IOT BASED SMART ELECTRICITY MONITORING SYSTEM

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Abstract: This paper presents the smart controlling of load energy utilization readings over the web. The proposed framework configuration dispenses with the contribution of human in power maintenance. The client can view vitality utilization in watts from a web page by giving a channel id to the heap. To investigate the energy use and to give more perception of the energy utilization insights, the Webpage utilizes the THINGSPEAK ANALYSIS. Wi-Fi unit performs IOT task by sending energy information of the heap to the website page which can be gotten to through the channel id of the gadget. In the proposed framework, Arduino micro controller is utitlized by which a buyer can do administration control by knowing vitality use from time to time. The unit created can be viewed on the website page through the Wi-Fi module.

Keywords: Internet of things, energy monitoring system, Electromechanical, smart meter, Wi-Fi

I.INTRODUCTION

Not every person comprehends what the matrix is, not to mention the Smart Grid which may be possibly known from the news or from local vitality suppliers. "The lattice," refers to the electric framework, a system of transmission lines, substations, and transformers and progressively that convey power from the power plant to home or business. It is what one plugs into to flip on the light switch or catalyst PC. The electric framework flow was worked during the 1890s and enhanced as innovation progressed over the decades. Today, after continuous improvement, it comprises of in excess of 9,200 electric producing units with 1 million megawatts of creating limit associated with 300,000 miles of transmission lines. In spite of the fact that the electric lattice which is viewed as a building wonder, we are extending its interwoven nature to its ability. To develop, another sort of electric network is required, one which is developed from the base to deal with the groundswell of computerized, modernized gear and innovation subject to it, and one that can robotize and deal with the expanding multifaceted nature and caters power in the 21st Century.

Benefits of smart meter over conventional Electromechanical meters:

1. Smart meters are error free. The exact readings are acquired by the clients and utility suppliers.

2. Readings can be sent remotely over the web to the clients and utility suppliers. Physical presence at the site is not required.

3. Alteration of these meters can be easily identified by the specialists.

4. Smart meters when added with home apparatuses can be utilized to control the power consumption.

Figure 1: Electromechanical v/s smart meter

For so many years, utility providers have been worried about the quality and economy of the energy system. And for now security and privacy are new emerging challenges for them [3].

II. ENERGY MONITORING SYSTEM

The Smart grid energy monitoring system which use Wi-Fi module is described in two part; one is physical and another web part. The physical part consists of Arduino Nano board, Wi-Fi module, LCD display, buzzer and power supply.

WORKING PRINCIPLE

The current sensor device consists of a accurate, low-offset, linear Hall circuit with a copper conduction path which is located near the surface of the die. Connected current which move through this copper conduction produces an attractive field which the Hall IC changes over into a corresponding voltage. Gadget accuracy is improved through the nearness of the attractive flag to the Hall transducer. An precise, corresponding voltage is given by the low-counterbalanced, chopper-balanced out BiCMOS Hall IC, which is customized for accuracy in the wake of bundling.

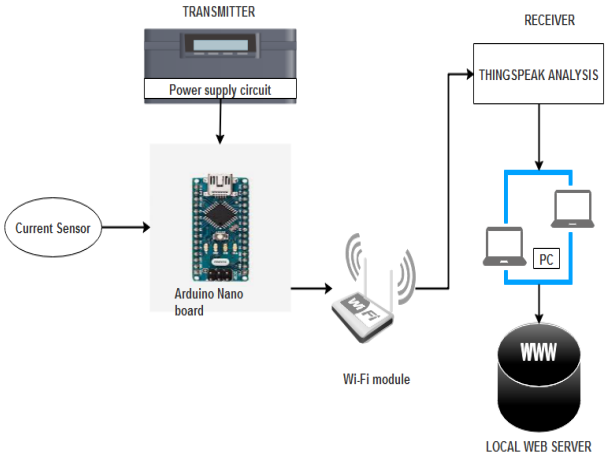

Figure 2: Block diagram of the system

Arduino is a microcontroller and can be powered with the power jack at the start and later can be powered with AC to DC adapter or with a battery. ThingSpeak is an IoT analytics stage benefit that enables you to total, imagine and dissect live information streams in the cloud. ThingSpeak gives moment representations of information presented by your gadgets on ThingSpeak. With the capacity to execute MATLAB code in ThingSpeak you can perform online investigation and preparing of the information as it comes in. ThingSpeak is regularly utilized for prototyping and evidence of idea IoT frameworks that require analytics.

