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SMART ELECTRIC BILL PREDICTOR

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Abstract–

There are many problems in metering and billing processes like meter reader has to visit each customer meter to manually record the meter reading, the probability of the non-existence of the customers at their homes during that time, the lack of integrity and credibility of some of the meter readers, the safety and the outback areas represent a huge drawback, which cannot be neglected. In other hand, the traditional energy meter suffers from well-known measuring errors. This Smart Electric Bill Predictor System provides an excellent solution to traditional meters problems where the system will design based on the use of energy smart meter to read electrical energy consumed to get an accurate reading. Then the energy reading is sent to the control center in the electricity department based on GSM/SMS technology. The electricity department receives readings and makes processing operations and extracts the customer bills. The Smart Electric Bill Predictor sends a message to the customer mobile phone to keep the track of electricity usages, which contains the current bill, due bill, and total bill every two months have to be paid. The proposed system will havethe ability of automatic power outage if the customer refrains or delays for certain time in paying the bills by means of an SMS.

Keywords— Energy Meter, Node-MCU, Arduino, Current Sensor, Voltage Regulator

Introduction

The world is changing towards wireless technologies, which prefer not only reducing human efforts but is helping in making systems automatic and efficient. A system is said to be intelligent when it can decide what to do and can work automatically. An Energy meter measures the electrical energy in units used by the home appliances which consume electrical energy from the main power supply. Electromechanical and Electronic meter are two types of meter available to measure the unit consumption or electricity used. Electromechanical meters are commonly used in rural areas. Electromechanical meters have become out of date nowadays.

Digital meters replace electromechanical meters. Digital meter consists of LCD/LED to display the unit consumption. In traditional meter reading system manpower is required to read the meter and record the reading. An IOT Based Smart Electric Bill Predictor System does the same task without human efforts or any error. IOT Based Smart Electric Bill Predictor system is controlled using Arduino Uno. It is more efficient in terms of memory and GPIO.

The data obtained is then sent to the cloud through the internet. Unit consumed obtained can be sent wirelessly over long distance without any noise disturbance using the internet. The Smart Electric Bill Predictor is highly accurate and efficient because of no human interference. The Smart Electric Bill Predictor System predict by using internet and the concept of IOT, so that base station, as well as users, remain updated with the current consumed units, resolving the present problems faced by the electricity board and the user. Traditional meter and billing system is unable to keep track of maximum demand of consumers. The consumer is facing problems like receiving due bills for bills that have already been paid as well as poor reliability of electricity supply and quality even if bills are paid regularly. The remedy for all these problems is to keep track of the consumers load on timely basis, which will held to assure accurate billing, track maximum demand and to detect

threshold value. These are all the features to be taken into account for designing an efficient energy billing system.

The "Smart Electric Bill Predictor" addresses the problems faced by both the consumers and the distribution companies. With the use of GSM modem the consumer as well as service provider will get the used energy reading with the respective amount, consumers will even get notification in the form text through GSM when they are about to reach their threshold value, that they have set. This system enables the electricity department to read the meter readings monthly without a person visiting each house. This can be achieved by the use of Arduino unit that continuously monitor and records the energy meter reading in its permanent memory location.

PROPOSED WORK

The Smart Electric Bill Predictor System gets supply from the power station to its input terminals. Generally energy meter has two input terminals and two output terminals .From the input terminals of the energy meter input is given to ac converter (220v to 12v) by shorting both input of energy meter and input terminals of the ac converter. This converter converts 230V AC to 12V DC. This 12V DC supply is output of the converter. This DC supply is given as input to the voltage regulator. The output of the regulator is given as input to the Arduino Ain pin. The output of the meter is given to the 2 terminals.

The current sensor ACS712 has two terminals. One terminal is grounded and another terminal is connected to the analog pin of Arduino. The load must be connected between two sensing terminal of current sensor. When it give supply to the energy meter. It will transfer the load through the output terminal, passing through the current sensor. This current sensor senses the current that passes through the wire and gives it to the Arduino.

