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Opponent Review "Lung Data Analysis With Deep Learning" by Hari Krishnan Kesavan Vijayakumar

I enjoyed reviewing the bachelor thesis "Lung Data Analysis With Deep Learning" which conducts experiments on high-resolution histological lung images to determine which Multiple Instance Learning method is best suited for this specific task.

The author writes in a concise yet readable way. The thesis is self-contained and provides readers from different domains with the necessary background knowledge to follow the conducted experiments. Via a short introduction to Machine Learning with Artificial Neural Networks (ANNs). And a more detailed section that covers architectures and concepts most relevant for the given task. Namely, Convolutional Neural Networks (CNNs) and the most important variants of Attention mechanisms.

The experiments are well-documented, all necessary steps are welldescribed, which enables reproducibility. The dataset and the two methods, Multiple Instance Learning (MIL) versus Clusteringconstrained Attention Multiple Instance learning (CLAM), are introduced, and references to existing work cover the relevant literature for the topic. Given the small sample size, the author makes the reasonable decision to formulate the task as binary classification (healthy and non-healthy).

The evaluation uses the appropriate metrics AUC, accuracy, and F1-score, calculated for all the individually trained models using 10-fold stratified cross-validation. The author concludes that on this specific dataset, neither of the two methods performs significantly better than the other one.

All in all, the thesis meets my criteria for a good bachelor thesis, and I am pleased to recommend this Bachelor thesis for ACCEPTANCE.

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