

IOT Based Energy Meter Billing and Monitoring System

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Abstract— The Internet of Things is a system of consistently developing physical items, (for example, associated gadgets and shrewd gadgets), inserted with hardware, programming, sensors and system network that empowers these articles to gather and trade information. IoT is regularly utilized for keen home, information obtaining, brilliant vitality observing, modern mechanization, and an assortment of stages. This venture portrays the engineering of an Internet of things-based Energy Monitoring System in the power framework. The objective of this venture is to imagine and screen the power utilization online on an advanced cell utilizing portable application by coordinating savvy plugs, sensors, Internet of Things (IoT) gadgets and GATEWAY which empowers the correspondence between the different keen fittings and the web server facilitating the checking framework application, in this manner encouraging the client to act appropriately to spare power or to give the solid power supply by utilizing Renewable Energy Sources.

Keywords: IoT, Sensors, Thingspeak

I. INTRODUCTION

In the present charging framework, the appropriation organizations are unfit to monitor the changing most extreme interest of buyers. The buyer is confronting issues like accepting due bills for bills that have just been paid just as the poor unwavering quality of power supply and quality regardless of whether bills are paid routinely. The solution for every one of these issues is to monitor the customers' load on convenient premise, which will hold to guarantee precise charging, track most extreme interest and to distinguish limit esteem. These are every one of the highlights to be considered for structuring an effective vitality charging framework

The customary metering frameworks have numerous inconveniences as manual perusing has weaknesses, for example, blunders in taking perusing, mistake, outside conditions influencing readings, deferred work. These systems likewise require gigantic labor. Programmed meter perusing framework is one approach to dodge these deficiencies.

II. LITERATURE SURVEY

This paper centers the keen home vitality the executive's dependent on IOT. Utilizing sensors, they have gathered data through close to home territory arrange for checking to control the apparatuses utilized in a brilliant home. Gathered data is handled utilizing a microchip. They have built up their own steering convention to improve the execution of this framework. This framework will be utilized by a keen home or an office to control its electrical apparatuses. In this framework, information will be put away locally and can't be seen by a remote user.

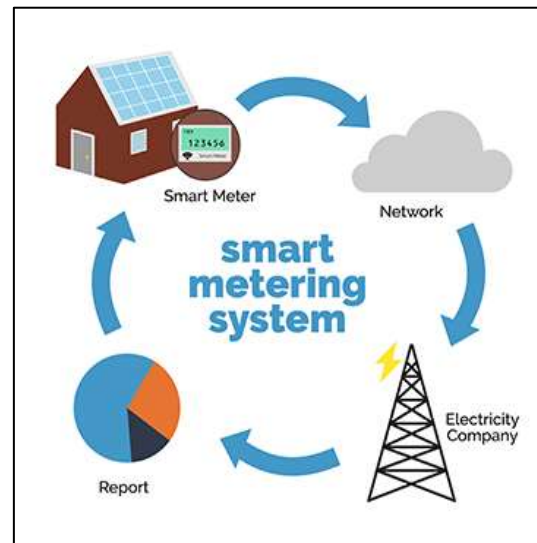


Fig. 1: IOT interface smart meter through Network

This paper vitality the board framework demonstrates produced dependent on state factors. These state factors are characterized dependent on apparatuses attributes. They have likewise created virtual sensors for this framework. Virtual sensors are created dependent on the Internet of Things (IoT). Utilizing this sensor and state factors they have estimated the vitality utilization of every apparatus. In view of this estimation investigation of vitality utilization of every machine associated in an industry or a house was made. In light of the examination, results they have given the answer for vitality use decrease. This strategy is simply programming based there is hardware included.

III. EXISTING METHOD

The present framework just gives criticism to the client toward the month's end just as consistently which measure of intensity devours each heap and bills. Additionally, the meter readings are taken physically. A shopper can realize the units devoured by observing their power bill as it were. Additionally, colossal labor is required to take the readings. There is no assurance for vitality meter altering. Buyers can't screen ordinary vitality utilization or use. The real disadvantage of this frame the executives of intensity control are difficult.[1]

IV. PROPOSED SYSTEM

In the proposed method, the consumer can manage each and every load which amount energy consumption by knowing their energy usage from time to time. This method not only provides two-way communications between the utility and the consumer. Another huge advantage of this system is that it notifies the consumer & utility at the event of the meter tampering. By this information, the consumer & utility can control the tampering are to reduce energy crises.[3]

A. Advantages

- The multiple load power consumes measurement.

