



Energy Tracking and Bill Estimation Using IOT

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Abstract- Electricity is the most requisite power in current times. IOT based mostly whole strength watching Associate in Nursing invoice estimation gismo mentioned during this paper has a goal to construct recognition amongst family and industrial shoppers regarding their utilization of this energy. It will thus with the help of exhibiting period of time calculable voltage consumption by suggesting that of each load associated with it and real time calculable invoice of complete consumption on a screen unit. The novel strategy employed in the planned gismo is the integration of a cloud-hosted information and manipulation unit. The hosted information in Adafruit cloud enables the straightforward format of this technique that is besides the employment of any electrical power-driven strength dimension chip or fashionable and voltage device and it in addition receives logged with the remaining calculable consignment of each month. To store strength once unused, customers will perform the managed unit to transmit switch directions for masses. The planned device in addition makes Use of NodeMCU, 4-channel relay module, and Adafruit cloud.

Keyword-Nodemcu, IoT, Adafruit , Relay module, Electricity.

I. INTRODUCTION

Electricity asking is one among the foremost necessary and demanding performances of the house. The meter reading, although it's merely, is much quite easy and involves processes which will provide varied issues. The foremost common issues that area units presently see is that the result from the manual processes followed by Calculation errors, delays in system change and fault trailing problems are the main issues that firms realize troublesome to seek out answers for. This project suggests a mostly based system to gather, method and give notice to shoppers regarding the electricity consumption. This technique is going to be reliable, economical and correct to suit the needs. The planned answer uses wireless Technologies, over an answer that uses a server to handle a licensed person. The Automatic Electricity bill generation system is divided into elements. Hardware consists of electronic elements whereas the software package half consists of the server in keeping with communication. In the existing system for the assortment of energy consumption knowledge, the representatives of MSEB visit each residential area, take the snapshot and manually read the consumption knowledge from the meter. The burden on the MSEB approved person is reduced and alternative new options have conjointly been introduced. Customers will currently simply read their electricity usage exploitation server.

Proposed System:More efforts taken for bill generation. Customers face vast issues with this procedure of exploiting this manual method to calculate Bills. This is often a heavy issue that they are not communicating with their shoppers. There's conjointly no facility to match the previous month's electricity usage with this month.

II. BLOCK DIAGRAM

The diagram consists of Node MCU, Associate in Nursing opto-isolator module, a 4-relay module. The opto-isolator module is employed to modify on and 4-loads. Once any load is turned on the corresponding opto-isolator is additionally turned on and its opto-isolated output. This module receives a high signal once a switch is turned on in the adafruit module. The output from the opto-isolator is connected to a 4-relay module and the calculated bill is distributed to the adafruit cloud. The client will access the bill from anyplace within the world. The client will switch any device from a place within the world.

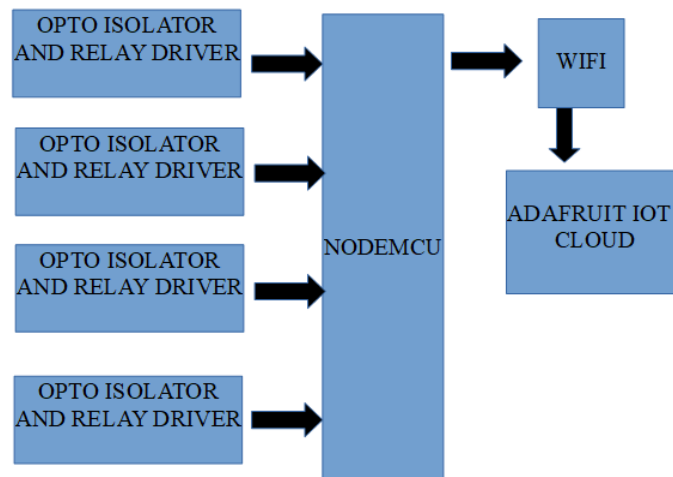


Fig.1 Block diagram of IOT based energy tracking and bill estimation

Implementation– initially the client must access the adafruit cloud and enter valid id and parole. Then he must choose correct dashboard. he must switch the correct electrical appliance on or off. Then the information is distributed to the NodeMCU through wireless fidelity. The Node MCU then switches corresponding electrical appliances. Then the NodeMCU calculates the time that the electrical appliance is on. Then it calculates the bill and sends it to the adafruit cloud.

III. HARDWARE

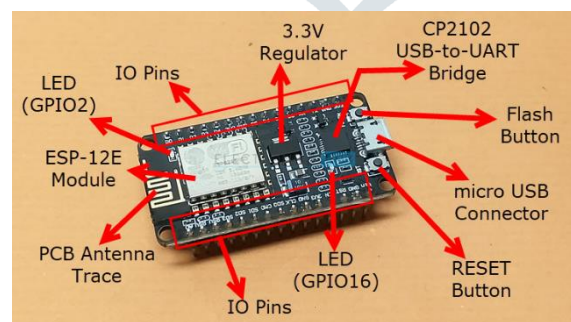


Fig.2.NodeMcu

Node MCU:

Power Pins Therearea unit four power pins. VIN pin and 3 three.3V pins. VIN is wont to directly provide the NodeMCU/ESP266 and its peripherals. Power delivered on VIN is regulated through the onboard regulator on the NodeMCU module – you'll conjointly provide 5V regulated to the VIN pin three.3 V pins area unit the output of the onboard transformer and may be wont to provide power to external elements. GND area unit the bottom pins of NodeMCU/ESP266 I2C Pins area unit wont to connect

I2C sensors and peripherals. each I2C Master and I2C Slave area unit supported. I2C interface practicality is accomplished programmatically, and therefore the clock frequency is a hundred kilocycles at the most. It ought to be noted that I2C clock frequency ought to be more than the slowest clock frequency of the slave device.

