contextflow

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User Report

Always in the picture thanks to AI

Evangelisches Klinikum Niederrhein introduces contextflow ADVANCE Chest CT in the Pulmonology Department

Lung diseases are among the most common as well as most diverse health problems worldwide. They require precise diagnoses and effective treatment strategies. In this context, artificial intelligence (AI) opens up a promising avenue for detecting a wide variety of disease conditions in affected patients as early as possible. Fanar Othman, head physician at the Clinic for Pulmonary and Bronchial Medicine at Johanniter Hospital Oberhausen, has also discovered the possibilities of deep learning-based technology for himself. He uses the CE certified software contextflow ADVANCE Chest CT to ensure that even when there is a lot to do, the pulmonologist no longer misses anything.

As part of the Lower Rhine Evangelical Hospital and Bethesda Hospital network, the department not only cares for around 3,000 patients a year in its own hospital, but also provides consultative care for three other sites in the western Ruhr region, including

Dinslaken and Duisburg. As a former stronghold of the coal and steel industry, the region is also known as the "coal pot". Particularly among the older generation, the doctors still see many patients whose health was severely affected by their work in the former mines, blast furnaces and factories. As a result, a not insignificant proportion of the medical care provided locally is for occupational lung diseases such as pneumoconiosis, silicosis, asbestosis and, unfortunately, the resulting late effects such as cancer and pleural mesothelioma.

So there is a lot to do for the total of five pulmonologists under the direction of Fanar Othman. "We have a large catchment area and, simply because of the size of our association, we get to see a large number of rare pathologies in addition to the usual clinical findings," says the chief physician. "In these cases, it can already become a challenge to make the correct diagnosis and initiate appropriate therapy." In this context, a single disease may be associated with multiple radiological patterns. Precise characterization is often laborious and examiner-dependent.

Quick access to relevant knowledge

Since last year, contextflow's AI solution has been providing a remedy for this problem. It takes over the sifting and provision of information from CT examinations that are relevant for diagnostics. The recognition software detects even small changes in the lung parenchyma and relates them to specific diseases. For nodules, it can even show progression. The resulting findings report is generated automatically and is available directly in the PACS viewer within a few minutes. In this way, the tool saves the diagnostician from having to work through thousands of image slices every day, and at the same time, prevents anything important from being overlooked.

Using an AI system in his department is new territory for Fanar Othman. He was made aware of ADVANCE Chest CT by his physician colleague, the head of radiology, Prof. Dr. Jörg Michael Neuerburg, who has already been using the software successfully for some time. "From the beginning, I liked how affable and user-friendly the application was," Othman recalls. "You have to take care of practically nothing. The findings generated by the AI are prepared in a simple and clearly understandable way, so you can adopt the results

without time-consuming cross-checking. There is not enough time for anything else in daily practice. Everything has to be done in a jiffy."

Progress controls at the push of a button

When the opportunity arose to take part in a product training course initiated by contextflow, the pulmonologist jumped at the chance. During the online training, he discovered that the software can do a lot more that is valuable for his work: "For example, the AI is able to compare different series of images taken at different points in time. This makes it possible to assess the size development of nodules, which is very important for determining further therapeutics."

In addition to calculating the diameter in a plane, the system also applies 3D volumetric analysis to evaluate the total mass of a pulmonary nodule. The volumetric measurement method is becoming increasingly important because it offers a more accurate assessment of malignancy risk, or tumor grade, compared to linear measurement, and also helps to better monitor response to therapy - especially when it comes to determining tumor doubling time. This refers to the fact that in most malignant lesions, volume increases first, followed by size.

From the pattern of findings to differential diagnosis

The software solution is also used for texture analysis, e.g. for characterizing parenchymal changes such as ground-glass opacities, reticular pattern or honeycombing. In this context, the distribution of the changes in the lung allows decisive conclusions to be drawn about the underlying clinical picture. However, differential diagnosis is a difficult and complex task due to the sheer number of existing lung pathologies. In addition, it is often the small but subtle differences that matter. Even experienced experts sometimes reach their limits here. "Sometimes it's difficult to decide with subtle changes in the lower lobe: is this an emphysema bullae or honeycombing? The AI can differentiate such structures incredibly well," Fanar Othman is pleased to report.

What the Oberhausen head physician also likes is that the structural parenchymal changes can be displayed in percentage form with the help of ADVANCE Chest CT: "When a check-up is due, you can't always tell with the naked eye whether it has improved after

therapy or not. If the response is not that great, it's helpful to know by what percentage it ultimately got better. A lot of patients ask us explicitly about that, too." So such clear feedback can have a positive effect on doctor-patient communication.

Overall, the expert is very pleased with how AI has been able to reduce the workload in his department over the past year while increasing diagnostic accuracy. He says his team is also enthusiastic and has already asked him - or rather the AI - for advice in one or two tricky cases. Othman is not worried that a machine could one day outstrip him: "I see it as an opportunity - especially in view of the fact that there is a shortage of staff anyway. AI is therefore a helpful support in the diagnostic process that makes a lot of things easier. In the end, it is still us who bring it all together with the laboratory values, clinical data and samples and come to a decision. That remains the fine art and continues to be the physician's task."