Chapter 11
Role of IoT in Enhancing Secure Medical Image Transfers

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ABSTRACT

The secure transmission of medical images is one area where the Internet of Things (IoT) is transforming the healthcare industry. The importance of IoT in improving the privacy, accuracy, and usability of medical imaging data is examined in this chapter. Healthcare providers can use IoT technologies to enable the real-time

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transmission of sensitive medical images while reducing the risks of unauthorized access and data breaches, thanks to the proliferation of connected devices. Effective data transfer is made possible by IoT through the use of secure and lightweight communication protocols like MQTT and CoAP.

INTRODUCTION

Securing medical image transfers is a vital component of telemedicine, and the Internet of Things (IoT) has a revolutionary effect on this. Imaging data collection, analysis (Pandey, B. K., & Pandey, D., 2025).), and transmission have become more efficient with the widespread use of IoT devices in the healthcare industry. Still, given the sensitive nature of medical images, worries regarding security and privacy are also heightened by this increase in data transmission. Medical images are safely transferred from the source to the intended recipient to the integration of cutting-edge security measures like end-to-end encryption that IoT technology offers. Medical data is shielded from unauthorized access and manipulation by encryption, which also maintains its integrity and confidentiality. Authentication mechanisms enabled by IoT also guarantee that patient data is only accessible by authorized personnel, lowering the possibility of data breaches. Its capacity to enable edge computing is another important part of IoT's role in secure image transfer. Sensitive medical images are exposed to fewer vulnerabilities during transmission thanks to this model's data processing that takes place closer to the device level (Satheesh, N. et al., 2025). Attackers will find it more difficult to intercept and alter medical data with this method since it eliminates the need for centralized cloud-based storage. Transparency and traceability can be ensured by integrating cutting-edge technologies like blockchain with Internet of Things systems to create immutable records of medical image transfers. The security and portability of medical image transfers in telemedicine applications are further improved by IoT protocols like MQTT and CoAP.

Medical Image Transmission in Telemedicine

The transmission of medical images is an essential component of telemedicine, as it enables remote diagnosis, treatment planning, and patient monitoring. Regardless of the patient's physical location, medical professionals are able to provide timely and accurate medical interventions thanks to the capability of transmitting images in real time (Kumar, M. S. et al., 2025). These images include X-rays, CT scans, MRIs, and ultrasounds. This is especially helpful in areas that are underserved or rural, either of which may have limited access to specialists. When it comes to diagnosing