

# Chapter 2


# The Role of Artificial Intelligence in Radiodiagnosis

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## ABSTRACT

*The integration of artificial intelligence (AI) into radio diagnosis is transforming the field by enhancing diagnostic accuracy, efficiency, and clinician workflow. AI-powered tools have demonstrated their potential to augment reader performance in interpreting chest radiographs, as evidenced by significant improvements in accuracy and time efficiency. Furthermore, AI-driven methodologies, such as deep learning algorithms, are being applied to detect complex pathologies, including COVID-19, fractures, and malignancies, with diagnostic accuracies rivalling or surpassing human radiologists. The implementation of AI in interventional radiology and radiotherapy planning has also introduced new opportunities for precision medicine, such as automated scoring and enhanced image quality for clinical decision-making. This*

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*chapter explores AI's role in radio diagnosis, highlighting its applications, benefits, and limitations. It addresses challenges like model generalizability, data bias. It also highlights the need for education and collaboration between radiologists and developers.*

## **INTRODUCTION**

Artificial Intelligence (AI) is revolutionizing radiodiagnosis by improving image interpretation and diagnostic accuracy. Machine learning and deep learning algorithms examine medical images to identify patterns, abnormalities, and diseases with high accuracy. AI helps radiologists by minimizing workload and maximizing diagnostic efficiency. With applications in a variety of imaging modalities, the role of AI in radiology is evolving fast. AI will play an increasingly important role in radio-diagnosis as technology improves, improving patient outcomes.

### **Overview of AI and Machine Learning in Healthcare**

With data-driven decision-making and predictive analytics, machine learning and artificial intelligence are revolutionizing the healthcare industry. AI assists radiologists in image segmentation, lesion classification, and detection. Deep learning algorithms, particularly convolutional neural networks (CNNs), improve diagnosis accuracy by learning from vast image databases. AI-enabled automation improves output and reduces turnaround time for radiology reports. The goal of the use of AI in medicine is to improve the quality of patient care by the support of physicians and not substituting for them. The study introduces time-dependent feature effects and global feature importance explanations for comprehensive explanatory analysis of survival models in medical and healthcare applications. It shows how post-hoc interpretation methods can identify biases in AI systems predicting length of stay. The study evaluates cancer survival models beyond predictive performance, enabling model developers to improve algorithms and physicians to discover disease biomarkers (Baniecki et al, 2025). There is a systematic ambiguity in the term Artificial Intelligence (AI) between full AIs, which are autonomous electronic entities that function similarly to human healthcare professionals but are electronic rather than biological, and electronic expert systems, which are used by healthcare professionals to perform their duties. Although there aren't any complete AIs yet, this topic highlights the unique ethical issues that apply to the two types of AI (Kluge,2020). AI-based cancer imaging research should have a clear medical focus, accurate methods, and reliable outcomes. It should predict clinical endpoints and have a significant impact on clinical care. Key aspects include target population selection, sample size defi-

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