Chapter 2
Cloud Based Wireless Infrastructure for Health Monitoring

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ABSTRACT

The wireless infrastructure based devices can collect data for long period of time even with a tiny power source as they perform specific function of collection of health related data and sending to gateways. The sensing data of healthcare monitoring consumes low power but they had limited computation power to process this data, where the cloud computing plays a vital role and compliment the loophole of wireless infrastructure based systems. In cloud computing with its immense computation power for easily deployment of healthcare monitoring algorithms and helps to process sensed data. As these two technologies did great jobs in their respective fields a conflate framework of these two technologies may lead to a great architecture for healthcare applications. This chapter reviews complete state-of-the-art and several use cases related to healthcare monitoring using different wireless infrastructure and adapting cloud based technologies in providing the healthcare services.

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INTRODUCTION

World Health Organization (WHO, 2015b) defined several diseases and their cure based on age, gender, etc. Due to modern lifestyle and food habits, it is not easy to categorize any disease in a particular age group or gender, but still some diseases occur with time, and they need to manage accordingly. Several diseases like hypertension, cancer, diabetes, respiratory infections, road injuries, disability, and heart disease are leading to cause of deaths (WHO, 2015a). Several other diseases like asthma, stress and obesity are the secondary cause and leading to other diseases. Further, there are exceptional cases like children, disabled people, and elderly people need additional care. There are hundreds of diseases present worldwide. Some are zone specific other are commonly prevalent diseases. If proper treatment is available, many lives can be saved.

Traditional Healthcare Systems

The traditional healthcare system is based on two basic principles i.e. either doctor has to visit the patient for treatment or patient has to go to the medical practitioner, hospital, clinic, and/or day care center. There is no other method of treatment available to treat illness or severe disease effectively. In traditional health care system if patient's condition is critical then he/she may be admitted to hospital but even for a routine checkup like blood pressure patient need to visit a doctor or record it at home manually and report the same to the doctor. There is no automated system which can monitor all vital signs of patients automatically and report them to the doctor as and when needed or a doctor can check the current vital statistics of the patient and regulate the treatment in real time. The traditional healthcare management scenario is changing drastically with the emergence of prominent infrastructures including cloud and wireless networks like Wireless Sensor Network (WSN) or Body Sensor Network (BSN). Mobile and pervasive computing (MPC) have become the third wave of the world information industry after the computer and the Internet. Individually these technologies contribute exhaustively for the development of general purpose applications by providing better and cost effective sensing and computation power. As the wireless infrastructure based technologies make a significant contribution in the broad range of areas including forest -fire monitoring, weather- forecasting, structural health monitoring, smart cities, smart homes and smart offices to health and elderly monitoring. On the other hand, the cloud plays a vital role in its services that make a computation or storage of massive data with ease, fast and minimal cost.

The wireless infrastructure elements like WSN, BSN, and MPC enhanced real remote sensing benefits due to its infrastructure-less deployments, capabilities to sense data at remote areas and ability to communicate with each other without any