

AI Model Aids in TB Detection via Smartphone

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Study: Transfer Deep Learning for Tuberculosis Detection on Chest X-Ray Images Captured by Phone Camera

Key findings:

A deep learning-based tuberculosis (TB) detection model can detect TB on phone-captured chest X-ray photographs.

Why it matters:

An early diagnosis of TB is crucial but challenging for resource-poor countries. TBShoNet provides a method to develop an algorithm that can be deployed on phones to assist healthcare providers in areas where radiologists and high-resolution digital images are unavailable.

This is the first study applying transfer deep learning to smartphone-captured chest X-ray photos for TB diagnosis.

Background:

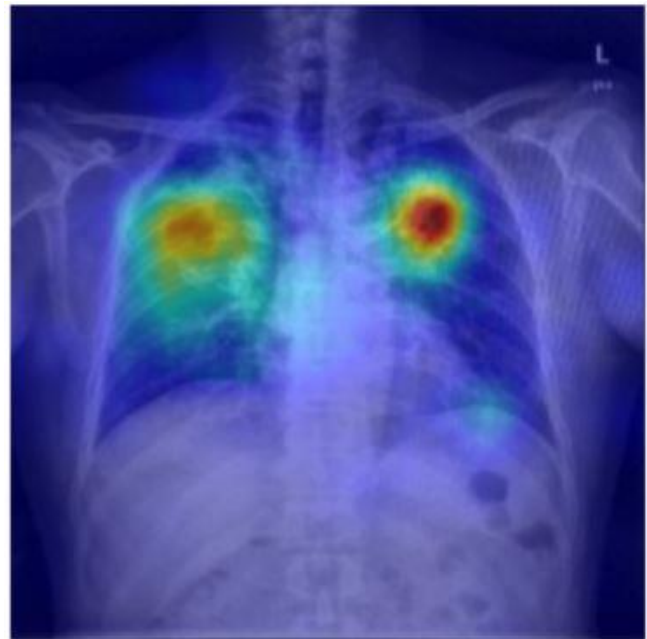
Three publicly available datasets were used for model pre-training, transferring and evaluation. The neural network was pretrained on a database containing 250,044 chest X-rays with 14 pulmonary labels, which did not include TB. The model was then recalibrated for chest X-ray photographs by using simulation methods to augment the dataset.

The TBShoNet model was built by connecting the pretrained model to an additional 2-layer neural network trained on augmented chest X-ray images. Then 662 chest X-ray photographs taken by five different phones (TB: 336; normal: 326) were used to test the model performance. Sensitivity and specificity for TB classification were 81% and 84%, respectively.

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“WE NEED TO EXTEND THE OPPORTUNITIES AROUND MEDICAL ARTIFICIAL INTELLIGENCE TO RESOURCE-LIMITED SETTINGS.”

LEAD STUDY AUTHOR PO-CHIH KUO, PH.D.