Chapter 16
Cognitive Internet of Things (C–IOT)

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ABSTRACT

Energy conservation is one of the essential requirements for the betterment of the Earth's future. The main objective of this chapter is to provide an effective framework of smart grid (SG) using the intelligence of cognitive radio network (CRN). The SG connectivity will be enhanced by using the functionality of internet of things (IoT). Using IoT, the devices between the consumers, manufactures, and energy source provider (government) can conserve resources and economy. In this chapter, the requirement of smart grid, the need for IoT technology in SG, and the usage of CRN in SG are all elaborated. The infrastructural design pattern of cognitive radio-IoT-based smart grid is introduced in this chapter.

INTERNET OF THING

Internet of Thing (IoT) is one of the magic words used by most of the researcher around the word. It is basically interconnection of physical things with virtual object. The main motivation of this technology is to provide Smart environment to live. The fundamental infrastructure of IoT comprises of following components: IoT devices (sensors), IoT gateway, Edge processor and Massive storage as posturized in Figure 1. All these components are connected through heterogeneous communication networks (Ghassemi, Bavarian, & Lampe, 2010). The End user communication is comprised of either internet or mobile communication.

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The notable research area in this technology are; Interfacing with the physical devices, communication and connectivity, handle the development of ubiquitous computing, unique identification, security, reliability, and interoperability.

BASIC OF COGNITIVE RADIO NETWORK

One of the challenges of IoT is communications and connectivity. This challenge can be solved by Cognitive radio network. The cognitive radio network (CRN) is an intelligent wireless design. It can monitor sense and detect the environment and reconfigure its characteristics to its requirement. The CRN in general determine the requirement parameter from the environment and adjust them for the required level satisfies the optimal communication experience of the end user. In CRN there will be two main participants as shown in Figure 2 primary user (licensed) who can transfer data whenever they required and other one is secondary user, where they can transmit data only when the primary user is silent.

Energy is one of the essential requirements of mankind which has be to preserved. Smart Grid (SG) is one of the booms to Energy industries, which has all the characteristic of conservation.

Why Cognitive Radio Networking in IOT

The important characteristic of a CRN is its ability of instantly changing the transmitter parameter based on the spectrum band availability. Thus the nodes in this network will transmit and sense the state of the channel, this process is called a dynamic spectrum accessing. If the dynamic spectrum allocation and the intelligent decision-making characteristic of a CRN is integrated with IoT framework then the performance of the IoT system would be enhanced.

Figure 1. IoT devices basic arrangement