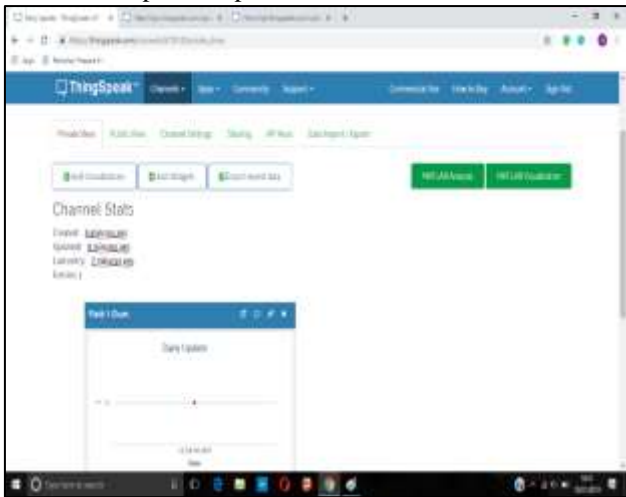


Fig. 2: Thingspeak channel

B. System Design

An electronic vitality meter is proficient to check charge, track robbery. Current transformer (CT) is joined with a line to gauge current moving through the heap and a voltage divider organize is associated with the line to quantify terminal voltage of burden. At that point it duplicates them to get control right then and there. At that point, it forms these estimations of capacity to figure the absolute power devoured by the burden. Computerized charging of vitality meter is made conceivable by interfacing an IOT modem to the vitality meter. As the specialists demand the units of vitality utilization the equivalent is sent to them through IOT administration from the vitality meter. Programmed association and disengagement should be possible by passing a code, for example, a secret key from the board dependent on bill installment of the customer through the IOT module. When this code comes to the microcontroller at the shoppers end the supply to the heap can be killed or turned on. If there should be an occurrence of modern purchasers the most extreme interest must be recorded by a higher authority from the board. At that point, this individual needs to official reset this most extreme interest in the wake of account it. This is tedious just as a repetitive occupation. Henceforth it is workable for the vitality meter to transmit this information to the board and store it in an uncommon register. This register must be opened by a higher authority from the board. This should be possible by discussing the greatest interest with the board through the IOT module. This detail with the vitality meter sequential number is put away in a specific register of the sheets microcontroller and can be just gotten to by a higher authority utilizing his secret word. When this technique is done then the most extreme interest of the modern shopper is reset. Identifying blame in dispersion framework should be possible by conveying between the dissemination transformer and the purchaser's vitality meter. In the event that there is supply in the transformer and no supply in the buyers end it implies that there is line blame between the shopper and the appropriation transformer. This correspondence is finished with IOT. At the point when this

correspondence interferes with vitality meter will send an IOT to experts and they can make vital move.

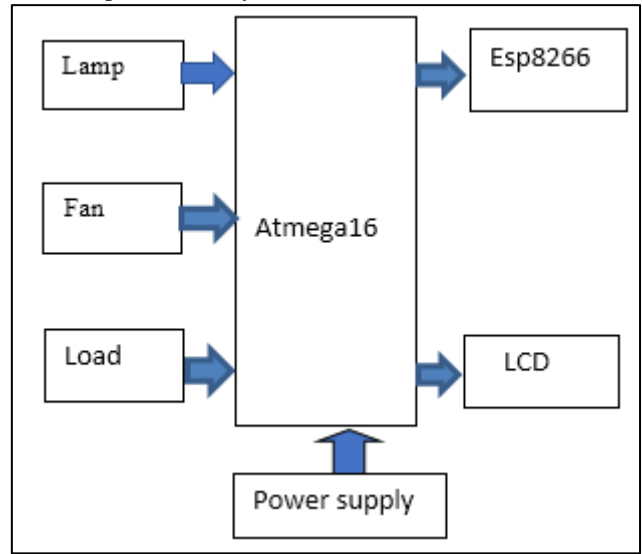


Fig. 3: System architecture

V. RESULTS & CONCLUSION

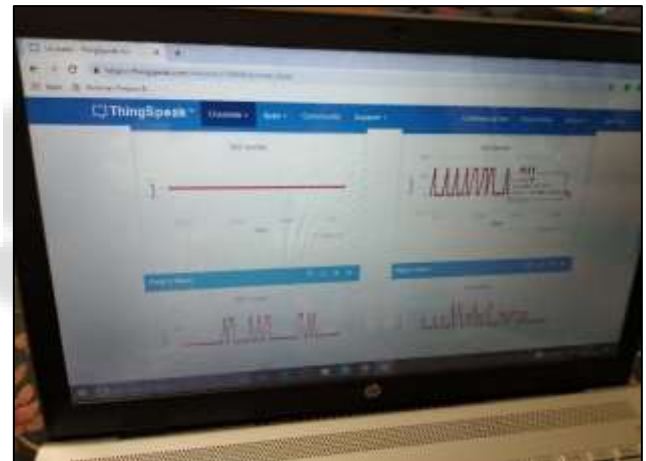
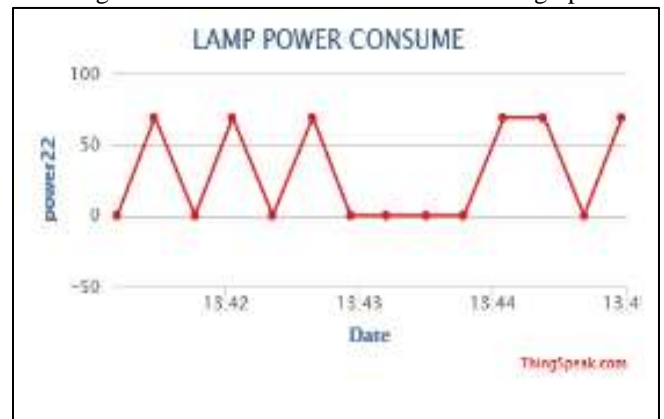