III. ARDUINO NANO BOARD

Arduino is a microcontroller board and is based on the AT mega 328P. It includes 14 advanced I/O pins and 6 simple info pins and a precious stone oscillator of 16 MHz recurrence, a power supply jack, a USB port to dump the code, ICSP header and a reset catch. It can be very well controlled with the power jack at the beginning and later can be fueled with AC to DC connector or with a battery.

Figure 3: Arduino nano board

IV. WI-FI MODULE

The ESP8266 WiFi Module is an autonomous SOC with consolidated TCP/IP tradition stack which can give any microcontroller access to your Wifi compose. The ESP8266 is capable of either facilitating an application or offloading all Wi-Fi organizing capacities from processor of another application. Each ESP8266 module is pre-modified with an AT direction set firmware, which means, it can be easily attached to Arduino gadget and get about as much Wifi-capacity as a WiFi Shield offers[3] (and that is simply out of the box). This module is an amazing, financially savvy board with a colossal, and regularly developing network. And Wi-Fi unit performs IOT activity by sending vitality meter information to website page which can be gotten to through IP address. The TX, RX pins are connected to the 7 and 8 pins of the Arduino microcontroller.

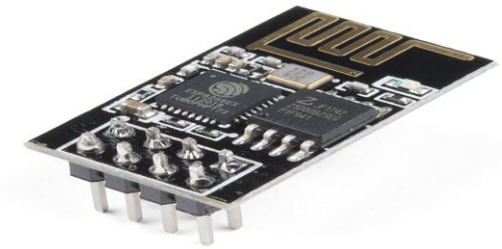

Figure 4: WIFI module

V. THINGSPEAK ANALYSIS

THINGSPEAK ANALYSIS is a free web service that lets you collect and store sensor data in the cloud and develop Internet of Things applications. The Thingspeak web service provides apps to analyze and visualize data in MATLAB. The information on reciver side is stored in local server. ThingSpeak requires a user account and a channel. A channel is the place to send information and where ThingSpeak stores it. Each channel has up to 8 information fields, area fields, and a status field. The information can be sent at regular intervals to ThingSpeak, but most applications function admirably consistently.

- Sign up for new User Account
- Create another Channel by choosing Channels, My Channels, and after that New Channel
- Note the Write API Key and Channel ID

The ordinary ThingSpeak work process lets to:

1. Make a Channel and gather information
2. Break down and picture the information

VI. EXPERIMENTAL ANALYSIS

Firstly, it is required to switch on the power supply, the current sensor linear Hall circuit with a copper conduction path located near the surface of the die. Connected current flowing through this copper conduction produces an attractive field which the Hall IC changes over into a relative voltage. Gadget accuracy is enhanced through the closeness of the attractive flag to the Hall transducer.

Figure 5: Hardware kit

The Node MCU is used to connect internet with the monitoring hardware system. The power utilized by the load is displayed in the cloud viz, ThingSpeak cloud in graphical format as shown in the Figure 6.

Figure 6: ThingSpeak cloud in graphical format

VII. CONCLUSION

Smart electricity monitoring system using IOT is the latest innovation method. This system is used for all home based remote control. In the present framework, energy stack utilization is brought to Wi-Fi and to assist buyers with avoiding undesirable utilization of power. A client using IoT framework can screen energy utilization and pay the bill Online. Likewise, a framework where a client can get SMS, on crossing limit of power is also possible. A framework can also be made to send SMS to the concerned meter perusing person of a particular region when burglary is distinguished at customer end. In addition to this, by utilizing cloud examination future vitality utilizations can be anticipated.

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