Impact Factor (SJIF): 5.301

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

Volume 6, Issue 3, March-2019

SMART METER USING IOT

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Abstract:

The Digital India program is a flagship program of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. So for supporting it ,our part of contribution by this project which make the energy meter reading digitally going to update in IOT server via microcontroller in absence of unit reading staff infield and for safety purpose we initiate two deductors (fire sensor & gas sensor).Normally after 60 days the electricity board concerned officer will mark and tell the energy meter unit reading of particular house and this process is quite lengthy so to overcome from it our system is beneficial for both electricity department and the house owner. After 30 days itself a LCD via IOT module with the information of units and the bill amount will send to the house owner mobile number and even in the 60th day the unit reading for particular meter will get updated in the IOT server. This project is easy and comfort for public to maintain the budget EB and efficient too.

Now, we use those two sensors to shut down electricity incase of any emergency like bursting of gas cylinders & fire accidents.

Keywords – Internet of Things,LPG sensor,Fire sensor,voltage sensor,current sensor.

I.INTRODUCTION

It has become a trend to integrate automatic systems via wireless applications over network. Along with the advancement of technology development, research on wireless applications and remote control has become significant and popular today. An electricity meter, electric meter, or energy meter is a device that measures the amount of electric energy consumed by a residence, business, or an electrically powered device. A smart energy meter (SEM) is electric device having energy meter chip for electric energy consumed measurement, wireless

protocol for data communication (IOT) and peripheral devices for security purpose, data showing, meter controlling etc.

Energy meter systems can be incorporated with embedded controllers such as IOT modem to transmit the data over the mobile network. Such data can be then fed and integrated into existing Energy Management Systems located at power companies and organizations. The problem of efficiently collecting data from a large number of distributed IOT Modems in the energy meters is still a challenging problem. IOT modem should needs the terminal to control that part. Our Embedded controller interfaced with energy meter reading systems and IOT modem to control both, and by using IOT it will automatically updated to server.

The Energy Monitoring System is appropriate for Industries, manufacturing plants, commercial buildings or any situation where an electrical system is used. The system provides the centralized energy monitoring and control. The Energy Management System leads to savings in the overall cost. These savings may be come from better utilization of manpower, servicing cost, savings in the energy consumption, and non-breakdowns in the system. The smart energy meter contains an energy meter, a IOT modem, a microcontroller (Arduino) and a relay circuit, which is connected between the energy meter and the load.

The proposed smart energy meter is able to provide all the metering and consumed energy, sending the generated bill by the mobile app over the IOT network as well as the upload to server. Factually at present, the metering and billing system of our country is totally conventional and it is very much slowed, faulty and corrupted so our proposed smart energy meter is highly deserved for national implementation. The overall operation of the proposed system is discussed in the next section.

II. RELATED WORK

Smart meter is used to calculate voltage and current, while switching on the load automatically it will calculate. Then it will print the cost of unit which is used by them. If the fire sensor or gas sensor has detected immediately power will switched off. After that those data can be stored in IOT server.[1]. BLH methods hide the energy consumption variations through controlling the battery charging and discharging process. The variances of household load profile can be offset to maintain a constant output load with the presence of a rechargeable battery [2]. The physical constraints of the battery, however, make it often impractical to flatten out the actual power variations. BLH schemes can also achieve hiding by randomizing the load profile to preserve a certain differential privacy [2][3]. The trade-off between the smart meter privacy and electricity cost in the context of home energy management and demand response by using a rechargeable battery is addressed in[3].

[3][4] In that we aim to exploit the existing household energy storage units for load hiding. In particular, we consider their use cases as both assistive and alternative energy storage solution to a dedicated battery to achieve hiding by leveraging the combination of BLH and LLH. Therefore, our proposed solution can address smart meter privacy concerns and accommodate individual privacy preference completely at the customer premises in a costeffective manner.. The use of EVs as assistive batteries to replace local dedicated large-capacity or fast-charging-cycle batteries for load hiding was discussed in [38], where the stochastic nature of both the EV charging process and household energy demand are captured by the Markov decision process (MDP). The use of cascaded rechargeable batteries to alleviate the privacy leakage from smart meter measurement was discussed in [4].

III. EXISTING SYSTEM

Energy meter was a device which has been existing in these days. It measures the amount of electrical energy consumed by a residence, business, or an electrically powered device.

The person from EB office was assigned to check the energy meter of different houses in the surrounding locality.

Then the bill will be generated based on the power consumed by the people for the period of two months.

Inorder to avoid huge blast, there is no sonsors used in household level.

IV. PROPOSED SYSTEM

It has become a trend to integrate automatic systems via wireless applications over network. Along with the advancement of technology development, research on wireless applications and remote control has become significant and popular today. An electricity meter, electric meter, or energy meter is a device that measures the amount of electric energy consumed by a residence, business, or an electrically powered device. A smart energy meter (SEM) is electric device having energy meter chip for electric energy consumed measurement, wireless protocol for data communication (iot) and peripheral devices for security purpose, data showing, meter controlling etc.

