PRESS RELEASE

PathoScan project: Automated digitalization in routine pathology

Erlangen: The Fraunhofer Institute for Integrated Circuits IIS is working together with partners PreciPoint GmbH, HTI Automation GmbH, the Department of Pathology at the University Hospital Regensburg and the Technical University of Munich to create an automated digital pathology system. Fraunhofer IIS intends to find a way of assessing the quality of tissue samples and weeding out any unsuitable ones before the samples are loaded for scanning. This will save valuable time by preventing unnecessary scans and means that pathologists won't end up with substandard specimens.

Up to now, much of the work done in pathology labs has been performed manually. This includes growing and dying tissue samples, analog quality control of the histological sections and creating and storing image libraries. It is an area in which digital innovation has been slow to make inroads so far due to a lack of reliable analysis results and the high costs involved. This is where the PathoScan project comes in. The fully automated digitalization workflow covers a host of pathology processes – from tissue dying to definitive diagnosis. Fraunhofer IIS is developing processes based on artificial intelligence (AI) that assess how well specimens have been dyed and cut. This means specimens that have been unsuccessfully dyed or those with tears or air pockets can be discarded during sampling rather than later, at the analysis stage, once the specimens have already been captured digitally. This saves time and money.

Modular AI solution makes routine tasks easier

Fraunhofer IIS has many years of experience working on automated microscopy systems and using machine learning to analyze medical images. In addition to feature-based classification approaches, this includes deep learning, a data science method that uses convolutional neural networks (CNNs). Machine learning can help pathologists attain reliable analysis results and, because it delivers consistently high image quality, enables them to make a definitive diagnosis.

The digitalization system's modular setup ensures that it can be easily integrated into existing pathology practice. What's more, an innovative dye technology for applying

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dye reagents reduces the need for expensive reagents, especially when it comes to immunohistochemical applications.

The PathoScan digitalization project with a total volume of 3.84 million euros is sponsored by the Bavarian Ministry of Economic Affairs, Regional Development and Energy with funding totaling 1.63 million euros (FKZ ESB074/005). Fraunhofer IIS is joined in this innovative consortium of industrial companies and research institutions by the Department of Pathology at the University Hospital Regensburg, the Technical University of Munich (TUM), PreciPoint GmbH and HTI Automation GmbH.

Fully automated digitalization workflow makes routine tasks in pathology labs easier.
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Gefördert durch

Bayerisches Staatsministerium für
Wirtschaft, Landesentwicklung und Energie

IN COLLABORATION WITH

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The Fraunhofer Institute for Integrated Circuits IIS in Erlangen is one of the world's leading application-oriented research institutions for microelectronic and IT system solutions and services. It is the largest of all Fraunhofer Institutes. Research at Fraunhofer IIS revolves around two guiding topics:

In the area of "**Audio and Media Technologies**," the institute has been shaping the digitalization of media for more than 30 years now. Fraunhofer IIS was instrumental in the development of mp3 and AAC and played a significant role in the digitalization of the cinema. Current developments are opening up whole new sound worlds and are being used in virtual reality, automotive sound systems, mobile telephony, streaming and broadcasting.

In the context of "**cognitive sensor technologies**," the institute researches technologies for sensor technology, data transmission technology, data analysis methods and the exploitation of data as part of data-driven services and their accompanying business models. This adds a cognitive component to the function of the conventional "smart" sensor.

More than 1100 employees conduct contract research for industry, the service sector and public authorities. Founded in 1985, Fraunhofer IIS now has 14 locations in 11 cities: Erlangen (headquarters), Nürnberg, Fürth and Dresden, as well as Bamberg, Waischenfeld, Coburg, Würzburg, Ilmenau, Deggendorf and Passau. The budget of 169.9 million euros a year is mainly financed by contract research projects; 26 percent of the budget is made up of German federal and state funds.

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