**ABSTRACT**

***Diseases like pneumonia and tuberculosis are leading causes of death world-wide. Although conclusive diagnosis requires other tests such as a sputum culture, chest radiography can be an important diagnostic aid and is routinely recommended since it is fast, affordable and highly sensitive. Moreover, automated detection of abnormalities on the chest X-ray can help in active case finding, screening, and in cases where other tests are not available or are inconclusive. Due to the nature of the domain, it is also important that algorithms not only make inferences but also generate explanations sufficient to convince a human expert.***

***Inspired by previous work, we develop algorithms that can detect abnormalities on the x-ray. The algorithm explains these detections by generating heat maps pointing out areas of the image that most influenced it. We establish baselines, benchmark against previous work and show that a) transfer-learning from a large non-TB dataset dramatically improves TB detection, b) models in the domain show inferior performance on external data from a different hospital system but c) recent techniques such as mixup and progressive resizing improve performance and generalization. We achieve performance competitive with previous work in detecting pneumonia-like and other abnormalities on the NIH chestX-ray14 dataset and in detecting tuberculosis on the Shenzhen hospital dataset, and achieve state-of-the-art performance on the Montgomery county tuberculosis dataset. We look for potential sources of bias and evaluate our baseline with respect to gender, age and view position.***