

**PARALLELIZED DEEP CONVOLUTIONAL NEURAL  
NETWORKS FOR PATHOLOGY DETECTION AND  
LOCALIZATION IN CHEST X-RAYS**

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## **ABSTRACT**

Radiography is a prevalent method of medical diagnosis, especially in humans. Its popularity and increased usage are due to the affordability and the convenience of its procedures. This is used for a wide variety of cases in medical environments. Out of those, Chest Radiography or Chest X-Rays holds a significant place due to the numerous diseases that could be diagnosed by Chest X-Rays. These diseases vary from low-risk diseases to high-risk, life-threatening diseases. Due to this, accurate diagnosis of Chest X-Rays is considered very crucial. However, human errors are inevitable. In some parts of the world, medical professionals with extensive experience in Chest X-Ray diagnosis are scarce in numbers. Machine Learning attempts to provide a solution for these two issues of misdiagnosis and lack of medical professionals. Existing attempts are mostly based on Deep Convolutional Neural Networks. This dissertation presents a novel way of utilizing multiple neural networks for the purpose of accurate detection and localization of diseases present in Chest X-Ray images. The proposed algorithm creates a range of new pathways to conduct research in a variety of fields and use cases. However, this dissertation primarily aims to prove the strengths and advantages of the proposing algorithm for Chest X-Ray classification within a well-defined scope. The dissertation further presents the limitations, and its drawbacks backed up with extensive testing and evaluation procedures and techniques employing the experts.

**Keywords:** Deep Learning, Machine Learning, Deep Neural Networks, Medical AI, CXR Classification, Image Processing