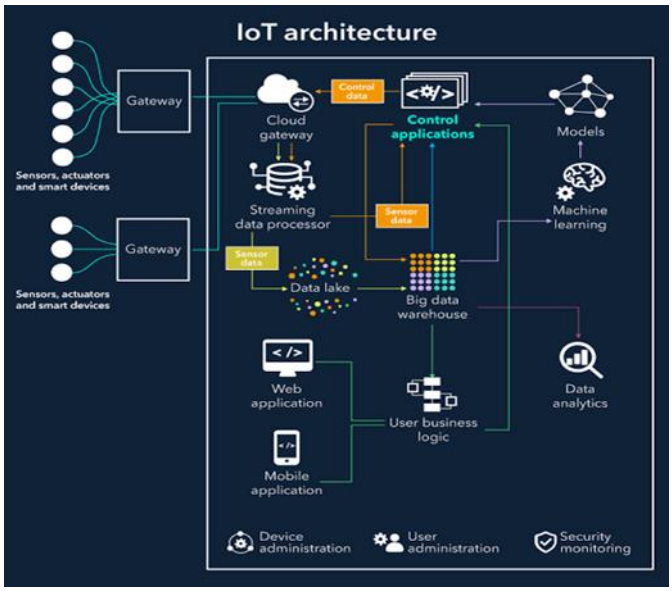

Figure 1Block diagram of IoT Architecture [10]

IV. RELATED WORK

The system is divided into two major parts: software and Construction of hardware. Configuring the hardware requires managing microprocessors, microcontrollers, sensors, and actuators whereas the software portion encloses programming that is that microcontroller and microprocessor has been written and uploaded. The system is made up of a microcontroller which is to be controlled and monitored connected to sensors and electrical and electronic devices. This segment shows how different parts of the hardware are designed. The requirements and details on the different components used for this device are listed below. Smart Home's main objective is to provide power consumption, performance, comfort and better real protection for batteries. Smart Home automation technology is much more widely used in India nowadays with the affordability and the tools that are easily available. Automation systems are also readily accessible. The main goal of this is to present a Small IoT platform designed and built by using a Node MCU ESP8266 powered WLAN network. The machine can monitor household electronic equipment via the web through the smartphone. Results from the machine check show actual control and monitoring functions from a computer connected to the network can be conducted. A. Node MCU ESP8266 ESP8266 Microprocessor Unit Node MCU ESP8266 ESP8266 is a system-on-chip (SoC) that incorporates a 32-bit microcontroller, regular digital peripheral interfaces, antennas triggers, RF balun, power amplification device and modules for low noise receiving amplifiers, filters and power management into a tiny package. Node MCU ESP8266 functionalities are as follows: MCU node has been the major component throughout the diagram above. It is linked by cable to an external power supply. The next key component is the relay. The 5V/12V DC relay is used as a toggle switch here. We can convert DC power to AC using the relay. Relay is linked to the MCU and bulb link. With Tinger.io, we can use the Tinger server to run all phones. Different buttons were included in the Tinger app, using these buttons we can turn on / off the switch. The graphical and pictorial interfaces in mobile phones and tablets were equipped with buttons, graph-plotter, LCD, and sensor-value screen in the form of iOS and android applications and software's. You can quickly and easily download the application, sign in, then track and manage all of your household appliances. The interface should allow the user to view and control the device status.

A Node MCU ESP8266 Section

Node MCU is an open source design and development board and software based on the commonly used Wi-Fi system ESP8266-12E. It allows users to code the ESP8266 Wi-Fi device with the quick, efficient, powerful and lightning speed LUA programming language or Arduino IDE. You can set up a Wi-Fi link by just a some keystrokes of codes and configure I / o pins just like Arduino to your requirements, turning your ESP8266 into a web server, much more hosting. It's the ethernet module's Wi-Fi closest approximation. Then you have a powerful tool on the Internet of Things (IoT). The

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Nodemcu parameters and specifications are listed below.

