# Chapter 55
# A Review of Different Techniques for Biomedical Data Security

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## ABSTRACT

*The aging population is vulnerable to various illnesses and health conditions because with increase in age the people suffer from chronic disease. Quite often, they are partially handicapped due to their restricted mobility and their reduced mental abilities. To resolve these problems, health monitoring systems are designed for real-time monitoring of patients. WBAN use medical sensors for acquiring patient physiological data with wireless technologies to send data to healthcare providers. Due to wireless transmission, the chances of attacking and occurring security issues in the data are more. So, the security of the system is the main concern because the system consists of patient privacy concerns. Due to these reasons there is need of designing security algorithms to prevent data from being stolen by attackers. The aim of this chapter is to present a review of different attacks that occurred during transmission of data and security issues related to data. The chapter also describes different algorithms to prevent data from being stolen through various attacks and security issues.*

## INTRODUCTION

In the developing countries like India, the poor medical facilities are the major concern especially in rural and remote areas. The population of India is assorted. As per National Rural Health Mission (NRHM) report 700 million people live in 636000 Indian villages where people don't have direct access to hospitals ("National Health Mission Report", 2014) which can be leads to death due to the poor doctor to patient ratio. In order to increase the patient care effectiveness there is a need of designing the effective

DOI: 10.4018/978-1-7998-8954-0.ch055

health care monitoring systems (Alaa, 2017). These health care monitoring systems are used to acquire, record, display and transmit the patient's physiological signals from patient's body to any other locations so the doctor can diagnose the patient condition. These healthcare monitoring systems can also be used to provide the medical help to the aged and disable people because with increase in age senior people losses their ability to take care of themselves due to chronic diseases, physical or mental disabilities (Marco, 2008). With designing of these health applications, one can easily know the health status of the elder and disable people. Various applications are designed based on wireless sensor network technology and IoT (Internet of Things) for e-health applications that are based on the daily living activities i.e. tracking of location, intake of medicine and other health status like monitoring of physiological signals Blood pressure, heart rate etc. of the elder or disable people (Magana-Espinoza, 2014). To design the e-health monitoring system there are basic requirements which have to keep in mind that are described below (Lopez-Nores, 2008):

- **Reliability**: The system should be reliable which can prevent duplication of information during the transmission of the data and provide the efficient Quality of Service.
- **Routing**: Choosing of greatest communication protocol which provides scalability, best route for send the information among others.
- **Mobility of Node**: Wireless nodes move freely in network. The wireless nodes should maintain their connectivity when they are moving in the defined network.
- **Security**: When the data is sent through the cloud or through internet the proper security mechanism should be used so that the patient data can be secure.

As mentioned above the medical data of the patient is transferred to the concerned person wirelessly if person is not available along with patient. During the wireless communication many types of attacks can affect the patient information which can be harmful for diagnose the disease. To provide suitable information to the doctor there is a need of proper security of the data. Many of techniques are introduced in passing years for the proper security of medical data. So the main aim of this book chapter is to provide the review of different attacks, security issues and available techniques of to remove security issues in biomedical data. The chapter also includes the advantages and disadvantages of available security techniques. The motivation behind this chapter to aware the bioengineers to provide the information regarding the available security techniques and security issues in medical data transmission so they can overcome the different issues occurred in data transmission and can provide the best solutions for more security of data. Figure 1 shows the workflow of this chapter.

## USE OF WIRELESS SENSOR NETWORKS (WSN) AND INTERNET OF THINGS (IOT) IN BIOMEDICAL APPLICATIONS

WSN and IoT plays main role for designing home care applications. In WSN sensor nodes are distributed in home which provide patient information to user in different environment (Keshavarz, 2016). When wireless sensor networks are used for designing medical healthcare applications called as Wireless Medical Sensor Networks. Wireless medical sensor networks (WMSN) give the significant improvements for healthcare in 21st century (Meingast, 2006). Wireless medical sensors are placed on the patient body and record physiological data of patient like temperature, blood pressure, heart rate, oxygen saturation