Detection of Rheumatoid Arthritis Using CNN by Transfer Learning

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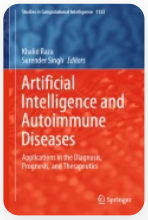

Artificial Intelligence and Autoimmune Diseases

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Abstract

Rheumatoid arthritis (RA) represents a long-term autoimmune condition marked by joint inflammation, resulting in discomfort and distortions of the joint structure. Early and accurate detection of RA plays a pivotal role in managing the disease and preventing irreversible joint damage. In this study, we propose a novel approach for detecting Rheumatoid Arthritis through the utilization of Convolutional Neural Networks (CNN) employing transfer learning.

Our methodology leverages pre-trained CNN architectures to extract hierarchical features from medical images, particularly X-ray images of affected joints. Transfer learning enables the model to capitalize on the knowledge learned from large and diverse datasets, enhancing its ability to discriminate between healthy and RA-affected joints even with limited labeled data. Fine-tuning of the pre-trained model is performed to adapt the network to the specific characteristics of RA-related features. We present a comprehensive evaluation of our approach using a dataset consisting of X-ray images from both RA patients and healthy individuals. The experimental results showcase the effectiveness of our CNN-based transfer learning method in accurately detecting RA. The outcomes of this research have significant implications for early diagnosis and management of RA. By harnessing the power of deep learning and transfer learning, our approach contributes to the development of a non-invasive and efficient tool for RA detection, which can aid healthcare practitioners in making informed decisions and improving patient outcomes.

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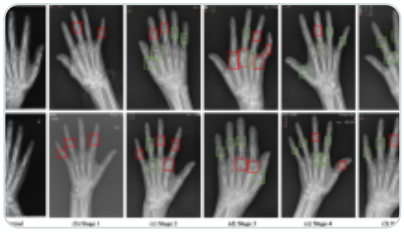

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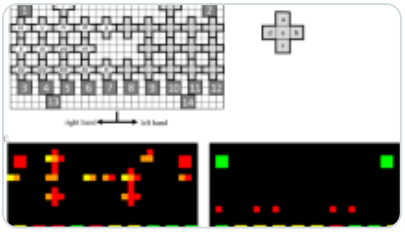

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