

Smart Prepaid Energy Meter Using Android App with SMS Support

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ABSTRACT

In today's management system is trying to make portable, automatic and remote control. This work presents a novel of a smart prepaid energy meter for an automatic and superior metering with billing system. The embedded and GSM short message service that is SMS provide the meter reading system with some automatic functions that are predefined.

Firstly, In this system energy meter system can interface with embedded controller and GSM modem is used to transmit the data like consumed energy in Kwh, generated bill, security services that is cut or on. Over of this system the GSM mobile network such as data can be fed and integrated into existing energy management system located as power companies or without man power the organizations to provide the services among the customers. Our implemented project is provide all required services remotely for metering with billing of high fidelity.

Keywords — Smart Energy Meter (SEM), ARM7 (microcontroller), Global System for Mobile Communication (GSM), Short Message Service (SMS)

INTRODUCTION:

In proposed system a trend to integrate automatic systems via wireless application over network along with advancement of technology development research on wireless application has become significant and popular. Today's electricity meter is a device which used to measure the amount of electric energy consumed by a residence, business. A smart energy meter is an electric device having energy meter chip for electric energy for measurement, wireless protocol for data communication of as GSM and peripheral devices for security purpose, data showing, meter controlling etc.

The main idea is that user can use electricity for which they have already paid for this they have to recharge the GSM by paying in MSEB [3]. After recharging they can recharge the units in Energy meter. The supply of the house will continue until the electric meter reading reduces to zero. Here we are designing a System in which the user has to recharge the Energy units from MSEB via a GSM given by MSEB. After the payment the MSEB will recharge the units in the GSM. The Microcontroller

will then read the SMS and add it to its previous reading. When the pulse from Energy meter is detected then the microcontroller will reduce the reading by 1 unit. When the reading goes to zero the supply to the house unit is turned off. After recharge if the unit is greater than 1 unit then the supply is turned on then Read the pulse from Energy meter Reduce the reading by 1 unit.

LCD is used to display the energy units from electric meter. The proposed smart prepaid energy meter is able to provide all the metering with billing services like counting the consumed energy sending the generated bill by the SMS over the GSM network with security services [4]. Actually at present the metering with billing system in our country, it is totally conventional and it is very slow, faulty and corrupted so our proposed smart prepaid energy meter is highly deserved for national implementation.

II. RELATED WORK:

Mr. Nazir Bin Abdullah [1], he implemented an automatic meter reading system In 2012 for

domestic user. In this project he used GSM modem for transmitting of user side and receiving the energy of provider side. Mr. Hung Cheng Chen [2] proposed a wireless automatic meter reading system in 2012. he proposed to Zig Bee module on both sides. This technology is chip and less cost. Mr. Alauddin Al -Omary [3] proposed an automatic meter reading system using GPRS technology In 2011. MR. LI Quan Xi [4] design an automatic meter system based on ZigBee and GPRS system. In 2010.

Mr. H.G. Rodney Tan [5] designe an automatic power meter reading system using GSM network in 2007 this system proposed GSM digital power meter installed in every consumer unite and electricity ebilling system at the energy provider side. Mr. Mejbau Haque [6] propose a microcontroller based single phase digital prepaid energy meter for improved meter and billing system. Amit Jain [7], develop a prepaid meter using mobile communication in 2011.

III . LITERATURE SURVEY:

This project Electricity board is use for billing system and in water authority due to every house & to recharge the electric energy meter and taking the readings. This system uses Java Basics software, which is designed as the client application to send SMS using the Modem, then process and stores the data. In this client application we have functionality like register for new user and login. After login we have two options like as make recharge and history. In this system the micro controller & the GSM unit is incorporated with the Energy meter of each house. By corresponding authority every house has given a separate number.

The amount of consumption is stored in memory priority as SMS and GSM unit is fixed in an electric energy meter. Using of software we can send the SMS through Modem to that a special number which is assigned by these authorities and wait for reply of message. On other side, modem will receive the data in the form of a command and apprise the controller to supply the electricity The number assigned by the authorities is Unique.

IV. EXISTING SYSTEM

In existing system prepaid electric energy meter is placed in each house and this system man power is for taking readings but such a system include many issue like taking wrong readings and electricity theft reading made by human are prone to errors in such system if we doesn't use energy then also bill is monthly comes that mean we pay without using energy. The kWh units used and still have to be recorded by meter readers monthly on the foot. The recorded units need to be require by a meter reading company. Process of the meter reading, company must be firstly link checked and confirmed

V. PROPOSED SYSTEM:

This mechanism, imperative, requires the users to pay for the electricity before it can be use. In that system the consumers hold amount and then use of the electricity until the credit ending time If the available credit is completely end then the electricity of the supply is cut-off through a relay. Readings made by human operators are face to errors this project addresses the above involved problems. The proposed system will first register the user. For making recharge the user must have to login the system. The username of user mobile number and password of having unit must enter to login then it will check for the user is authenticated or not through server. It can able to recharge through client android app only if the user is authorized user. After recharge ends it will cut off the electricity.

