Chapter 91
Mobile Sink with Mobile Agents: Effective Mobility Scheme for Wireless Sensor Network

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ABSTRACT

Wireless Sensor Networks (WSN) has been drawing considerable attention and discussion in recent years due to its potential applications in various fields. In modern applications for future internet the MSN (Mobile Sensor Network) is a key factor. Mobility allows the applications of Wireless Sensor Network to be compatible with IoT (Internet of Things) applications. As mobility enhances capability of the network it also affects the performance of the network at each layer. In recent years the various methodologies are proposed to handle mobility. Most of them use mobility for efficient data collection in WSNs. The purpose of this paper is to study effects of mobility on various performance parameters of the network and to explore the effective techniques to handle mobility in network. This paper proposes Mobile Sink with Mobile Agent mobility model for WSN which will increase the lifetime of the network using sink and agent node mobility.

1. INTRODUCTION

Wireless sensor networks (WSN) is a network of spatially distributed physical sensors which sense the data like temperature, moisture, pressure etc. This ability of sensors is used in wide range of applications like forest fire detection, medical monitoring pollution monitoring and agriculture surveillance (Bruckner, Picus, Velik et al., 2012). There is a long history of using sensors in medicine and public health. Due the recent evolutions in electronics, it is highly economical to get the low cost, lightweight multipurpose

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sensors which can be integrated to use in different applications. Wireless sensors have limitations such as Non rechargeable battery power, Low computation ability, Limited memory storage and No standard platform (El Emary, & Al-Gamdi, 2014; Hamid, Harouna, Salele et al., 2013).

WSN consists of battery powered small devices which are capable of acquiring physical information from environment, processing of information and forwarding the collected information to the required destination. Application which involve multimedia data often act as sensor-actor network in which scalar sensors collects the environmental information and depending upon the environmental parameters the multimedia nodes are switched On or OFF. The multimedia nodes can be operated in sleep/awake mode as per requirement. This way is efficient way in terms of energy saving and lifetime improvement of the network (Ekleitis, Meger, Dudek, 2006).

Figure 1. Wireless Camera Sensor Network (WCSN)

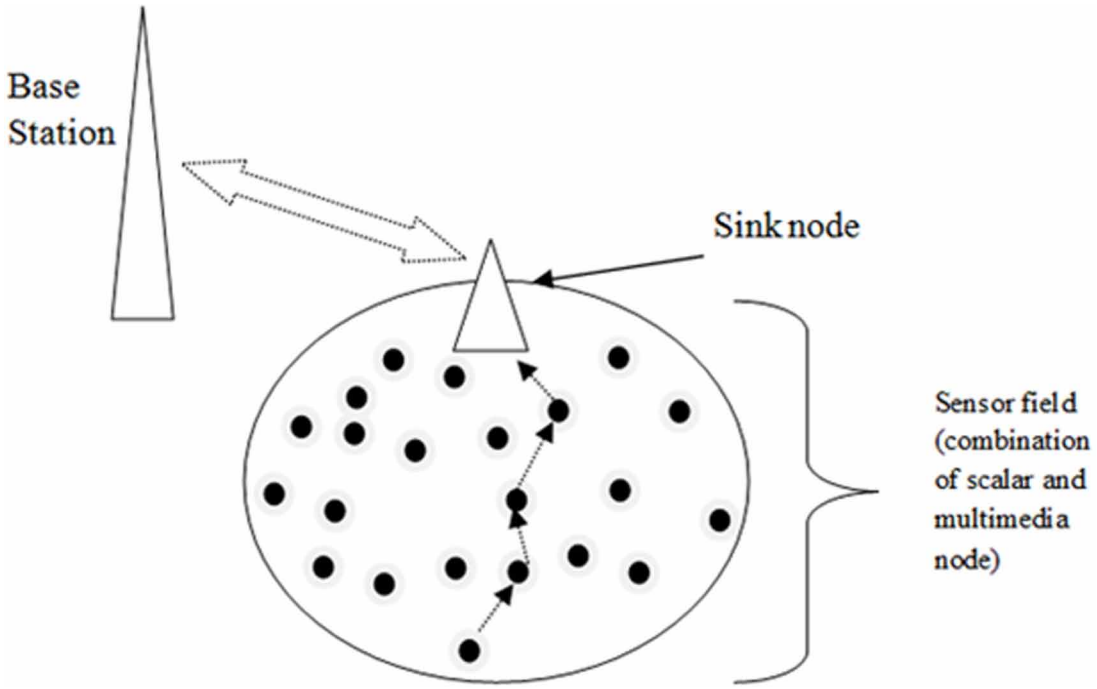

Figure 1 shows architecture of Wireless Camera Sensor Network (WCSN). WCSN is constructed by a set of small and low cost sensor nodes which can produce images or videos from the sensing area. The images are then processed and transmitted to other sensors or to a central base station. The base station and the sink node in the architecture shown are static and the nodes in sensor field can be static or mobile as per application.

WCSN are widely used in various fields such as battlefield visual monitoring, environment monitoring, safety monitoring, person locator services, traffic monitoring, intelligent home, and medical treatment and public healthcare.

Pure static networks face problems due to dynamic changes of events and unpredictable environmental change in the network. Some of the challenges for static network are (Rezazadeh, 2012):