IOT BASED ENERGY METER WITH CURRENT, VOLTAGE AND COST

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ABSTRACT

This study has specifically focused to develop an IOT Based Prepaid Smart Metering System which would be able to address some of the challenges currently available in the regular digital automated metering system in Eurasia. Smart Metering with its unique performance with the Internet of Things (IoT) tend to be an efficient system for electricity management, se- cure against the intervention by third parties, and reliable for tracking and real-time remote monitoring. Hence, this project work is accomplished by analyzing available functions and journals on the existing design of Smart Metering and discussed on further preferable application. In the currently working system, electricity meter reading for electricity usage and billing is done by human workers from home to home and building to buildings. The purpose of this project is to develop a Smart Electricity meter using GSM. This can reduce human errors and helps to retrieve the real time meter value via GSM and send it to customer's mobile phone through GSM. This also al- lows electricity board to modify the variable package price in specific duration. The administrator can analyze the customer's power consumption data and generate the report from the data online. The prototype will be able to introduce the billing system to the customers, get the power consumption data from smart meter, keep the data in centralized database and generate the report.

Keyword: *- Energy meter1, Arduino2, Relay3, etc….*

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1. INTRODUCTION

Electricity is one of the vital requirements for sustainment of contents of life. It should be used very judiciously for its proper utilization. But in our country, we have lot of locality where we have surplus supply for the electricity while many areas do not even have access to it. Our policies of its distribution are also partially responsible for this because we are still not able to correctly estimate our exact requirement and still power theft is prevailing. On the other hand, consumers are also not satisfied with the services of power companies. Most of the time they have complaints regarding statistical errors in the monthly bills. With this we can monitor meter and track if any fault is there or not. In previous meter a circular metal strip rotates and according to that rotation we calculate the consumption. But our meter works on pulse which is created according to consumption and we previously connected an- droid board which monitor the pulse and according to pulse the bill is generated. With the help of this project we are aiming to receive the monthly energy consumption from a remote location directly to centralized office. In this way we can reduce human efforts needed to record the meter readings which are till now recorded by visiting every home individually. Smart energy meter is an electronic device that measures the most accurate amount of electricity consumed by a residence, business or any electrically-powered device. A smart meter is reliable source

for most accurate information of consumed energy that reduces the chance of error in the existing billing system to minimal.

EXISTING PREPAID METERING TECHNOLOGIS

SMART CARD BASED PREPAID ENERGY METERS

Smart card is a credit card sized plastic card embedded with an integrated circuit (IC) and usually it consists of a ROM, EEPROM and a CPU.A smart card provides both the memory capacity and the computationalcapability [5]. Access to data stored on the card is under the control of the smart card operating system. In this method consumer have to have the smart card recharged for the amount he chooses and enter the card into the card reader of the energy meter. Then the meter store the number of units recharged and start to measures the energy consumption.When purchased units are used up the meter disconnect the power supply until the next recharge.

RFID (RADIO-FREQUENCY IDENTIFICATION) BASED PREPAID ENERGY METERS

Radio-frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. The technology requires some extent of cooperation of an RFID reader and an RFID tag. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. In this method RFID cards which are issued by the electricity suppliers to individual consumers are used. This RFID card is unique with a code in it and consumers are free to make flexible recharge. When the consumer wants to use the system, he needs to show the card to the reader, then the unique code inside the card is recognized by the reader, and starts deducing the amount of the RFID card as per the quantized unit charge. When the usage completes the consumer has to recharge the RFID card again. In This Project The IOT Based Prepaid Smart Metering System Includes Meter, which is used to measure the flow of electric power from input to the output terminal, LCD Display, which is used for displaying readings of the parameters that are being measured, GSM module is used for communication with the end user and it is responsible for updating the data on the distribution side

1.1 OBJECTIVE
1. *Measure electrical parameters such as voltage, power factor, wattage, unit consumption, total bill amount.*
2. *Display above electrical parameters and billing data on website.*

