Tuberculosis detection using deep learning and contrast-enhanced canny edge detected X-Ray images

ABSTRACT

Tuberculosis (TB) is a disease that causes death if not treated early. Ensemble deep learning can aid early TB detection. Previous work trained the ensemble classifiers on images with similar features only. An ensemble requires a diversity of errors to perform well, which is achieved using either different classification techniques or feature sets. This paper focuses on the latter, where TB detection using deep learning and contrast-enhanced canny edge detected (CEED-Canny) x-ray images is presented. The CEED-Canny was utilized to produce edge detected images of the lung x-ray. Two types of features were generated; the first was extracted from the Enhanced x-ray images, while the second from the Edge detected images. The proposed variation of features increased the diversity of errors of the base classifiers and improved the TB detection. The proposed ensemble method produced a comparable accuracy of 93.59%, sensitivity of 92.31% and specificity of 94.87% with previous work.