











Review Article

A Taxonomy on Smart Healthcare Technologies: Security Framework, Case Study, and Future Directions

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Received 17 December 2021; Accepted 22 June 2022; Published 5 July 2022

Academic Editor: Paulo Jorge Sequeira Gonçalves

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There is a massive transformation in the traditional healthcare system from the specialist-centric approach to the patient-centric approach by adopting modern and intelligent healthcare solutions to build a smart healthcare system. It permits patients to directly share their medical data with the specialist for remote diagnosis without any human intervention. Furthermore, the remote monitoring of patients utilizing wearable sensors, Internet of Things (IoT) technologies, and artificial intelligence (AI) has made the treatment readily accessible and affordable. However, the advancement also brings several security and privacy concerns that poorly maneuvered the effective performance of the smart healthcare system. An attacker can exploit the IoT infrastructure, perform an adversarial attack on AI models, and proliferate resource starvation attacks in smart healthcare system. To overcome the aforementioned issues, in this survey, we extensively reviewed and created a comprehensive taxonomy of various smart healthcare technologies such as wearable devices, digital healthcare, and body area networks (BANs), along with their security aspects and solutions for the smart healthcare system. Moreover, we propose an AI-based architecture with the 6G network interface to secure the data exchange between patients and medical practitioners. We have examined our proposed architecture with the case study based on the COVID-19 pandemic by adopting unmanned aerial vehicles (UAVs) for data exchange. The performance of the proposed architecture is evaluated using various machine learning (ML) classification algorithms such as random forest (RF), naive Bayes (NB), logistic regression (LR), linear discriminant analysis (LDA), and perceptron. The RF classification algorithm outperforms the conventional algorithms in terms of accuracy, i.e., 98%. Finally, we present open issues and research challenges associated with smart healthcare technologies.

1. Introduction

Over the past decade, the healthcare industry has witnessed a drastic improvement in treatment procedures and methodologies. It majorly comprises healthcare professionals, medical equipment, laboratories, etc., to provide appropriate

medical facilities for the patients [1, 2]. In the traditional healthcare system, patients have to be present physically to interact with doctors for their treatment [3]. But, as estimated in [4], it is getting challenging for the traditional healthcare system to monitor a huge number of patients with chronic diseases. Especially, approximated in the