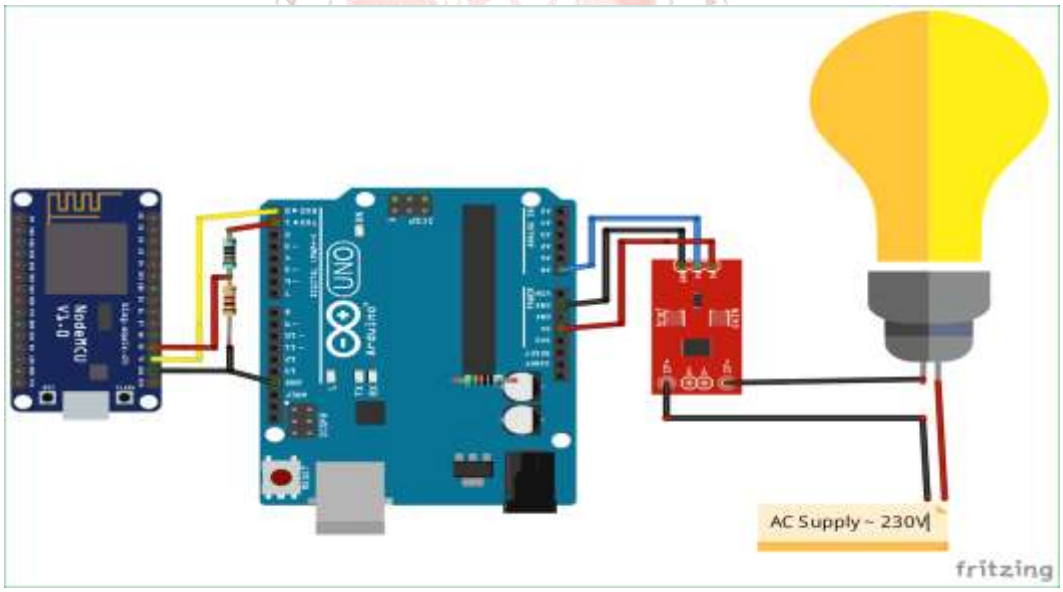

Fig. Interfacing of current sensor

The app display how much unit it consumed and it will display bill of one month and at last it insert a notification when meter cross some threshold value. the threshold value sends notification alert to the Mobile through the Wi-Fi . Firstly the output of current sensor is not a current or power consumed by appliances it is analog voltage signal proportional to current flowing though the circuit. The output of the sensor is supplied as input to the analog input part in the Arduino Uno Board. This analog voltage must be converted into digital voltages for further calculation. Arduino board has inbuilt analog to digital convertor which converts analog input of power to digital output. This digital output is displayed on app display in form of Watts. There is a set point value when the power utilized by the load exceeds the set point value app send notification to customer.

Required Components:

- ArduinoIDE
- Arduino UNO
- ESP12/Node-MCU
- ACS712 Current Sensor Module
- Voltage Regulator
- Load

Fig. Smart Electric Bill Predictor

Smart Electric bill predictor reduces manual efforts . Microcontroller takes the reading from energy meter and display the reading on app or web-site. The reading from energy meter also sent to the cell phone of user through GSM model. Smart electric bill predictor Keep track of consumed energy on timely basic, So that customer can monitor their electricity usage .

The Arduino is used to connect app with the monitoring circuit system. The power utilized by the load is send to the cloud server and app fetch data from cloud server to show on mobile phones In the Smart electric Bill Predictor current sensor is used to sense the current and display it on internet using IOT. The Proposed System

updates the data in every 1 to 2 seconds on the internet using cloud server.IOT system where a user can monitor

Fig. Displaying Unit Consumed On App

B. Displaying Unit Consumed on App:

Current senses the power consumed this gives output in analog form. the output of the sensor is supplied as input to the analog input of Arduino It has inbuilt analog to digital convertor which converts analog input of power to digital output. This digital output is displayed on app display in form of Watts. ISmart App shows monthly analysis of unit consumed by customer and their bills also allow to keep track of live unit consumed on app. customer can monitor their electric usages from anywhere in world. ISmart app also provide option to pay your bill online though app.

Module in App:

- Registration Module

- Login module
- Bill Details
- Online Payment

Conclusion

Smart Electric Bill Predictor is based on IOT Technology to achieve future prospective demand of electricity. It is based on principle of two way communication by Smart electric bill predictor will be part of a much wider internet of things in things in future integrating multiple aspect of human needs service to satisfy all such needs using this smart electric bill predictor it can reduce the manual effort to take reading from energy meter which is cost effective. This smart electric bill predictor also reduces man power. It is user friendly and smart electric bill predictor can enhance electricity department send a message to consumer about billing information. The power consummation of meter is an important design content though its overall cost is a bit high but if produced in a large scale it can reduce the cost.

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