Chapter 30
Data Storages in Wireless Sensor Networks to Deal With Disaster Management

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ABSTRACT

Sensor networks are dense wired or wireless networks used for collecting and disseminating environmental data. They have some limitations like energy that usually provide by battery and storages in order that we cannot save any generated data. The most energy consumer of sensors is transmitting. Sensor networks generate immense amount of data. They send collected data to the sink node for storage to response to users queries. Data storage has become an important issue in sensor networks as a large amount of collected data need to be archived for future information retrieval. The rapid development and deployment of sensor technology is intensifying the existing problem of too much data and not enough knowledge. Sensory data comes from multiple sensors of different modalities in distributed locations. In this chapter we investigate some major issues with respect to data storages of sensor networks that can be used for disaster management more efficiently.

INTRODUCTION

One of the characteristics of the post-PC era is to push computation from desktops and data centres out into the physical world. The area that we find especially interesting is networked sensors. Already today networked sensors can be constructed using commercial components using only a fraction of a Watt in power on the scale of a few inches. Wireless sensor networks produce a large amount of data that needs to be processed, delivered, and assessed according to the application objectives. A sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument. The rapid advancements in computing has enabled the development of low

DOI: 10.4018/978-1-5225-6195-8.ch030

cost wireless sensor networks (WSNs), and making WSNs one of the most important research areas. These are wireless ad-hoc network that connect deeply embedded sensors, actuators, and processors. This combination of wireless and data networking will result in a new form of computational paradigm which is more communication centric than any other computer network seen before. In the past few years, much research effort has been put forth to instrument the physical world with a large number of networked sensor nodes that are collaborating while self-configuring. Wireless sensor networks are composed of tiny devices with limited computation and battery capacities. The role of Wireless sensor networks in modern technology is obvious; and this was the main idea for many researches in the last decade. Progresses in wireless communications and micro electromechanical systems (MEMS) led to the deployment of large-scale wireless sensor networks (WSN). In other words, it revolutionized the way we monitor and control environments of interest (B.Arpinar, 2006). WSNs were identified as one of the ten emerging technologies that will change the world in MIT Technology Review (K.Moessner,2009). A wide variety of attractive applications with the use of WSNs (P. K. Chrysanthis,2006) would come into reality, such as habitat monitoring, search and military industries, disaster relief, target tracking, precision agriculture and smart environments. The applications of these networks are becoming wider nowadays. Smart environments represent the next evolutionary development step in building, utilities, industrial, home, shipboard, transportation systems automation, disaster management, earthquakes and so on. Like any sentient organism, the smart environment relies first and foremost on sensory data from the real world. One of most prominent sensor network applications is disaster management with the aim of achieving improved management. As the use of wireless sensor networks expands, Millions of sensors around the sphere currently collect rushes of data about our world. Wireless sensor networks produce a huge quantity of data that needs to be processed, delivered, and measured according to the application objectives. WSNs create variant types of data like arrays and images. These data should be stored somewhere for variety of queries. The section exemplifies how the use of semantics can enhance data management in sensor networks. Semantics exploit underlying relationships between data captured by sensors [6-8]. Wireless sensor networks (WSNs) are becoming increasingly popular in many spheres of life. Application domains include monitoring of the environment (e.g. temperature, humidity, and seismic activity) as well as numerous other ecological, law enforcement, and military settings. Sensors have more limitations like memory, CPU and energy providers (Mehdi Gheisari,2012). Most sensors use battery as its energy provider. We usually scattered sensors in dangerous environments. Sensors produce vast data that should be stored for further usage like querying. We cannot store all produced data that comes from sensors because of their limitations. As a result, we should store them in an effective way. Wireless sensors are deployed in a growing number of applications where they perform a wide variety of tasks like pervasive computing, e.g., monitoring learning behavior of the children, senior care system, environment sensing, etc., generate a large amount of data continuously over a long period of time. Often, the large volumes of data have to be stored somewhere for future retrieval and analysis. A big challenge is how to store data efficiently for future information retrieval.