

PRESS RELEASE

Characterizing lymph nodes by means of ultrasound and reliably diagnosing malignant growths

Researchers at Fraunhofer IGD have developed software that will enhance the quality of information yielded by ultrasound examinations of the neck and head area. ECHOMICS will make it possible to reliably diagnose malignant growths in lymph nodes without resorting to invasive procedures. The scientists will present the results of the project at the three-day DMEA trade fair in Berlin (26 - 28 April 2022).

Darmstadt: Sonography is one of the most important imaging procedures, including in the diagnosis of cancer. However, malignant changes to lymph nodes spreading from squamous cell carcinomas in the head and neck region can often only be diagnosed with certainty by means of a biopsy. "In the future, it will be possible to detect malign growths in the lymph nodes by ultrasound alone and to initiate appropriate treatment without having to take the much more circuitous route of a biopsy or resection," says Dr. Stefan Wesarg, Director of the Visual Healthcare Technologies Department at the Fraunhofer Institute for Computer Graphics Research IGD. This novel approach has been made possible by the ECHOMICS software package.

AI-based algorithms

To this end, the researchers have developed AI-based algorithms that automatically recognize and mark lymph nodes on 2D as well as 3D images of the head and neck region. Parameters such as the shape and size of a lymph node, its internal structure and elasticity, or the specific characteristics of its edge texture provide information about the nature of the change – similar to the automated analysis of tumors in radiological image data. In addition, the software also takes into account the patient's other clinical data such as gender, age and lifestyle habits.

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**Fraunhofer IGD
at DMEA**
April 24-26, 2022
Berlin, Germany

Joint Fraunhofer
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Hall 2.2, Booth E106

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Stefan Wesarg: "In order to detect malignant changes at an early stage, it is important to always examine the same lymph nodes and to systematically compare the new image data with those from previous examinations." An arduous task of analysis that poses challenges, even for experienced physicians. This is precisely where ECHOMICS comes in.

Visual analytics assist in testing hypotheses

The software not only enables the comparison of individual-specific data sets over a longer period of time, but also cohort analyses. "Researchers can formulate hypotheses, for example about a correlation between different characteristics, and validate them using the data," says Prof. Jörn Kohlhammer, Director of the Information Visualization and Visual Analytics Department. The more patients whose data are anonymously recorded and compiled by the software, the more reliable the verification of relevant markers.

The objective is to create a kind of signature for squamous cell carcinomas that have metastasized in lymph nodes, which will allow an exact diagnosis and facilitate a prognosis about the further course of the disease. Stefan Wesarg: "Although this is still some way off, ECHOMICS provides clinical research with a crucial tool to come closer to achieving this ultimate goal." The first users of ECHOMICS are physicians at the University Hospital in Düsseldorf. More than 3750 ultrasound examinations of neck lymph nodes are performed here annually. "ECHOMICS gives us an additional decision-making aid in lymph node diagnostics, which creates increased diagnostic certainty for physicians and patients alike," says PD Dr. Kathrin Scheckenbach, senior physician in the ENT clinic at University Hospital Düsseldorf. "Additionally, this path leads us to a more automated IT/AI-based and thus increasingly objective assessment." ECHOMICS is being further developed and readied for market launch in partnership with Medcom in Darmstadt, Germany.

ECHOMICS is a project funded by the German Federal Ministry of Education and Research as part of the "KMU-innovativ: Medizintechnik" program, which is due to terminate in April 2022. At DMEA in Berlin, the researchers from the Fraunhofer Institute for Computer Graphics Research

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IGD will present this and other new developments to an audience of professionals who work in the field.

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For more information:

Further information on this and all other exhibits of the Fraunhofer IGD at the DMEA: <https://fh-igd.de/DMEA-en>

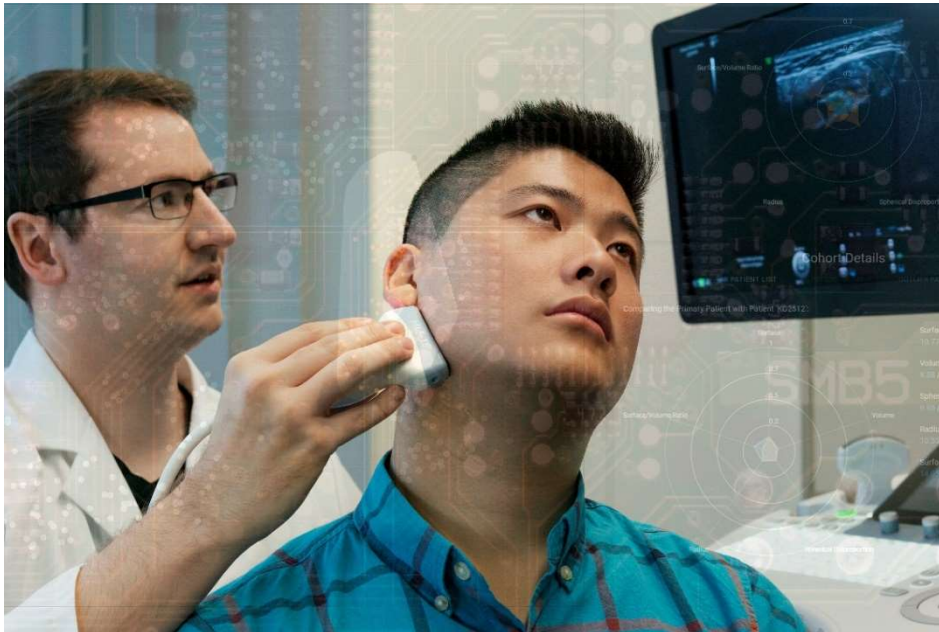


Photo (M): Fraunhofer IGD is developing the software ECHOMICS to detect malignant lymph nodes in ultrasound images. (© Fraunhofer IGD)

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About Fraunhofer IGD

Founded in 1987, the Fraunhofer Institute for Computer Graphics Research IGD is the world's leading institute for applied research in visual computing—computer science based on images and 3D models. We turn information into images and images into information. Keywords are human-machine interaction, virtual and augmented reality, artificial intelligence, interactive simulation, modeling, 3D printing and 3D scanning.

FRAUNHOFER INSTITUTE FOR COMPUTER GRAPHICS RESEARCH IGD

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Around 180 researchers at three locations in Darmstadt, Rostock and Kiel in Germany develop new technology solutions and prototypes for industry 4.0, digital healthcare and the smart city. In cooperation with its sister institutes in Graz, Austria and in Singapore, they also take on international relevance. With an annual research volume of €21 million, we use applied research to help in the strategic development of industry and the economy.

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