Energy meter systems can be incorporated with embedded controllers such as IOT modem to transmit the data over the mobile network. Such data can be then fed and integrated into existing Energy Management Systems located at power companies and organizations. The problem of efficiently collecting data from a large number of distributed IOT Modems in the energy meters is still a challenging problem. IOT modem should needs the terminal to control that part. Our Embedded controller interfaced with energy meter reading systems and IOT modem to control both, and by using IOT it will automatically updated to server.

LPG gas sensor and FIRE sensor are mainly used to send the alert message and shut down the total load, inorder to avoid huge damage to the environment.

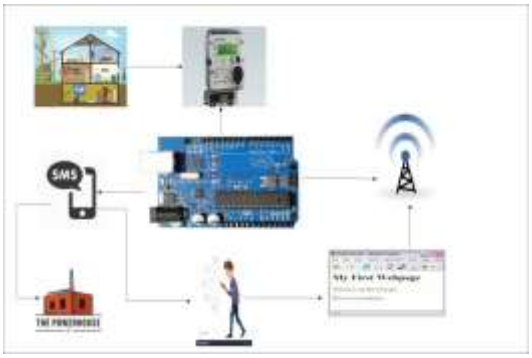


Fig 1.1 Architecture Diagram

V. METHODOLOGY

CALCULATE THE VOLTAGE AND CURRENT

Now we are going to calculate that how much unit has been used with the help of respective connections using current and voltage sensor.

COST OF THE UNIT

With the use of unit that has been noted we going to calculate the cost of unit by using the formula cost=unit*cost of per unit. Then the calculated unit has been printed automatically in the screen.

FIRE SENSOR AND VOLTAGE SENSOR

Some of the home accident has been take place by the leakage of gas and some may due to the fire fluctuations. This may overcome by using the fire and the voltage sensor . It will automatically detect the fire and leakage of gas . If it will detect then the electric board has been automatically turned off in order to avoid any accidents.

IOT Board

Meanwhile by the use of IoT we are connected the server and the readings that denote how much unit has been used till now and the cost of the units are generated in the server automatically.

ALGORITHM:

Step 1:- Start

1.1: include the liquidcrystal library file, To display the values,

1.1: Add analog register to read analog files

1.3: set Pinmode configuration for input and output.

1.4: start the serial. begin communication.

1.5: start to read continuously analog values from sensors

Step 2: Read digital values

2.1: check out the digital pin value (switch)

2.2: if digital pin gets high, read analog value from current sensor, voltage sensor

2.3: To calculate the power factor multiply A0 and A1 values.

2.4: The power factor will be displayed with LCD using lcd commands.

2.5: calculating the cost

Step 3: LPG GAS DETECTOR

3.1: Collecting the analog values from A3

3.2: fixing the threshold value

3.3: if the threshold value exist

3.4: pass the data to IOT board using serial communication.

Step 4:

4.1: Passing all the data to server using serial communication

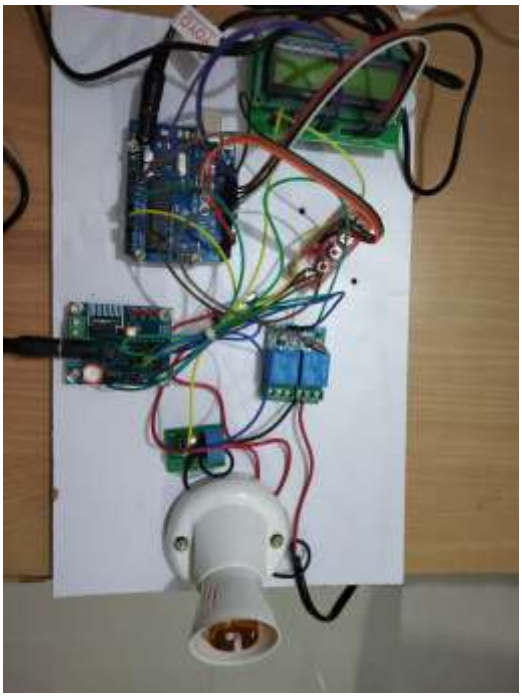
4.2: making the centralized data base

4.3: creating output window using php

VI. RESULTS AND CONCLUSION

Arduino and IOT based Smart Energy Meter for advanced metering and billing system is built which is able to read and send data via wireless protocol using IOT technology through IOT modem, capable of manage the meter as well as the line connection. However this project needs more modification for more reliable and higher degree of satisfaction and safety. For IOT module the network coverage of the SIM used is one of the important facts. The network strength should strong so that the IOT module can work well.

OUTPUT



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