GPIO Pins NodeMCU/ESP8266 has seventeen GPIO pins which may be appointed to functions like I2C, I2S, UART, PWM, IR remote, junction rectifier lightweight and Button programmatically. Every digital enabled GPIO is designed to internal pull-up or pull-down, or set to high ohmic resistance. Once designed as Associate in Nursing input, it can even be set to edge-trigger or level-trigger to get central processing unit interrupts.

ADC Channel- The NodeMCU is embedded with a 10-bit SAR ADC. The 2 functions are enforced exploitation ADC. Testing power provides voltage of VDD3P3 pin and testing input voltage of TOUT pin. However, they can not be enforced at an equivalent time.

UART Pins-NodeMCU/ESP8266 has a pair of UART interfaces (UART0 and UART1) which give asynchronous communication (RS232 and RS485), and may communicate at up to four.5 Mbps. UART0 (TXD0, RXD0, RST0 & CTS0 pins) is used for communication. However, UART1 (TXD1 pin) options solely knowledge transmit signal thus, it's sometimes used for printing logs.

SPI Pins-NodeMCU/ESP8266 options 2 SPIs (SPI and HSPI) in slave and master modes. These SPIs conjointly support the subsequent all-purpose SPI features:

4 temporal arrangement modes of the SPI format transfer

Up to eighty megahertz and thus the divided clocks of eighty megahertz Up to 64-Byte first in first out

SDIO Pins-NodeMCU/ESP8266 options Secure Digital Input/Output Interface (SDIO) that's employed to directly interface American state cards. 4-bit twenty five megacycle per second SDIO v1.1 and 4-bit fifty megacycle per second SDIO v2.0 unit of measurement supported.

PWM Pins-The board has four channels of Pulse breadth Modulation (PWM). The PWM outputs are often enforced programmatically and used for driving digital motors and LEDs. PWM frequency varies from one thousand one thousand to 10 thousand ten thousand (100 Hz and one kHz). management Pins unit accustomed management the NodeMCU/ESP8266. These pins embrace Chip alter pin (EN), Reset pin (RST) and WAKE pin.

EN: The ESP8266 chip is enabled once amount pin is force HIGH. Once forced LOW the chip works at minimum power.

RST:RST pin is employed to reset the ESP8266 chip.

4channel opto-isolator board

I/O Isolation for MCUs (Micro Controller Units)

1. Noise Suppression in shift Circuits
2. Driving Port Signal Voltage: three.6-24V
3. Output Port Voltage Port: three.6-30V
4. Outputs are often Switched from Pull-Up or Pull Down with Jumpers.
5. Channel relay board

This is a 5V 4-Channel Relay interface board, be ready to management varied appliances, and different instrumentation's equipment with giant current. Software Arduino IDE is used to style and develop the project mistreatment. NodeMCU. Adafruit IOT cloud is employed to manage electrical appliances and skim the energy bill.

IV. RESULT ANALYSIS

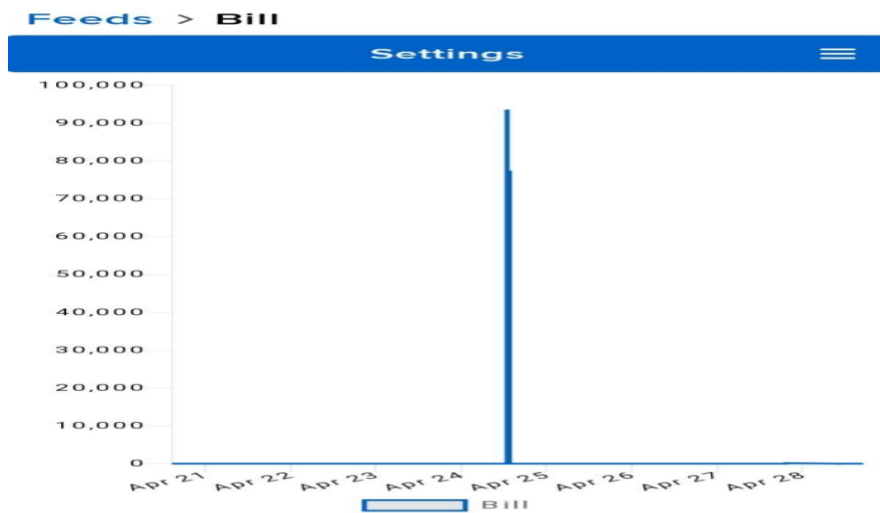


Fig.3.Billing graph

V.CONCLUSION

This system will browse on/off standing electrical appliances which might be monitored from a place within the world and it predicts the electricity bill of the month. The client will limit the uses of electrical appliances so as that the whole bill is often reduced.

VI. ACKNOWLEDGEMENT

On this incredible event of accomplishment of our undertaking on "IoT based energy tracking and bill estimation system". An abundance of thanks goes to all teachers and guides who have given their full exertion in directing the group in accomplishing the target furthermore as their consolation to stay up with our advancement on course. At last, collectively of the colleagues, I would want to determine the worth within the entirety of my gathering individuals for his or her help and coordination. I really want to believe that we'll accomplish more in our future undertakings.

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