2. METHODOLOGY

This mechanism requires the consumers to pay for the electricity before its consumption. On that way, users hold credit and then use the electricity until the credit is ended. If the available credit is ended then the electricity supply is cut- off by a relay. Readings made by operators are prone to errors. This project shows the above mentioned problems. These system will first register the user. For making recharge the consumer must have to login to the system. The username and password must create to login then it will check for the user is valid or not through server. It can able to recharge through user phone app only if the user is authorized user. As recharge ends it will cut off the electricity. The working of the project is described in the fig.1. At first the GSM module is initialized and it establishes a network for communicating with the user. After initialization the controller checks the balance if it is above optimum balance then the load is turned on. If the balance is below a certain value then the controller will send a SMS for recharging the energy account.
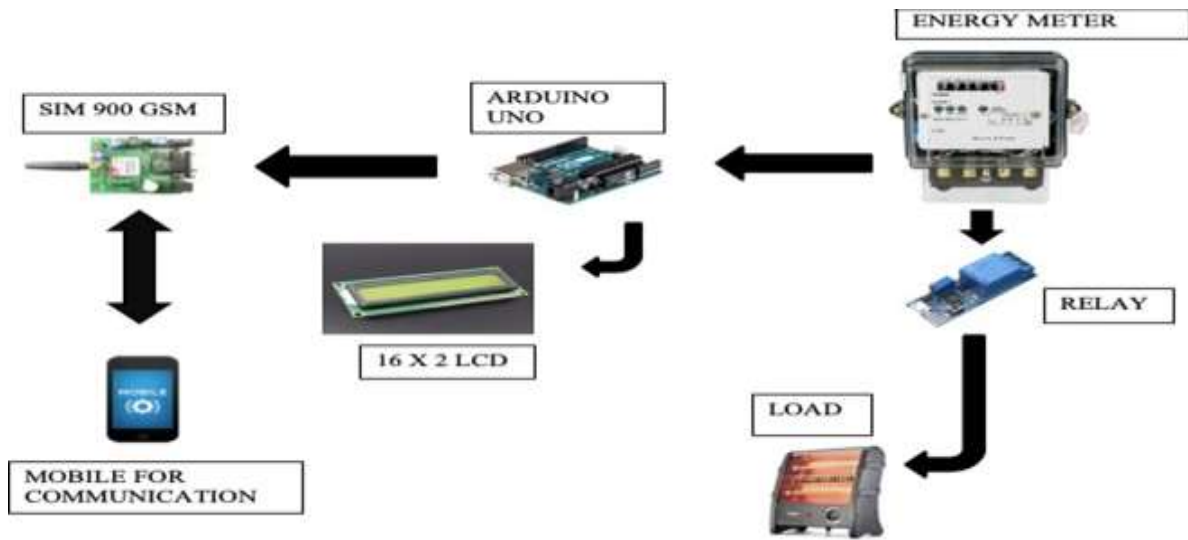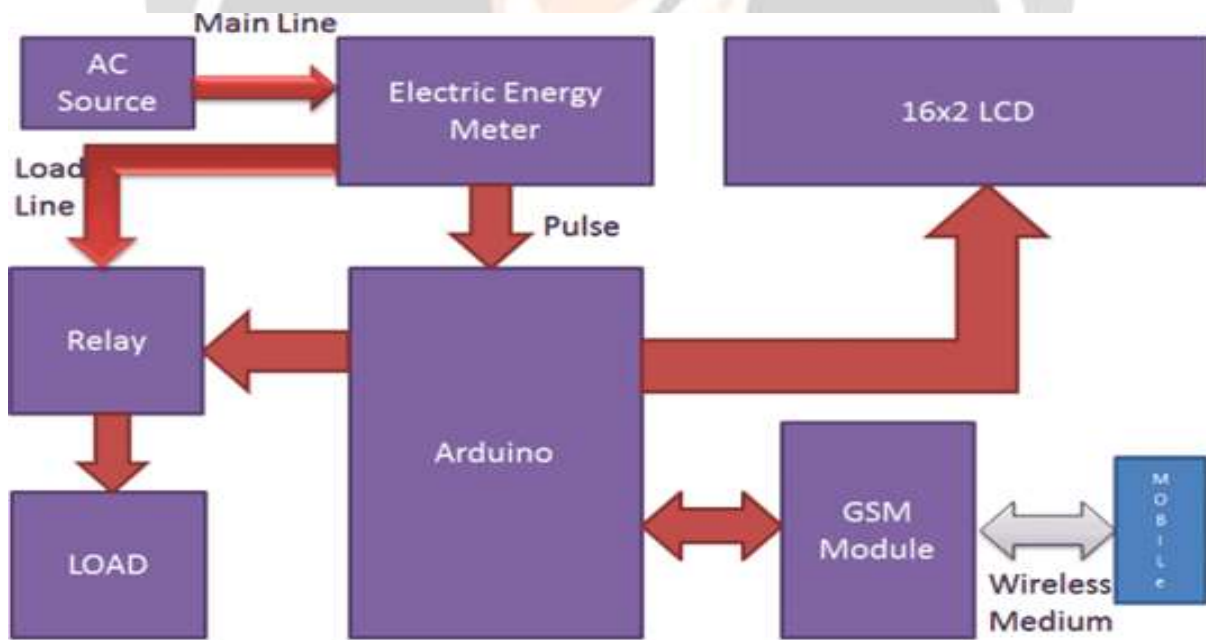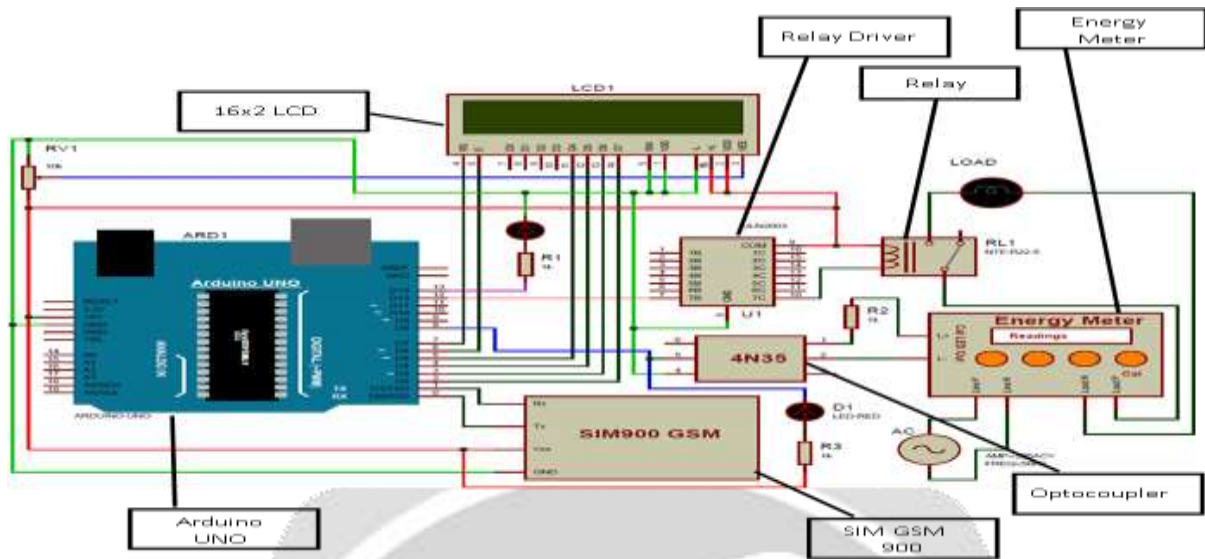
Fig 1: Flow Diagram