Microcontroller	ESP8266-12F
Analog pins	1
Clock Speed	80MHz/160MHz
Operating Voltage	3.3V
Flash	4M bytes
Length, Width	63.3 mm/29.1 mm

Table I Specifications of Node MCU[1]

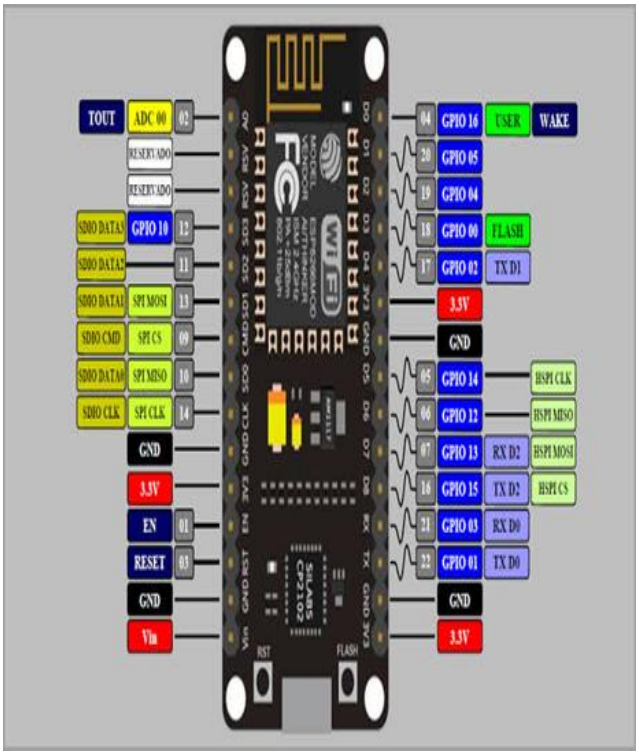

Figure 2 Pin Diagram of Node MCU ESP8266 [1]

B Thinger.io section

Thinger.io platform is an Open Source platform for the IoT, it provides a platform for ready to use scalable and reusable cloud infrastructure for connecting a number of devices. Developers and Industries can start controlling their things from the internet (Wi-Fi) in seconds, without worrying about the required cloud architecture connection.

Features Thinger.io offers on board.

1.Opensourse

2.HardwareAgnostic

3.CloudPlatform

4.Easycoding

5.For Makers and companies[9]

C Dashboard

The place where we can see the operation we can do the IoT device which we are connected to Internet Using Node MCU

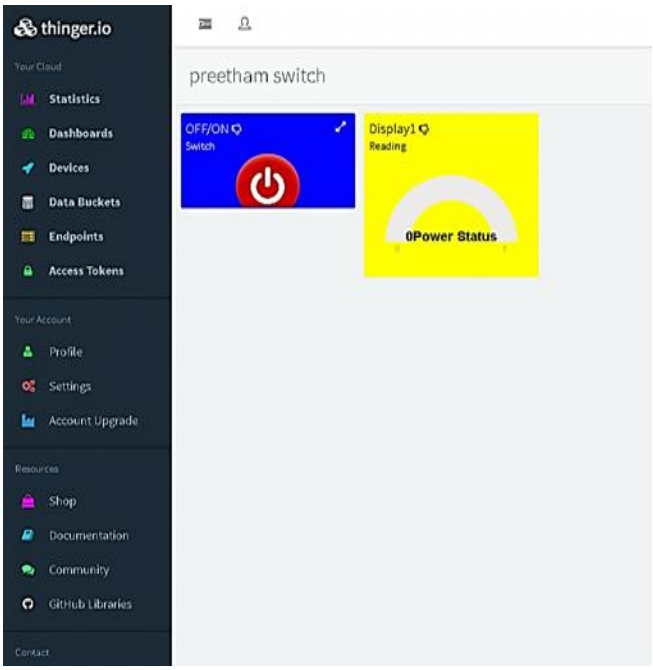

Figure 3 Dashboard of Thinger.io

D Data buckets

The data received from the Iot device that is Node MCU is stored in the data buckets. These can be transferred through the CVS files to the respected mail what we have and share the data of the IOT.

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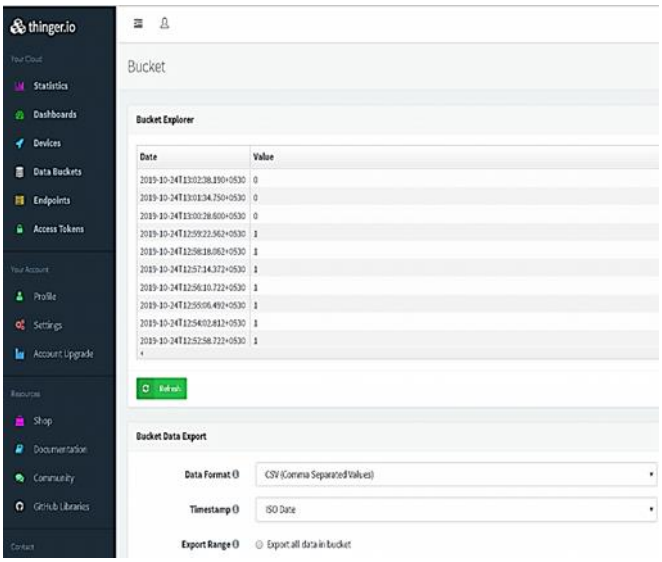

Figure 4 Data bucket of Thinger.io

E End points

The data buckets can be share and access the application with the third party application by connecting the end point of the Thinger.io to the other online tools.

