Fujitsu launches Heart Explorer to study heart behavior

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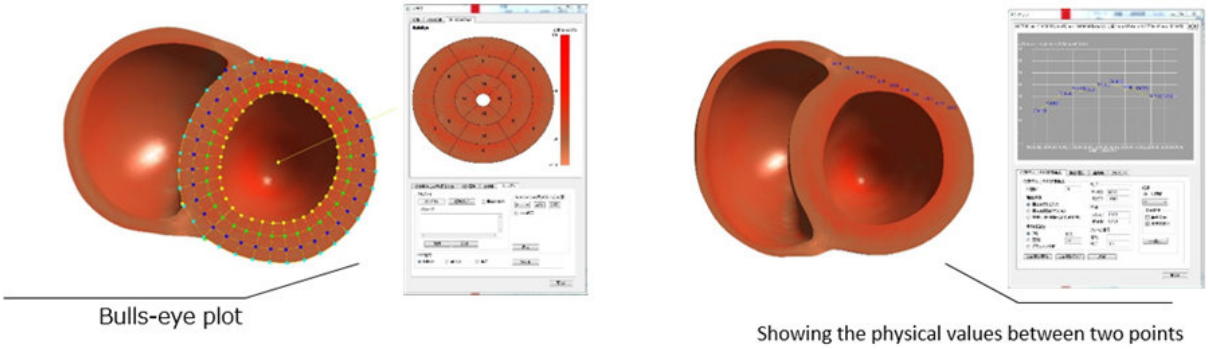


Visualizing physical values such as the pressure on the heart muscles using a graph. Credit: Fujitsu

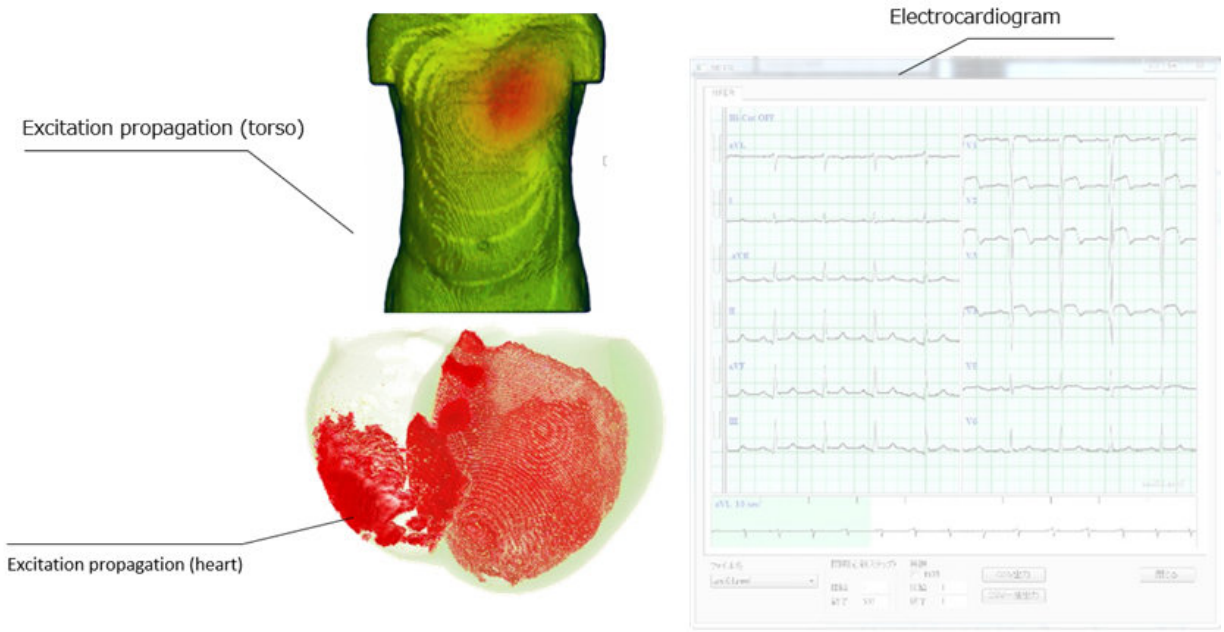
Fujitsu today announced the Japan launch of Fujitsu Healthcare Solution Heart Explorer, a software for medical and nursing schools, including university medical hospitals. This software is based on the results of a heart simulator that reproduces heart behavior in exquisite detail so that the heart can be modeled in 3-D for observation and analysis.

The software goes on sale in Japan from today. Heart Explorer utilizes data output from a heart simulator created through R&D using the K computer and other computing resources, enabling students to observe and analyze the movements of the myocardium, the flow of blood, excitation propagation, and electrocardiograms, which were all

previously very difficult to represent. This software enables learning through experience, including structural analysis functionality that visualizes physical values, such as the pressure exerted by heart muscles, in graphs, as well as the ability for students to freely adjust their viewpoints for the 3-D model and the configuration of cross sections. More than just a view to healthy hearts, this teaching material also offers contents that cover an array of cases that enable the study of heart disease, such as myocardial infarction. In addition, the software has been designed to improve understanding through 360-degree, three-dimensional observation of such factors as the three-dimensional structure of the heart, the internal structure, and the heartbeat, which have been difficult to visualize, using virtual reality (VR) technology in the form of the zSpace 200 (sold separately), which is a 3-D stereoscopic display.

