

Chapter 15

Ensuring Security and Privacy in Cloud-Based Healthcare Information Systems Using Deep Learning Techniques

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ABSTRACT

The cloud-based system is a technology that is currently in the development phase and allows e-health information systems to store and exchange medical records. Nevertheless, it also exhibits significant privacy and security vulnerabilities. Deep learning techniques have recently shown great promise to protect the privacy and anonymity of these infrastructures. This chapter summarizes recent research in the field. This chapter discusses various security attacks, including malware and ransomware, phishing and social engineering, man-in-the-middle attacks, and denial-of-service attacks, as well as studies demonstrating the potential of deep learning techniques for detecting and preventing these attacks. These studies also demon-

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strate the potential of deep learning methods for safeguarding the confidentiality of sensitive health information. Despite the encouraging results of these studies, additional work is necessary to perfect deep-learning techniques for cloud-based e-health system security.

1. INTRODUCTION

Cloud-based e-health information systems are those that provide e-health services and solutions by using the infrastructure of cloud computing. These solutions give on-demand access to healthcare data, assets, and services by using the scalability, flexibility, and cheap cost of cloud computing (Nayak et al., 2022). Cloud-based EHR systems provide secure access to patient data, medical imaging, and diagnostic systems provide real-time access to medical images, telemedicine, and remote patient monitoring systems enable healthcare providers to deliver healthcare services remotely, and HIE systems provide a platform for healthcare providers to share patient health information securely. Mobile health applications, often known as mHealth, provide patients with a simple platform via which they may access various healthcare services and information. In general, cloud-based electronic health information systems offer a few significant benefits, including greater collaboration, decreased expenses, improved patient outcomes, and enhanced access to healthcare services. Nevertheless, they also create a variety of challenges, including those pertaining to regulatory compliance, concerns over data security and privacy, and difficulties in interoperability and communication. The research paths that have been taken in the field of cloud-based electronic health information systems are outlined in Table 1.

Table 1. Research Pathways in the Field of Cloud-based e-health Information Systems

Research Pathway	Description
Cloud-based Electronic Health Records (EHR) (Ganiga et al., 2020)	Investigating the viability and safety of storing patient records in the cloud, as well as analyzing the benefits and drawbacks of using electronic health record (EHR) systems that are hosted in the cloud.
Big Data Analytics in e-Health (S. Mishra et al., 2022)	One of the research areas of cloud-based electronic health record systems is the investigation of how cloud computing can be utilized to manage and analyze massive volumes of healthcare data, such as patient records, medical imaging, and sensor data, in order to improve the diagnosis and treatment of illnesses.
Cloud-based Telemedicine (Ma et al., 2020)	Research is being conducted into the feasibility of using cloud computing to facilitate remote consultations, diagnoses, and treatments. The use of video conferencing and the monitoring of vital signs remotely are two such examples.

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