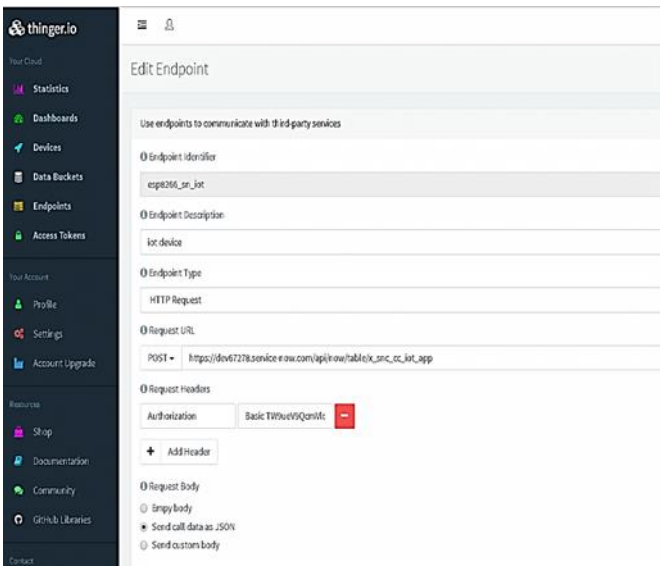

Figure 5 End point of Thinger.io

F Data Transmission

The data live transmission rate with 24/7 accuracy and the bits transmitted and received data with IP address location with additional Device status is appeared and the time connected by the device to the Thinger.io using WiFi connectivity.

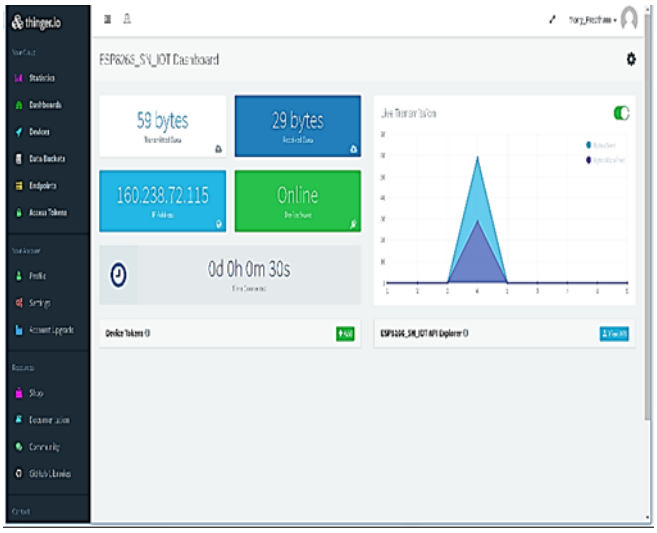

Figure 6 Live transmission of Thinger.io

V. WORKING OF THE SYSTEM

The system is made up of three separate sub-systems: the very first subsystem consists of the Thinger.io App unit to receive equipment classification, the second sub-system to be able to add several DHT11 temperature sensors to measure the temperature, the PIR sensor to detect movement as well as the ultrasonic sensor to calculate range, and the third subsystem consisting of a main and central microcontroller operating as the C. A relay unit was also interacted by the main microcontrollers to regulate the site machine. Using an ESP8266 (Node MCU) as the personal server, the sensor data is collected to the ui supported by mobile phones or tablets from the different sensors. Essentially, the holder's hand is in charge of switching ON or OFF the entire system. As the thing gets charged up, it checks for the current Service Set Identifier) and immediately and automatically connects and links to the Web otherwise it stays offline and conducts the automatic control function which does not require the owner's orders. The primary sensors accumulate the atmospheric circumstances and send them to the controller console that analyses the information sent individually of each sensor and instead then sends the data obtained to the internet server at the same time. Each sensor's measurements can be managed at any period of time by the consumer from any