VI . WORKING:

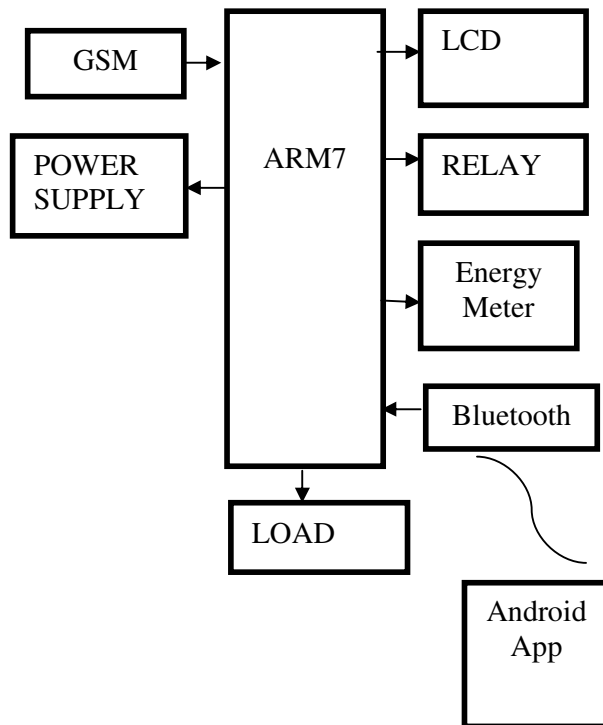
This project has the ARM7 work as a Central Processing Unit. All of this system is interfaced with microcontroller. The GSM modem is cascade connected with the controller. It is used for the communication module between provider and user. The GSM of a network for the transfer of information of coding in embedded c which is used for programming microcontroller is using for programmer Hardware along with MP-LAB IDE software. The relay work as switching device to cut off and restore the power of supply. LCD is

interfaced to microcontroller using connection of parallel port.

In this system the Microcontroller worked continuously records the readings and the present meter reading can be sent to the request of Electricity department. In this system also can be used to disconnect the power supply to the house when non-payment of electricity bills. The GSM modem with SIM card is required for each energy meter. The registration must be done at client side app and then login using username of user mobile number and password of having unit if the login is successful it check for the entered user is authorized or not at server side then if it is authorized user then only recharge can be made. Otherwise it will not be able to login. In this system also we implemented a Loan system means when total recharged is end then we can take a LOAN units from MSEB by sending message. User have to know history of using energy units so Bluetooth App is created in this paper.

VII. BLOCK DIAGRAM OF SYSTEM:

We are creating an java client application for interfacing with hardware kit. By using server we send message to app then app will send message to the GSM which is in the hardware kit. That message will receive and the according to available recharge system will work.



VIII . ALGORITHM :

ALGORITHM 1:

- Step1:** Start the program.
- Step2:** Interface of the LCD & the keypad to the ARM7
- Step3:** Initialize the LCD.
- Step4:** Recharge the Units.
- Step5:** Configure the GSM & Send Message to the Service provider.
- Step6:** If the Units greater >1 then line connect then relay is on.
- Step7:** If the Units is <1 then line is not connected then relay is off.
- Step8:** When Electricity is consumed then the recharged amount will get decremented.
- Step9:** When 80% at the recharged is consumed then the user will get a warning message to recharge the energy meter.
- Step10:** When the recharged money gets over the Relay cut-off the household power supply.
- Step11:** stop the program.

ALGORITHM 2:

- Step 1:** Open the client android application.
- Step 2:** To make user Registration
- Step3:** Using user name and do login password
- Step 4:** After login make the recharge
- Step5:** If authentication is done by sever then recharge is done and display msg on the lcd
- Step6:** Stop.

IX. RESULT:

1. Hardware Of System



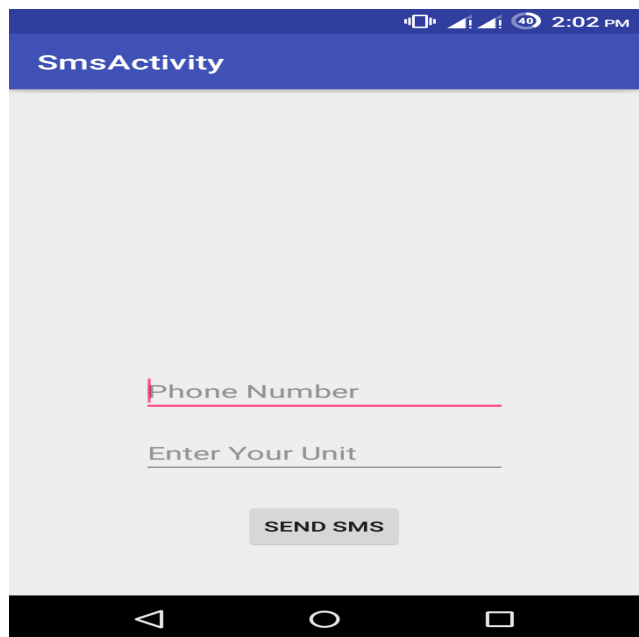
2. When Take a LOAN units From MSEB



3. When Mobile Number is configured



4. Mobie App for Energy Unit



X . FUTURE SCOPE:

In the present time of the 21st century we have no space for faults or errors either in any technical system or in general applications. A smart prepaid energy meter is an advantages concept for the further. It's facilities the exemption from electricity bills. Electricity coupons will be available at nearby

shops. The word of the prepaid means “pay before use” and in which one of the advantage and the application of this concept smart prepaid energy meter is used to prepaid the ongoing supply connection of the power electricity to homes, offices etc.

XI .CONCLUSION:

The design of Smart prepaid Energy meter using the GSM technology can make the users pay for the electricity before it's consumption. In this way, consumers credit and then use the electricity until the credit is completely end. If the available credit is end then the electricity supply of connection is cut-off by a relay. This reduces human labour and at the same time increases the efficiency of calculation of bills for used electricity. The Smart energy meters will bring a solution of creating the awareness on unnecessary wastage of power and will tend to reduce wastage of power. This system will reduce the burden of energy providing and no theft of power will take place. By implementing prepaid system this paper work exposes the purpose of energy monitoring and controlling. It is hoped that this work helps the consumers for better energy management and it's utility in the distribution system for economic liability of the Electrical boards.

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