Fig -2 Block Diagram

2.1 Circuit Diagram

Fig – 3 Circuit Diagram

3. OPERATION

This model has the Arduino UNO as CPU. The entire system is interfaced with Arduino UNO. The GSM modem is serially connected with the controller which is used as communication module between User and provider. The GSM uses its own network for the transfer of data. Special coding in Arduino is used for programming AT89S51 microcontroller. The relay is used as switching device to cut off and restore power supply. The LCD is interfaced to microcontroller using parallel connection. In this project the Microcontroller based system continuously measures the readings and the current meter reading can be sent to the Electricity department on request. This system also can be used to cut off the power supply to the house in case of non-payment of electricity bills. This GSM modem with SIM card is essential for each energy meter

4. ADVANTAGES

1. *It is Non contactable.*

2. *Easy wall mounted installation*

3. *Maintenance is low.*

4. *It reduce human interference*

5. *The alarm system helps to create awareness to the public regarding their energy consumption and the corresponding charges*

5. CONCLUSION

By using this project, we can reduce the manual effort to take the reading from the energy meter which is cost effective. Divergence in service is going to be the key competitive factor to the improve market share in the present power markets prepaid meters with their advantages over conventional ones are likely to help power providers to differentiate and offer value –added services to users. Encourage clients to opt for prepaid meters on a voluntary basis and offering tariff or non-tariff incentives to those users who prepaid their power changes would help the utilities to execute this system. Reduces man power. It is user friendly and we can enhance this project, in which an electricity department can send message to the consumer about the billing information.

6. REFERENCES

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