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geographical position. It helps us to capture all the sensor information per second for the intent of future research. The module can function in automatic and manual mode in two modes. When adjusted to automatic mode, all household appliances such as fans, boilers, etc. They are automated to operate according to the sensors recognized in the nearby circumstances. On the other hand, once set to manual mode, the consumer can control or supervise any home electrical device remotely with a mobile phone or a computer/laptop connected to a web network or workplace desktop computer. In addition to the auto-manual mode of functionality, most of the features, such as normal water level monitoring and switching OFF or ON the water pump, ring alarms when detecting the human presence in the front of the door which can also be used for protection and safety by the movement sensors at home or at the office to notify the holder privately. These systems need not be switched at regular intervals as they are automatic and constantly underneath the microcontroller's instructions. Likewise, several of the alert signals and cautions such as building on fire, fuel leakage, intruder detection, etc. are transmitted wirelessly and informed by e-mail and telephone alerts to the owner of the house regarding the current scenario. Using location trackers such as GPS, we can track the person who own and can be locate the vehicle at any instantaneous time from geographical location. To finalize, Internet of Things provides greater protection with all the features that are rich.

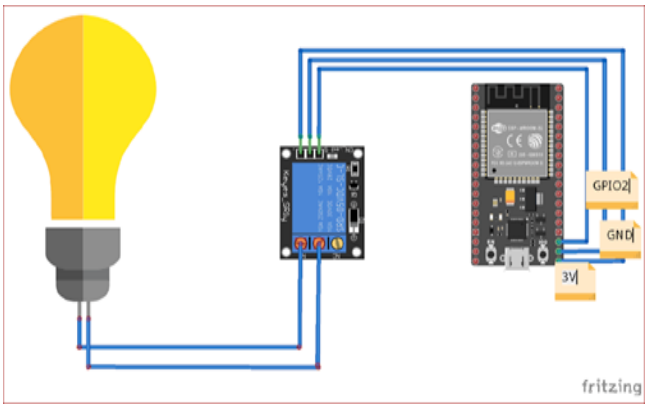

Figure 7 Schematic Plan of the Project[15]

VI. RESULTS AND APPLICATIONS

With Node MCU ESP8266 controller module, relay module device attached to the household appliances to be managed and linked to each other through Wi-Fi. IOS, Android and Windows versions are available for the system.

Figure Screenshots displaying the Thinger.io app's appliance switch with a tailor-made design and switches were usually used to promote observation and dominate many networked tasks. By pressing virtual buttons on the Mobile phones or personal computer, the household machines can be monitored at any private area. One preferred position of this application is that was it very well may be communicated inside all the relatives of the house. At the point when the one-part turns ON or OFF a machine, the activity will be evident to every single other part sharing the application. So also, constant just as verifiable information of estimations of temperature, moistness, GPS area, separation - measure and so forth can be gotten from anyplace utilizing the application.

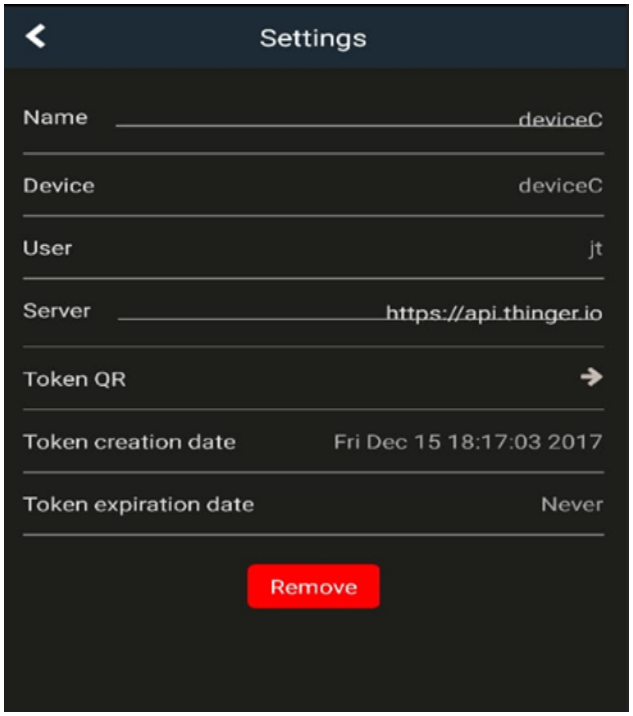

Figure 8 Application view of Thinger.io (Android)

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Further, this framework can be utilized in numerous spots, for example, banks, emergency clinics, research centers, traffic stations, private lofts, house, lanes, poultry ranches, nursery and so forth. More or less, this framework can be utilized at different fields and zones so as to cause them to work keenly and perfectly

