

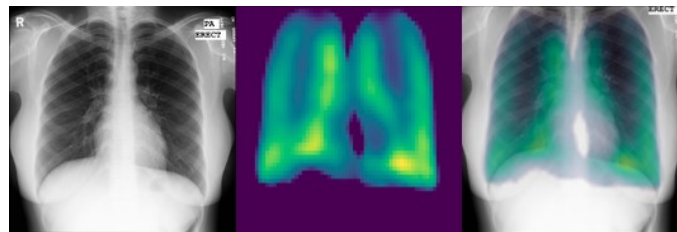


Chest X-ray Global Analyzer

What's new: engineered on the basis of deep neural networks, Topazium implemented a platform which detect and localize the presence of 16 radiological signs (see Annex A) indicative of cardiovascular or respiratory clinical conditions on a frontal chest radiography (chest X-ray).

Key insights: our system accurately identifies and localizes key radiological findings in chest X-rays of patients faster than current clinical practice.

How it works: chest X-ray images belonging to patients with a suspected cardiovascular or respiratory clinical condition are uploaded into Topazium's platform. It outputs the probability of 16 different abnormal radiological signs along with a heatmap localizing the suspected regions.



Normal chest X-ray: 99.0%

Results: the system is able to detect images with evidential radiological signs of disease, whilst correctly categorizing those deemed as “negative”. Accuracies are comparable to expert radiologists; however, it does it faster.

Why it matters: chest X-ray is one of the most commonly performed diagnostic examination for cardiovascular and respiratory life-threatening diseases. Automated chest radiograph interpretation could provide substantial benefit in many medical settings. At the level of practicing radiologists, it can reduce time to diagnosis as well as fatigue-based diagnostic error. It can also increase access to medical imaging expertise in areas of the world where access to skilled radiologists is limited.



Annex A

Topazium's framework currently classifies the following chest x-ray anomalies:

Atelectasis: loss of lung volume secondary to collapse

Cardiomegaly: a medical condition in which the heart is enlarged in its transverse cardiac diameter by 1.5cm

Consolidation: filling of the pulmonary tree with material that attenuates x-rays more than the surrounding lung parenchyma

Edema: an abnormal accumulation of fluid in the extravascular compartments of the lung

Emphysema: abnormal permanent enlargement of the airspaces distal to the terminal bronchioles accompanied by destruction of the alveolar wall and without obvious fibrosis

Fibrosis: excess of fibrotic tissue in lung

Hernia: abnormal protrusion of the lung beyond the confines of the thoracic cage

Infiltration: any poorly defined opacity in the lung

Mass: area of pulmonary opacification that measures more than 30 mm

Nodule: small, rounded opacities within the pulmonary interstitium

Pleural thickening: any form of thickening involving either the parietal or visceral pleura

Pneumonia: infection within the lung

Pneumothorax: presence of air in the pleural space

Pleural Effusion: collections of fluid within the pleural space

Tuberculosis: infection by *Mycobacterium tuberculosis*

COVID19: infection by SARS-CoV-2