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Smart defective energy meter for power theft control using IOT

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ABSTRACT

IOT based smart energy meter is used for billing and helps to identify the power theft. It is highly desirable in the field of energy and consumer can do power management by knowing the usage of energy on time to time using PIC16F877A microcontroller, which also calculates the bill amount. The customer needs to pay the bill on schedule; if they couldn't able to pay the bill the electric power connectivity can be turned off automatically from the distant host. The theft of the electricity increases the cost which is to be paid by customer. To overcome the problem, smart meter system is used to monitor the power theft and which sends the alert message to the consumer. Hence this system is used to detect the power usage and the power theft.

Keywords: PIC Microcontroller, LCD display, IOT, GSM etc.

INTRODUCTION

The Internet of Things (IOT) is a rapidly growing and the emerging topic of the technical, social, and economic significance. Objects are being combined with the connectivity of the internet and a powerful data analysis capability which promises to transform the work and the way of living. At the same time, however, the Internet of Things raises the significant challenges it can be able to stand in the way of realizing its potential benefits. One of them is the standardization, due to numerous and different technologies it has to work together in the IOT system. In a fully inter operable environment, any of the IOT device would be able to connect to any of the other devices, regardless the manufacturer or the technology.

In practice, of the interoperability it is more complex. Open standards can able to facilitate interoperability, but yet it is poorly understood; which is the strategies that needs to be executed in order to create standards that can allow the degree of functional openness. This research then therefore explores in which innovation strategies have been applied by many actors in the field with respect to the open standardization and which implications it has for the innovation. By using a theoretical framework that combines the elements of the complex technical system, dominant design theory, standardization theory and lead users, an exploratory study which has been carried out. More than 150 documents have been analyzed by means of the qualitative data analysis and coding.

The results show that the several standards will dominate the market at the moment and that standardization which is mainly driven through the proprietary approaches by companies, leading to a fragmented IOT field in which devices are just partly interoperable with each other. It becomes more recognized by many of the actors in the field that IOT can only succeed if the devices are fully interoperable. Creating middleware that will allow connecting the devices operating on the different technologies, learning from the users and the open source of the platforms which are the examples of strategies that can be able to enable the full

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interoperability. The open nature of IOT leads to the creation of dominant configurations, in which of its components can rearrange depending on the context. This has the implications for innovation. Since IOT is not a consolidated industry in which a dominant design guides the incremental innovation, innovation stems from linking of the components

RELATED WORK

REVIEW OF LITERATURE

Anitha.K, Anitha.V, "Smart Energy Meter Surveillance Using Iot" Year 2018.Pp. 978-1-5386-3817-

Electricity plays a cardinal role in everyday life. The survey says that the consumption of electrical energy in India is the third biggest problem. The single person energy use rate in India is nearby 0.7 KW. India's share with global energy demand will be rising every day. Internet of Things (IOT) is an emerging field and the IOT based devices have created are the biggest evolution in the field of electronics and IT. The main objective of this project is to create awareness about the consumption of energy and the efficient use of home appliances for saving the energy. Due to manual work, their existing electricity billing system has major drawbacks. Their system provides the information about meter reading, power cut and the alert systems by producing an alarm when energy consumption exceeds beyond the limit by using IOT. The idea is implemented to reduce the human participation to collect the monthly reading and minimize the technical problems concerning the billing process. This project extends the design and implementation of an energy monitoring system with the pre-intimation of power agenda using Arduino microcontroller and a GSM (Global System for Mobile Communication) module. The main advantage of this system is that a user can understand the amount of power consumed by the electrical appliances on the daily basis and can take further steps to control them and thus help in conservation of energy. From the electricity board section, the information concerning the bill amount, payment and the pre-planned shutdown of power details is communicated to the consumer. If the customer fails to pay the bill on time, the user will be informed through a message. If still the customer does not pay the bill, then as per the rules of designated consideration, one alert message will be sent then automatically power connection is disconnected from the remote server. In the already existing smart energy meter, it shows the energy consumed by the appliances from the date of installation of the Energy meter and its corresponding rupees. In this proposed energy meter, the meter gives the energy consumed on a daily basis, its corresponding rupees, billing details and payment using IOT.

Power schedule and an alert system for producing an alarm when the energy consumption exceeds beyond the certain limit. It also has the facility of terminating the power supply when the residents are out of station to minimize the wastage of energy. This system not only reduces the power cut issues and the labor cost for noticing the residential energy consumption in regular intervals, but also increases the energy conservation with the help of alarm systems and the energy meter accuracy by reducing the billing error and the cost of maintenance.

REVIEW OF SURVEY RASHMI

M.N.U.B.Mahadevaswamy,Phd."Iot Based Energy Meter Monitoring Using Arm Cortex M4 With Android Application "International Journal, Volume. 150,No.1, Year.2016,

Internet of Things (IOT) aims at interfacing different gadgets to the internet web – encouraging human-machine and machine-machine connections offering superior security, console and effectiveness. The concept of IOT is utilized in this model, remote monitoring of energy meter which is intended to overcome the issues in existing Automatic Meter Reading (AMR) system. It spares tremendous human work. A controller integrated with electronic energy meter assist in distant correspondence from the developed android application. This application enables monitoring of bill generation at consumer premises without human intervention and also in visualizing live data consumption and sight energy expended points of interest on daily/monthly basis. In addition, it gives authority to power organizations to seize lenient

customers who have extraordinary dues for remote disconnection of the power supply.