Fig 4. Table of raw sensor data and Month graph



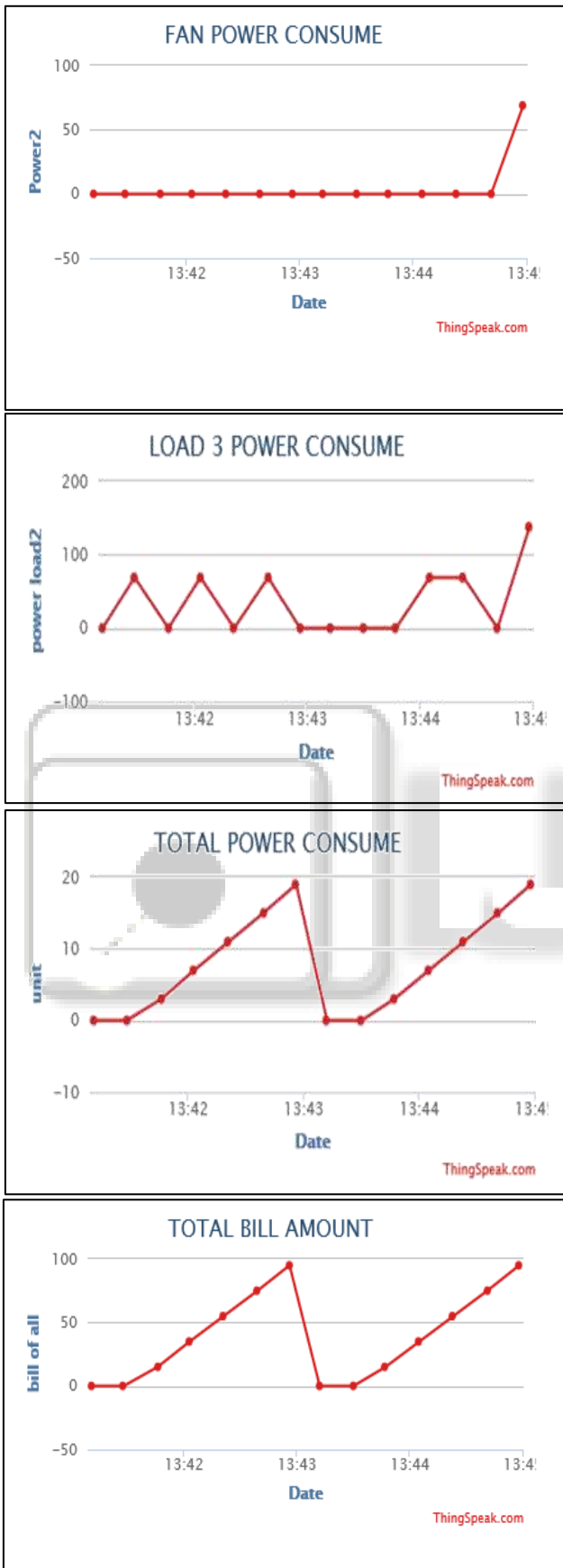


Fig. 5: Sensors data and each minute graph

VI. CURRENT SENSOR

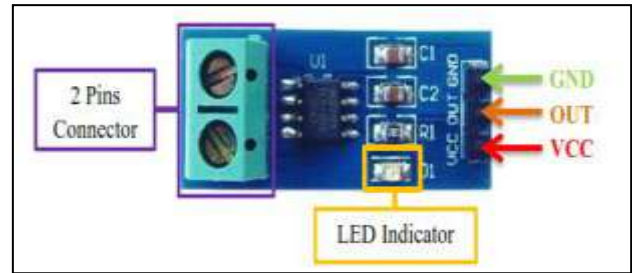


Fig. 6: current sensor

The Allegro® ACS712 gives conservative and exact answers for AC or DC current detecting in mechanical, car, business, and correspondences frameworks. The gadget bundle takes into consideration simple execution by the client. Run of the mill applications incorporate engine control, load recognition and the board, exchanged mode control supplies, and overcurrent blame insurance. The gadget comprises of an exact, low-balance, straight Hall sensor circuit with a copper conduction way situated close to the surface of the bite the dust. Connected current coursing through this copper conduction way creates an attractive field which is detected by the incorporated Hall IC and changed over into a relative voltage. Gadget precision is upgraded through the nearby nearness of the attractive flag to the Hall transducer. An exact, relative voltage is given by the low-balance, chopper-balanced out BiCMOS Hall IC, which is modified for exactness in the wake of bundling. The yield of the gadget has a positive slant ($>V_{IOUT}(Q)$) at the point when an expanding current courses through the essential copper conduction way (from pins 1 and 2, to pins 3 and 4), which is the way utilized for current detecting. The interior opposition of this conductive way is $1.2\ m\Omega$ run of the mill, giving low power[2].

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