

CSCI-567 Group Project Proposal

Huixian Gong, Hanyi Wang, Qifan Wang, Yumin Wang

Background

The musculoskeletal conditions were diagnosed mainly through the physician's examination via radiographs. It heavily relies on the physician's experience. However, unclear radiographs often lead to misdiagnosis. Hence, we propose to architect a Convolution Neural Network (CNN) model to predict if the musculoskeletal conditions exist in the radiograph.

Data

The data we are working on are musculoskeletal radiographs (MURA) [2] from the website <https://stanfordaimi.azurewebsites.net/datasets/3e00d84b-d86e-4fed-b2a4-bfe3effd661b>.

Basically these are bone X-ray images representing normal or abnormal bones (bones with fractures).

While there are musculoskeletal radiographs for multiple body parts, we will first work on images for hand, as we have most data available for hand. Time permitting, we will also explore bone conditions for the other body parts.

Method

As the paper for analyzing the MURA dataset [2] uses the 169-layer Convolutional Neural Network (DenseNet-169) designed by Huang et al. in 2018 [1], we will reimplement this network to replicate the baseline.

Reference

- [1]
G. Huang, Z. Liu, L. van der Maaten, and K. Q. Weinberger, "Densely Connected Convolutional Networks," Jan. 28, 2018, *arXiv*: arXiv:1608.06993. Accessed: Sep. 20, 2024. [Online]. Available: <http://arxiv.org/abs/1608.06993>
- [2]
P. Rajpurkar *et al.*, "MURA: Large Dataset for Abnormality Detection in Musculoskeletal Radiographs," May 22, 2018, *arXiv*: arXiv:1712.06957. doi: [10.48550/arXiv.1712.06957](https://doi.org/10.48550/arXiv.1712.06957).