

PRESS RELEASE

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The driving force of digitalization in medicine

The Fraunhofer Institute for Medical Image Computing MEVIS celebrates 20 years

Bremen, September 14, 2015 – In recent decades, medicine has undergone a fundamental change. The computer has entered medical practices and clinics. X-ray and ultrasound images are now digitally recorded. Today, MRI and CT scanners deliver three-dimensional images and videos of the inside of the body. The Fraunhofer Institute for Medical Image Computing MEVIS in Bremen has contributed significantly to the field and developed a range of innovative software methods. On September 14, the Institute celebrates its twentieth anniversary with an official ceremony in Bremen’s City Hall. Founded as a nonprofit Ltd in 1995, it became part of the Fraunhofer-Gesellschaft in 2009. Today, it is one of the leading institutes for computer support in image-based medicine worldwide.

In the mid-nineties, the digitalization of medical image data was still in the early stages. X-ray images were usually recorded on film, which doctors observed on fluorescent screens. The images were stored in archive cabinets and could only be sent via couriers and postal mail. Imaging methods such as MRI and CT that allow three-dimensional images of inside the body were available primarily in larger centers.

Today, digitalization is widely established in medicine. X-ray images are recorded and stored digitally and can be sent over the internet. Doctors examine them on monitors and can zoom and use software tools, for example, to measure tumors. MRI and CT scanners now belong to standard medical tools. They deliver not only razor-sharp still images, but also entire sequences of the body’s dynamic functional processes.

Fraunhofer MEVIS has helped drive this process of digitalization in the last two decades. Computer systems, indispensable in the today’s clinical routine, have been developed in cooperation with the Institute in Bremen. One example is the system for digital mammography: “We were pioneers in digitalizing diagnostic processes,” says Horst Hahn, one of the two Institute Directors. “Our work led to, among other things, the establishment of the MeVis BreastCare spin-off, a successful provider of digital mammography workstations.”

The Institute’s planning software for complex liver surgeries has been another pioneering success story. It supports surgeons in preparing complex interventions and operating on the organ as effectively and safely as possible.

Editor

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“One problem is that research results often remain unused,” emphasizes Hahn. “We bring the research into practice and tackle the enormous obstacles we see worldwide.” The Fraunhofer MEVIS experts have built optimized modular software systems and cultivated a network of clinical partners, with whom they can test and implement new developments. This integration with university clinics allows Fraunhofer MEVIS to coordinate large research projects. In the BMBF-funded SPARTA project, a consortium of ten partners works to improve targeting in radiation therapy. Sophisticated software should help adjust the radiation to the current condition of the cancer patient during the course of several weeks of therapy.

In celebration of the anniversary, the senate reception and gala will take place in the Bremen City Hall on September 14, 2015. Eva Quante-Brandt, the Bremen Senator for Science, Health, and Consumer Protection, and Reimund Neugebauer, the President of the Fraunhofer-Gesellschaft, will pay tribute to the Institute’s achievements. On the following day, Fraunhofer MEVIS will open its doors for media representatives and visitors interested in the field. During the open house, the Institute will present a cross section of its research.

Among others, projects that address mechanical learning and automatic pattern recognition will be presented. One example is software that supports pathologists in diagnosing tissue samples. The computer automatically highlights areas in gigabyte-large images areas containing possible abnormalities that are relevant for the diagnosis. Doctors save time and can focus on examining diagnostically conclusive images. “We want to bring physicians and computers together in a way that optimizes their strengths,” emphasizes Director Ron Kikinis.

For faster transfer to medical practice, Fraunhofer MEVIS develops web-based software tools for diagnostics, therapy, and clinical studies, such as the National Cohort (NAKO), Germany’s largest health study to date. The experts in Bremen have developed browser-based software for NAKO that enables fast availability and quality assurance of 30,000 MR images – an important prerequisite for the success of the study.

“In the future, computer support should not only save costs and provide new possibilities, but also reduce the susceptibility of diagnoses and therapies to errors despite increasing complexity,” says Horst Hahn. “Medicine will undergo radical changes, for which digitalization was merely a precursor.” The methods of the image-based therapy in particular have enormous potential. They are especially relevant for gentler, minimally invasive procedures. Here, unlike in open surgery, doctors cannot see directly and rely on the support of imaging methods.

Another field of research addresses the transfer of planning data in the operation room. Today, interventions are often planned and prepared with the help of computers. Optimally, planning results should be available to the surgeons directly at the operating table; this is currently only partially possible. Fraunhofer MEVIS develops mobile solutions, such as tablet software, that shows surgeons where it is best to incise so that blood vessels are spared. In the future, similar tablet software should support surgeons in breast cancer procedures.

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Image-based therapy will be the focus of the CURAC 2015 symposium held in Bremen between September 17 and 19, where Fraunhofer MEVIS will officiate as organizer and host. “The annual conference of CURAC is the primary German-speaking forum for computer- and robot-assisted surgery,” says Ron Kikinis. “It builds a bridge between radiologists and surgeons and in the future, should help make important information available at all times in the operating room.”

Embedded in a worldwide network of clinical and academic partners, **Fraunhofer MEVIS** develops real-world software solutions for image-supported early detection, diagnosis, and therapy. Strong focus is placed on cancer as well as diseases of the circulatory system, brain, breast, liver, and lung. The goal is to detect diseases earlier and more reliably, tailor treatments to each individual, and make therapeutic success more measurable. In addition, the institute develops software systems for industrial partners to undertake image-based studies to determine the effectiveness of medicine and contrast agents. To reach its goals, Fraunhofer MEVIS works closely with medical technology and pharmaceutical companies, providing solutions for the entire chain of development from applied research to certified medical products. www.mevis.fraunhofer.de/en

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