Chapter 4
An IoT-Based Energy Meter for Energy Level Monitoring, Predicting, and Optimization

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ABSTRACT

The current methods of energy monitoring and metering in India are extremely labor-intensive and prone to human errors. The system the authors propose will incorporate an automatic energy reading meter system (AERM) which will aid in the collection of data accurately and efficiently. Additionally, power companies find it hard to withstand the power requirement of a consumer because of a surge in industries, buildings, and population. The usage of electrical appliances has drastically increased over time. As per as energy balance maintains between the energy demand and supply for the power companies are bearing in mind an energy supervision technique. Therefore, there is adoption for load scheduling or load shifting to reduce the electricity bill. So consequently, the authors look into various optimization algorithms for load-shifting.

INTRODUCTION

The Internet of Things is a moderately new model that describes a group of coordination, methods, objects, etc.., by way of Internet Protocol v6 support onto the Internet environment. In the existing method of power supply grid is setup with an IoT arrangement is mainly used to improve the complications faced

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by various issues found by the consumers on a day-to-day base. For example, in the existing meter used by the users are getting the energy consumed details only once in a month using there is no control on the existing energy smart meter. Moreover, these energy bills can be problematic on user's consume data, but a user will not be able to access or modifications in their energy consumed on or after the most recent receipt. In furthermost circumstances, if some user is unsuccessful paying the receipt, then user connection power supply get disconnect on the next working day itself.

The IoT allows items to be sensed, shared data or controlled remotely within presented network structure, reduces people work and human interference creating opportunities for more integration of the physical world into computer-based systems, it will increases efficiency, accuracy and economic benefit. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical system, which also encompasses technologies such as smart grids, virtual power plants, smart homes and smart cities. Each thing is uniquely identified through its embedded system but is able to integrate inside the existing internet communications.

The Internet of Things (IoT) is the set of connections of substantial things or "objects" set in with hardware or electronics devices, sensors, network connectivity and including software, this enables these items to gather and transfer the energy data. IoT items agree to objects to be sensed and controlled via remotely from corner to corner from the presented network communications, it creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. "Things," in the IoT sense, can refer to a wide variety of devices such as energy data monitoring, weather monitoring, health monitoring data, biochip transponders on farm animals, electric clams in coastal waters, vehicles with built-in sensors, agriculture monitoring or field operation devices that assist forest fire-fighters in search and rescue operations. These devices collect useful data with the help of various presented technologies and then transfer by the devices itself flow the data between other devices.

An IOT is a recent technology with internet connected user devices. More rapidly or presently each IT company is must to build a outline support to IOT. Power or energy related companies by now make use of networked sensors to determine vibrations in turbines. They enroll the data all the way through the network to calculate systems that analyses it to forecast while apparatus will need preservation and when they will fail. Smart driverless car manufacturers set in sensors that measure temperature, light, pressure, and other surroundings to improve their products for easy access.

Sensors bring together statistics from the environment or object under dimension and spin it into helpful information. This sensor layer is cover up the whole thing from legacy manufacturing components to automatic systems, water level detectors, air quality sensors, accelerometers, and heart bit rate monitors. The scope of the IOT is getting higher rapidly, thanks in part to low energy consumed wireless sensor network technologies, which make possible components on a wired or wireless LAN to operate without the need for an A/C power source.

Even with the modern consideration given to safety and security for IOT components, it can be simple to ignore the need for end to end security for an IOT platform. Every part of a platform should be analyzed for security prospects. From the internet links to the software applications, and components to the transfer, stored information. The particular most important non-functional constraint of an IOT platform is that it offers strong safety measures.

In a real-time scenario using an IOT framework with the deployment of sensor mechanism, the authors are able to get the precise energy consumed by user details. A user can make choices to manage connected