With this software, Fujitsu is contributing to the improvement of medical technology and understanding by enabling more efficient study of the heart and of heart disease. Heart disease is currently one of the leading causes of death in advanced nations around the world (the second-leading cause in Japan, and the leading cause in the US), and research and development on a variety of treatment methods and devices is ongoing.

In addition to treatment methods, effort is also being put into educating medical and nursing students about the heart. The heart has one of the more complex structures in the body, and it is difficult to learn about topics like the complex movement of heart muscles or the flow of blood from text. Previously, students learned about the structure and basic functionality of the heart through methods such as hands-on dissection, models created using 3-D printers and other means, computer graphics made by designers, and textbooks, but there was a need for teaching materials that could be used to study a beating heart.



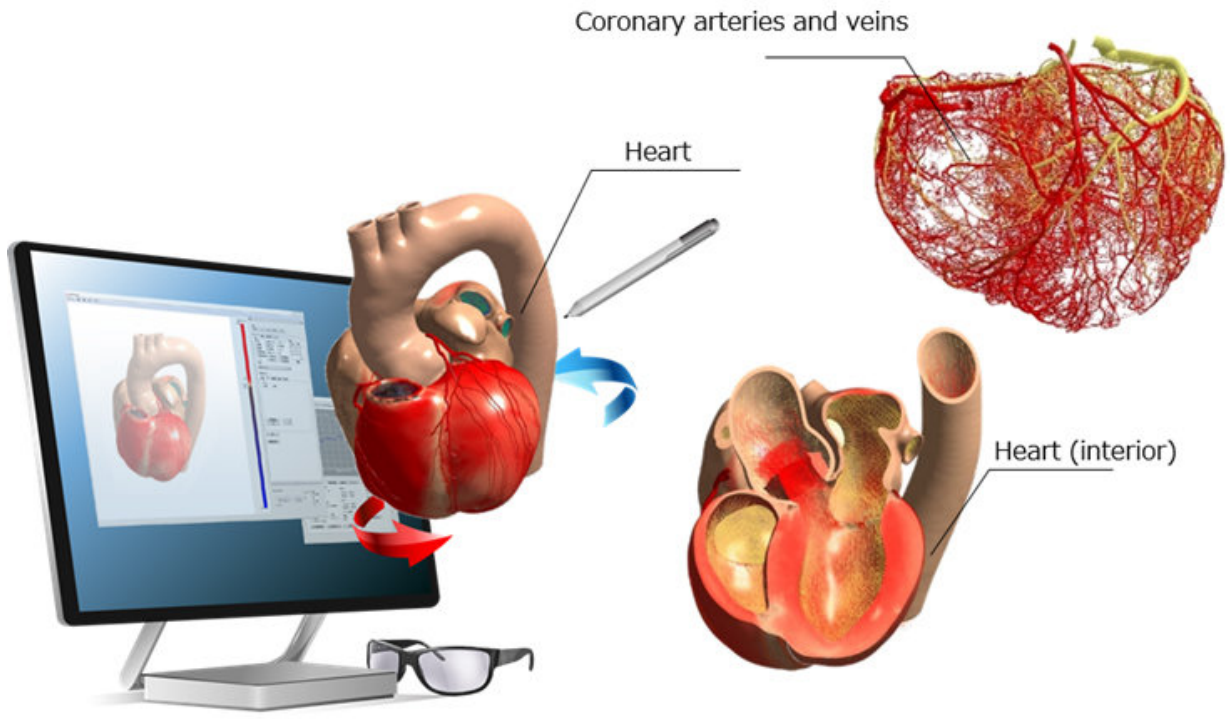
Studying the relationship between excitation propagation and an electrocardiogram. Credit: Fujitsu

In order to resolve this issue, Fujitsu developed Heart Explorer, incorporating the results of joint research with the University of Tokyo on a heart simulator. Using data output from the heart simulator created using the K computer and other computing resources, the software reproduces the pulsation of the heart in exquisite detail. Heart Explorer enables students to learn efficiently with a complex heart reproduction and a number of visualization and analysis tools.

Features of Heart Explorer

1. Highly effective learning with a detailed 3-D model

Learners can freely set the point of view and cross sections of the model, enabling them to study the three-dimensional structure, the internal structure, the beating of the heart, and the flow of blood with a 3-D model, which is difficult to study with a physical model. Using the visualization and analysis capabilities, students can also use graphs to visualize the force exerted by the heart muscles, the movement of blood flow, and the excitation propagation.



Three-dimensional viewing using VR technology. Credit: Fujitsu

2. Study multiple related topics simultaneously

It is said that in education using textbooks or physical models, it is difficult to understand the relationship between the waveforms of the

heart's electrocardiogram and the process of excitation propagation. In Heart Explorer, users can place electrodes on the surface of the body recreated from the simulator and then alter the voltage to display the waveforms on the electrocardiogram while simultaneously visualizing the excitation propagating through the torso, which enables students to understand the relationship between the two.

3. Incredibly realistic recreations of the heart using VR technology

The heart is considered an organ with a three-dimensional structure and blood flow that are difficult to grasp, but with VR technology using the zSpace 200, it is possible to gain a three-dimensional awareness of the complex configuration of the heart. Moreover, by connecting this system to a 4K projector, it can be used in a lecture in a large classroom at a university.

Provided by Fujitsu