So IOT based remote AMR framework is more viable methodology than the tradition of billing framework Conventional meter reading for any energy utilization by the consumer and billing is done by meter pursuers from place to place. This requires multiple labors and long working hours to accomplish complete region information perusing and billing. Meter pursuers billing is inclined to peruse error, wrong entry of data perused. There exist accessibility bottleneck to isolated places. Likewise the consumer has no clue of energy consumed each day / week. Progresses on this path include AMR.

It is the technology of remotely gathering of energy devoured and utilizing this data in the central office for invoice generation. This technology saves power suppliers the cost of intermittent outings to each physical area to peruse a meter. This convenient data combined with analysis helped both power suppliers and consumer better control the utilization and generation of electrical energy. Recent advancements in IC, microchip technology as empowered to create cost-effective items/products which avail economic advantages that justify AMR systems. There are diverse technologies being utilized for information exchange, remotely, yet the precision, speed, productivity, reliability and cost viability are the standard advantages legitimately accomplished in this framework with an extra android application to see the points of interest of energy devoured by the customer over a period of time.

EXISTING SYSTEM

- A detection of power theft in every house and in industry for different methods of theft. Electrical energy is very important for everyday life and spine for the industry.
- Electricity is indiscipline to our daily life with increasing need of electricity the power theft is also increasing, power theft is a problem that continues to plague power sector across whole country the objective of this project is to design such a system which will try to reduce the illegal use of electricity and also reduce the chances of theft. This work will automatically collect the reading and also detect the theft this model reduces manual manipulation work and try to achieve theft control.
- GSM innovation will transmit the meter readings and theft indication messages to the consumer and electricity board. This procedure will happen when needed that suggests if SMS is gotten from approved server transportable.

DISADVANTAGES

- Required fixed GSM Number
- Abuse of data while data transferring
- Limited data rate capability
- High complexity of the system

PROBLEM DEFINITION

- ✓ As Due to the increment in the theft of electricity, India is on the run of losing billions of Rupees, in the year 2012, the World Bank assessed, that the electricity theft diminishes, India's GDP by approximately 1.5%**.** An investigation by NDTV India also presumed that 40% of the electricity in India is unpaid.
- ✓ The BEST's vigilance department registered 1,882 cases of power thefts and recovered dues with penalty of over Rs 13 crores in 2017-18, 20% more than the previous financial year.
- ✓ The losses in power sector can be classified into two categories – technical and non-technical. Technical losses refer to losses in transmission from power plants to end consumers. This problem is unavoidable. On the other hand, non-technical losses are hard to understand. Such losses are essentially monetary or commercial losses. They arise when distribution companies supply electricity without getting paid. These non-technical losses occur because of non-paying customers.

EXPERIMENT

The electrical power is sort of completely generated, transmitted and distributed within the form of us because of economic thought except for the consideration operation of most of the

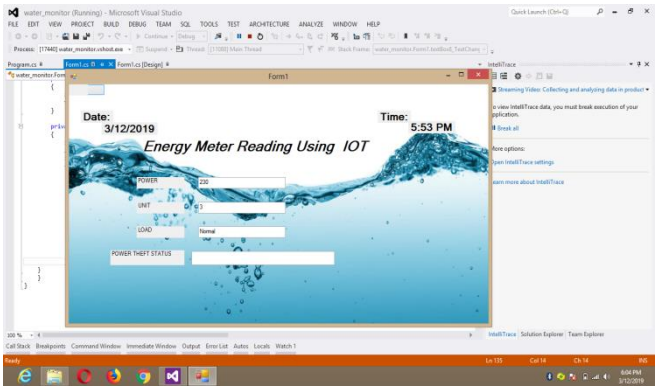
electronic devices and circuits, DC supply is required. Dry cells and batteries are often used for this purpose. No doubt, they have the advantages of being portable and ripple free, but their voltages are low, they need frequent replacement and are expensive in comparison to conventional DC power supplies. Now days, almost all electronic equipment includes a circuit that converts AC supply into DC supply. The part of the instrumentality that converts AC into DC is named DC power provide. In general, at the input of the facility provide there's an influence electrical device power. It is followed by a rectifier (a diode circuit) a smoothing filter and then by a Transformer circuit. From the block diagram, the basic power supply is constituted by four elements a transformer, a rectifier, a filter, and a regulator put together.

SCREENSHOTS OF THE LCD DISPLAY

LCD Display

The LCD Display shows the output of the Energy Meter.

