Chapter 6
The Role of Wireless Sensor Networks in Detecting and Predicting COVID–19 Using ML Algorithms

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ABSTRACT

An embedded system is a specialized computer that is resource constrained to sense and controls its environment. Embedded systems usually consist of hardware and software. The most used hardware materials are processors, peripheral communication devices, actuators, sensors, power supplies, and memory storage. The application-specific algorithms, device drivers, and operating systems are typically used in software section. Normally there is a standard protocol to communicate the particular type of embedded system; for example, nodes in sensor networks are the specialized embedded systems for detecting COVID-19. Sensor nodes with wireless communication capabilities can form wireless sensor networks (WSN).

INTRODUCTION

Embedded System

An embedded system is a specialized computer that is used to sense and control its environment. Embedded systems usually consist of hardware and software. The hardware materials include processors, peripheral communication devices, actuators, sensors, power supplies and memory storage. The application specific algorithms, device drivers and operating systems are included in the software part. Normally a standard protocol is needed to communicate to the particular type of embedded system. The nodes in sensor networks are specialized embedded systems. Sensor nodes with wireless communication capabilities can form Wireless Sensor Networks (WSN) (Al-Aubidy et al., 2017; Alagoz et al., 2018; Han et al., 2019; Mahajan et al., 2018).

Normally two types of wireless networks are used namely Personal Area Networks (PAN) and Wireless Sensor Networks (WSN). The WSN can contain hundreds or even thousands of sensor nodes. The WSN are used in industrial applications and can be deployed in hazardous environments, such as battlefields, volcanoes and wildfires. Personal area networks usually require measurement and minimization devices that are implemented in small numbers. PAN devices are designed for Wi-Fi and Bluetooth common-use technologies and standard protocols such as web browsing, file transfer application, audio, and video streaming applications. Today's research in WSN focuses on generating large-scale network systems of electricity using very specialized algorithms. They usually feature exhibits for science, hospital based on COVID-19, military and professional usage scenarios (Karsmakers et al., 2016; Li et al., 2019; Lombardo et al., 2012; Sarkar & Misra, 2016).

Therefore, in this research, the hybrid method is used to reduce the power consumption of WSN used in hospitals based COVID-19 for the patient healthcare monitoring system. Tremendous efforts have been taken to reduce the power consumption in Wireless Sensor Networks (WSNs) for healthcare systems in recent years. In any case, in a large portion of these Investigations, sensor information handling assignments, such as health decision-making and emergency reaction, are sent by the remote server. Launching and handling of large volumes of data sensors require many more communication resources, bringing in a remote server issues and delaying the decision time notification time. This work uses a hybrid technique (direct power management method for base station and self-executing path resource allocation method for server section) to reduce power consumption based on embedded system (Ge et al., 2013; Jiang et al., 2016; Sun et al., 2018; Yue et al., 2016; Zuhairy & Al Zamil, 2018).

In any case, in a large portion of these investigations, sensor information handling assignments, for example, health decision making and emergency reaction the message is sent by the remote server. Launched and handed over large volumes of data sensors use a many more communication resources, bringing a remote server issue and delaying the decision time notification time (Tyagi et al., 2022; Pal et al., 2022; Nair & Tyagi, 2021; Nair et al., 2021).

Patient Healthcare Monitoring System for COVID-19

Patient monitoring system is the most important diagnostic system in the hospital's based COVID-19 Intensive Care Unit (ICU), providing continuous display and interpretation of the patient's vital functions. Patient monitoring systems utilize telecommunications technology, medical diagnosis, treatment and COVID-19 patient care. It can be divided into two modes of operation: real-time mode, where the

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