

Chapter 33

UWDBCSN Analysis During Node Replication Attack in WSN

Harpreet Kaur

Thapar University, India

Sharad Saxena

Thapar University, India

ABSTRACT

Wireless sensor network is an emerging area in which multiple sensor nodes are present to perform many real-time applications like military application, industrialized automation, health monitoring, weather forecast, etc. Sensor nodes can be organized into a group which is led by a cluster head; this concept is known as clustering. Clustering of wireless sensor network is used when sensor nodes want to communicate simultaneously in a single network. The author organizes the sensor nodes by applying UWDBCSN (underwater density-based clustering sensor network) clustering approach in which routing of the packets is controlled by cluster head. The author also considers the security of sensor nodes which are harmful to different types of mischievous attacks like wormhole attack, denial of service attack, replication or cloning attack, blackhole attack, etc. Node replication is one of the types in which an attacker tries to capture the node and generate the replica or clone of that node in the same network. So, this chapter describes how to deal with these types of attacks. The author used the intrusion detection process to deal with this type of attack. All the detection procedure is combined with sleep/wake scheduling algorithm to increase the performance of sensor nodes in the network.

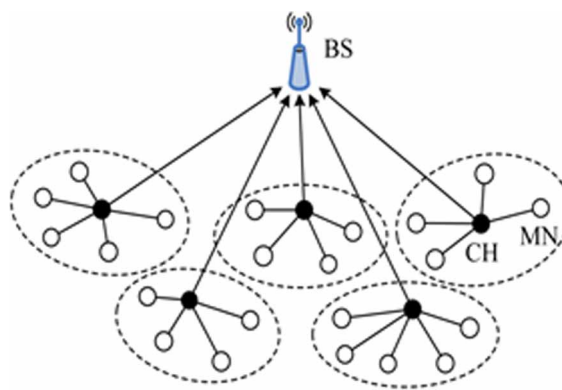
INTRODUCTION

Wireless sensor networks include the large number of multiple sensor nodes which are used for monitoring purposes such as elementary monitoring, forecast monitoring, early earthquake detection, military application etc. The sensor nodes are grouped together to perform the multiple tasks simultaneously which is monitored by a head selected by clusters of nodes in the network. The selection of cluster head is done by the sensor nodes and this overall concept of sending the data through cluster head is known

DOI: 10.4018/978-1-7998-5348-0.ch033

as Clustering (Boyinbode, Le, Mbogho, Takizawa, & Poliah, 2010). Clustering is important when the multiple sensor nodes are targeted to perform the single important task. It is energy efficient and less time is used for the packet transmission because the nodes communicate through cluster head. The different clustering algorithm has been proposed like LEACH, LEACH-C, UWDBCSN, LNCA etc. are consider of having same clustering approach but routing mechanisms are different. Figure 1 below shows the clustering of various sensor nodes. The sensor nodes are organized into clusters which tend to perform similar type of tasks like in data mining.

Figure 1. Clustering in WSN



Attacks on Wireless Sensor Networks

The author discussed about the various types of malicious attacks (Savner & Gupta, 2014) which are responsible for destroying the security of wireless sensor networks such as node replication attack, wormhole attack, jellyfish attack, Sybil attack etc. Security is major important concern because many applications directly or indirectly depend upon sensor network. They are used in everywhere in today's era. The author considered one of the dangerous types of attacks in which malicious user try to inject the attacking or malicious nodes in order to generate many insider threats. This attack is known as node replication attack. The different types of attacks on wireless sensor network are explained in Figure 2.

- **Jamming Attack (Li, Koutsopoulos, & Poovendran, 2010):** Jamming attack blocks the channel due to which the genuine nodes are unable to access the wireless communication. It is also known as denial of service attack which disrupts the normal functioning of the network and leads to many insider threats.
- **Wormhole Attack (Alajmi, 2014):** In wormhole attack, the malicious user creates the fake tunnel in the routing path of the sender and the destination nodes so that the sending node will use the fake tunnel for the immediate packet transmission and redirected them to their malicious network in order to halt the communication.
- **Sybil Attack:** In Sybil attack, the malicious attacking nodes possess the different fake identities in the same network and generate the confusion among different genuine nodes in order to increase the network delay.

15 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/uwdbcsn-analysis-during-node-replication-attack-in-wsn/262004

Related Content

Economic Impact of Cyber Attacks on Critical Infrastructures

Merve ener (2019). *Applying Methods of Scientific Inquiry Into Intelligence, Security, and Counterterrorism* (pp. 291-314).

www.irma-international.org/chapter/economic-impact-of-cyber-attacks-on-critical-infrastructures/228475

Social Media and the Use of Discursive Markers of Online Extremism and Recruitment

Robyn Torok (2020). *Cyber Warfare and Terrorism: Concepts, Methodologies, Tools, and Applications* (pp. 478-508).

www.irma-international.org/chapter/social-media-and-the-use-of-discursive-markers-of-online-extremism-and-recruitment/251445

A Strategic Framework for a Secure Cyberspace in Developing Countries with Special Emphasis on the Risk of Cyber Warfare

Victor Jaquireand Basie von Solms (2015). *International Journal of Cyber Warfare and Terrorism* (pp. 1-18).

www.irma-international.org/article/a-strategic-framework-for-a-secure-cyberspace-in-developing-countries-with-special-emphasis-on-the-risk-of-cyber-warfare/135270

Understanding Digital Intelligence: A British View

David Omand (2016). *National Security and Counterintelligence in the Era of Cyber Espionage* (pp. 97-121).

www.irma-international.org/chapter/understanding-digital-intelligence/141040

The Effects of Money Laundering (ML) on Growth Application to the Gulf Countries

Fakhri Issaoui, Toumi Hassenand Touili Wassim (2017). *International Journal of Cyber Warfare and Terrorism* (pp. 13-24).

www.irma-international.org/article/the-effects-of-money-laundering-ml-on-growth-application-to-the-gulf-countries/175644