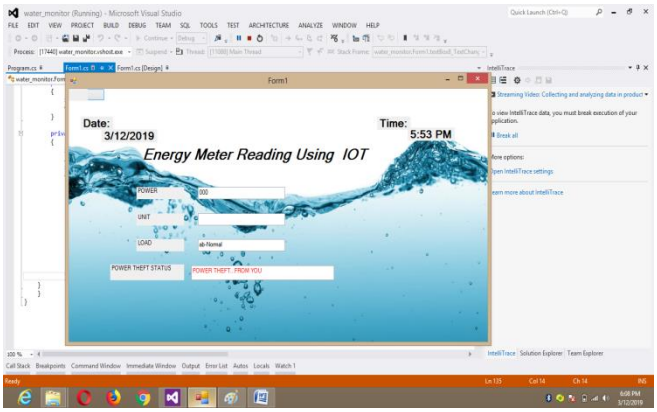
ENERGY METER READING BEFORE POWER THEFT



Before Power Theft

The Energy Meter Reading which is in a Normal State before Power Theft.

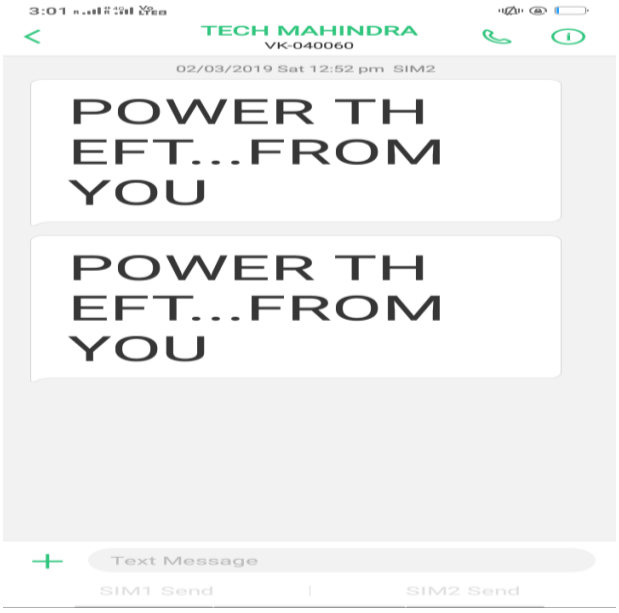
ENERGY METER READING AFTER POWER THEFT



After Power Theft

The Energy Meter Reading which is at Abnormal State after Power Theft.

ALERT MESSAGE TO GSM



Alert Message sent to Mobile

The Alert Message will be sent to the owner's mobile to intimate that the power theft is occurring and helps to detect the power theft.

PROPOSED SYSTEM ADVANTAGE

- We replaced the traditional meter by metering module which consist of metering IC and microcontroller which scans the energy meter automatically after every month and transmits this collected data to the remote station through the IOT network. The system consists of hardware and software part, the hardware parts, shows the block diagram of energy meter project that the users can monitor their home current power consumptions anytime and anywhere.
- PIC 16F877A gets the reading from 8051 and then communicates with specify a model sim

through commands and transmits the reading information through IoT to the central server.

- Here we have used two current transforming one is at the source end and other is at load end current. If the power difference between these transformers is exceed the threshold level then there is a theft is detected.

CONCLUSION

Aiming at current problems in smart metering this the paper explains the fundamental structure and system style for IOT primarily based energy meter charge and watching system emergency system. The paper conjointly explains the fundamental blocks and parts utilized in the technique. It's a whole case study of the projected system style. This system is extremely a lot useful for reduction in energy wastage and interference in electrical shortage.

In this system client will do power management by knowing energy usage time to time. Using this technique we will real draft watching system and time reduced charge system. The GSM output format has been analyzed.ThePIC-16F877A Microcontroller the operations were studied and it is programmed and the system working model was developed in order to accomplish the objective. "The IOT based mostly Energy meter" saves the customer's time by creating their work "leaner". The operation of the conniving the ability value is easy and doesn't involve delays. Instead of victimization DAQ that is extremely expensive during this project PIC (16F877A) microcontroller in conjunction serial communication has been used to interface with the virtual terminal.

REFERENCES

[1]. Rajakumar, P., Puviyarasi, R., & Singh, S. "Power Management and Advanced Metering Infrastructure Using Wireless Network in Remote Areas". International Conference on Power, Energy, Control and Transmission Systems (ICPECTS). pp. 210-213, 2018.

[2]. Li, Z., Dai, Y., Wang, Q., & Dong, X. "Application of High-Voltage Electrical Energy Meter in Smart Grid". 2018 3rd International Conference on Mechanical, Control and Computer Engineering (ICMCCE).pp. 103, 107, 2018.

[3]. Khan, N., Naseer, Y., Alam, I., Abbas, T., & Iqbal, Y. (2018). Wireless controlled smart digital energy meter and theft control using GSM with GUI. International Conference on Computing, Mathematics and Engineering Technologies.pp.1-6, 2018.

[4]. Metering, A. S., Visalatchi, S., & Sandeep, K. K. "Smart energy metering and power theft control using Aurduino & GSM". 2nd International Conference for Convergence in Technology (I2CT), 2017.