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Google's AI system outperforms human experts at spotting lung cancer

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The model will be made available through the Google Cloud Healthcare API

Google AI researchers working with Northwestern Medicine created an AI model capable of detecting lung cancer from screening tests better than human radiologists with an average of eight years' experience.

When analyzing a single CT scan, the model detected cancer 5% more often on average than a group of six human experts and was 11% more likely to reduce false positives. Humans and AI achieved similar results when radiologists were able to view prior CT scans.

When it came to predicting the risk of cancer two years after a screening, the model was able to find cancer 9.5% more often compared to estimated radiologist performance laid out in the National Lung Screening Test (NLST) study.

Detailed in research published recently in Nature Medicine, the end-to-end deep learning model was used to predict whether a patient has lung cancer, generating a patient lung cancer malignancy risk score and identifying the location of the malignant tissue in the lungs.

The model will be made available through the Google Cloud Healthcare API as Google continues trials and additional tests with partner organizations.

Google technical lead Shravya Shetty and product manager Daniel Tse explained in a blog post, "The AI system uses 3D volumetric deep learning to analyze the full anatomy on chest CT scans, as well as patches based on object detection techniques that identify regions with malignant lesions."

The model was trained using more than 42,000 chest CT screening images taken from nearly 15,000 patients, 578 of whom developed cancer within a year, during a low-dose computed tomography LDCT study the National Institutes of Health (NIH) conducted in 2002.

Results were then validated with data sets from Northwestern Medicine.

Lung cancer is one of the most common causes of death on Earth, according to World Health Organization data, taking more than 2 million lives annually and killing roughly as many people each year as breast cancer. A 2015 analysis found that only 2-4% of patients get an LDCT screening today.

“By showing that deep learning can increase specificity without sacrificing sensitivity, we hope to spur more research and conversation around the role AI can play in tipping the cost-benefit scale for cancer screening,” the blog post reads.

This is by no means Google’s first foray into cancer detection and treatment. Google Inception v3 was used to detect lung cancer by New York University researchers last year.

And deep learning is also behind Google’s advances in diabetic retinopathy diagnosis through eye scans, as well as DeepMind’s AI that can recommend the proper line of treatment for 50 eye diseases with 94% accuracy.