Chapter 15
Smart IoT Meters for Smart Living

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ABSTRACT

Smart cities and smart villages provide technology-based, sophisticated, and better lifestyles to their citizens. Smart cities include traffic control, transport management, managing spare resources like power and water, solid waste management, e-health monitoring, infrastructure management based on internet of things (IoT) technology. IoT is a technique that combines sensors, electronic devices, information and communication technology, and software for the social wellbeing of the common man. In recent years, many IoT-based smart devices, namely smart garbage bins, automatic parking system, smart electric meters, supervisory control and data acquisition (SCADA) for water distribution, have been devised and used successfully in many cities. Mostly, smart meters are used in recording electric power and gas consumption.

INTRODUCTION

This chapter introduces the basic concept of smart meter and we will also learn about the standard architecture of smart energy meter, smart gas meter and smart water meter.

Smart Metering

Smart metering is a technology enabled businesses procedure to keep track of energy consumption, automatic meter reading collection, process the collected data and use the processed information for business development. As smart metering is an efficient and effective method for tracing resource utilization in

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the distribution network. It acts as a decision support system for the supplier and for customers it acts as an assistant who informs and guides in energy utilization. On note of vast benefit electric, gas and water distributing companies and corporations are moving towards the smart metering concept (Lloret, Tomas, Canovas, & Parra, 2016). It is also an essential framework for establishing smart cities and smart villages.

Why Smart Meters?

Water, electricity and cooking gas are indispensable resource for life, economic well-being, and environmental integrity of the society. Even distribution of these vital resources to its citizens is a prime responsibility of the government. Decades ago the government used analog meters to record the consumption for billing purpose. Due to the advancement of science and technology the developing countries are trying to monitor and ensure the distribution along with billing using modern electronic devices. What is a smart meter? Smart meters are digital meter which replaces the traditional analog meters used in measuring and monitoring the consumption of resources like electricity, gas and water by households and industries. Smart meter embeds microcontroller, sensor, wireless and web technology to upgrade the mechanical device to an IoT based smart digital device. Smart meter prototype will provide technical solutions to monitor the distribution networking system and to ensure even distribution with nominal operational cost.

Advantages of Smart Meters

1. **Digital Display:** Most Smart meters have a digital display screen that shows the reading in their place at real time.
2. **Accurate:** As it is digital the reading are more accurate when compared with analog meters.
3. **Ease of Monitoring:** Smart meters provide provision to monitor the consumption more precisely so valuable resources like electricity and gas can be consumed in right way.
4. **Frequent Reading:** Can record reading frequently. i.e. hourly or daily based on the necessity.
5. **Automatic Reading:** Automatically transmits the reading to the customer as well as to the supplier or the distributer of the product. In case of analog meter a meter reader needs to collect record and transmit information to the administrative office.
6. **Timely Decision Making:** As the readings are collected frequently and as it is in digital format, collected information can be used for real time analytics. Based on the outcome of the analysis real time decision making can be done for the proper utilization and distribution of resources.
7. **Accurate Billing:** Transparent and accurate billing.

Application of Smart Meters

Smart Cities

As discussed earlier, smart cities use digital technology to enhance the life style of the people in the city. In the point of energy and resources conservation and preservation, adaptation of digital communication and information technology will optimize the utilization of resources. In smart cities "smart grids" play a vital role in effective distribution and conservation of electrical energy. Smart grid is the next generation of electric grids which uses digital technology to manage and monitor energy distribution.