

Feeling a heartbeat via a computer

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The dynamics of a beating heart, the turbulence surrounding the fuselage of an airplane, or the field of forces inside a molecule. All of these things can be felt, not only seen, with a new visualization technology developed at Linköping University in Sweden.

Today's powerful computers have opened previously unimagined possibilities regarding the presentation and analysis of scientific data. Volume data, in particular—such as three-dimensional computer tomographies of the human body—can contain incredible amounts of information. When such data are to be analyzed, it can be an advantage to be able to use to more senses than sight alone.

Karljohan Lundin Palmerius at the Division for Visual Information Technology and Applications has developed methods to explore volume data using the sense of touch—a branch of science that is often called haptics. He describes his pioneering work in a dissertation titled Direct Volume Haptics for Visualization.

Thanks to new computational algorithms, three-dimensional forms can be freely studied and perceived in a manner natural to the user, who works at a computer screen with a sort of touch tool. The most common type is constructed as an industrial robot in which miniature electric motors provide feedback to the hand.

“Different equations are needed for different applications. I am the first researcher to present the dynamic events of a beating heart in a real patient,” says Karljohan Lundin Palmerius.

His Methods can be used to provide a better basis for diagnosis, but also for simulations for doctors to practice on a patient who will then be operated on in reality.

The medical data he works with come from the Center for Medical Image Science and Visualization (CMIV) at Linköping University in Sweden.

From SAAB he has been given access to data from the development of the unmanned airplane Shark and has created a virtual wind tunnel where the constructor can feel how the airstreams move around the fuselage.

Source: Linköping University

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