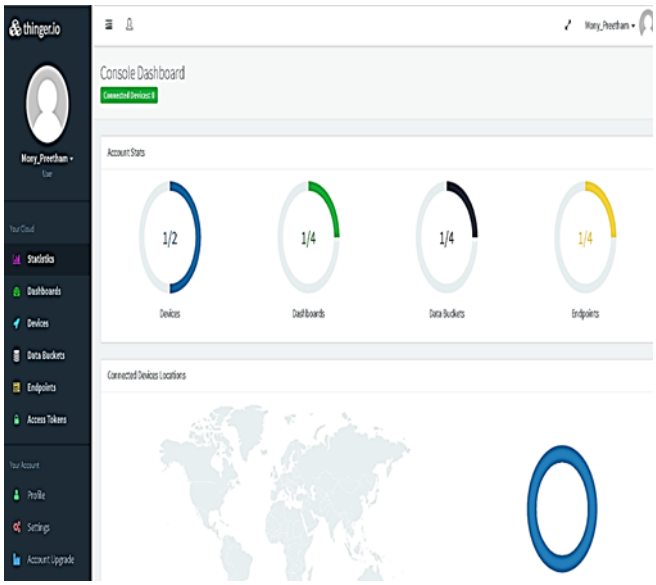

Figure 9 Desktop view of Thinger.io

The response of the IoT device can be controlled by the Node MCU with the help of the Application or the website from the computer. Considering the working of the mobile application the whole entire operation can be done by the digital pins in the application from anywhere in world when it connected to the Wi-Fi with the help of Thinger.io. The circuit components are mentioned below.

Thinger.io
2 channel Relay circuit
Node MCU
AC Operated Bulb
Mobile to operate

Table 2 Components used[1]

When all the circuits connects are provided with node MCU and Relay circuit D0 as the digital pin the node MCU and ground and power supply is provided as usual. 5V power supply is recommended to drive 2 channels. The connection are provide below with help of images of circuit.

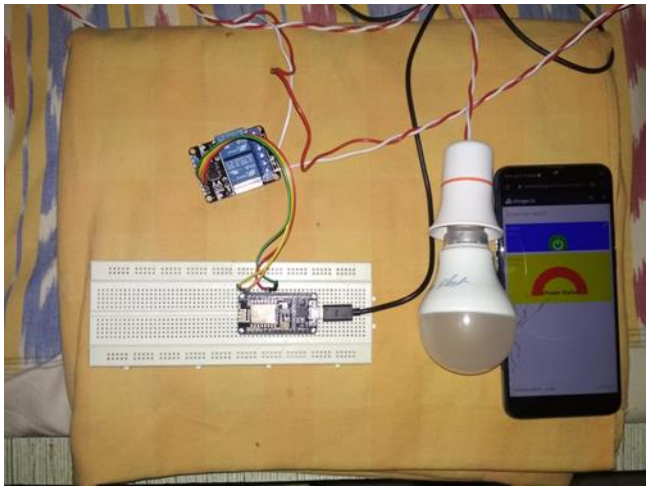

Figure 10 Working of Thinger.io in circuit OFF condition

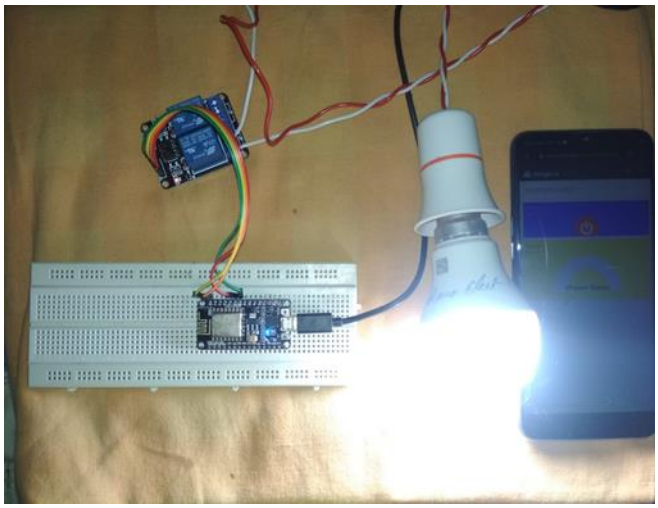

Figure 11 Working of Thinger.io in circuit ON condition

Hence we successfully operated the Devices with the help of Thinger.io using node MCU and Relay circuit board with application in mobile as well as in desktop and we collected the iot device data and stored in the data buckets, created digital switches/buttons for the IoT device in the thinger.io, Created End points to access the third parts apps and to find the data transmission rate with the device status 24/7 with accuracy.

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