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Visualization Support for Cognitive Sciences

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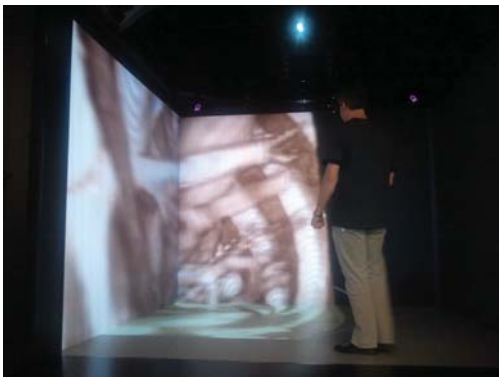
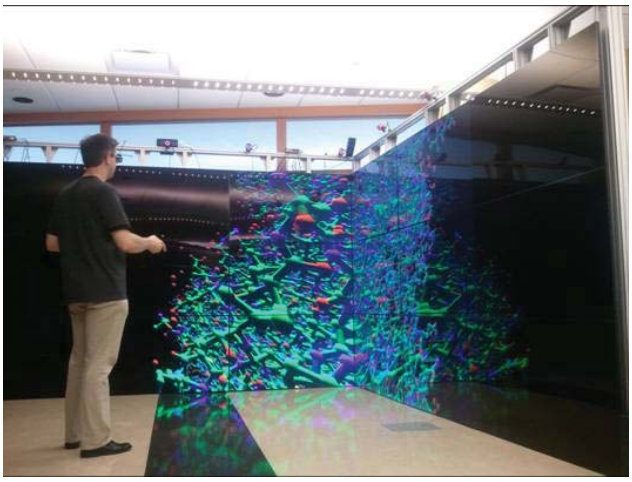


Researcher exploring a CT scan of a heart in the fully immersive I-space

The science of computer graphics and visualization is intertwined in many ways with Cognitive Sciences. On the one hand, computer graphics can lead to virtual environments in which a person is exposed to a virtual scenario. Typically, 3D-capable display technology combined with tracking systems, which are capable of identifying where the person is located at, are deployed to achieve maximal immersion in that the person's point of view is recreated in the virtual scenario. As a result, an impressive experience is created such that that person is navigating the virtual scenario as if it was real. On the other hand, visualization techniques can be utilized to present the results from a cognitive science experiment to the user such that it provides easier access to the data. This could range from simple plots to more sophisiticated approaches, such as parallel coordinates.



Data set visualized in the Display Infrastructure for Virtual Environments (DIVE)

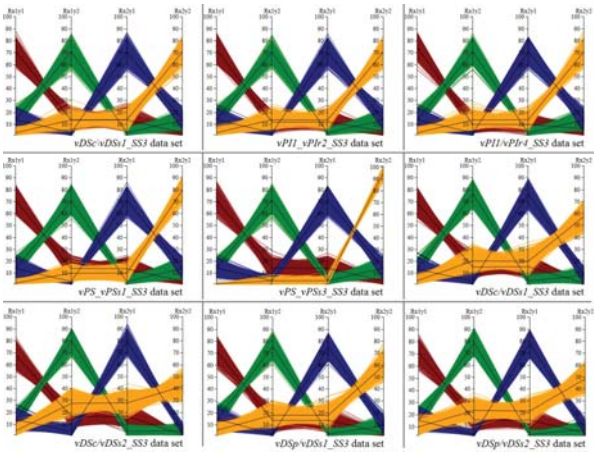
Display environment showing a virtual scenario of a room setup on an aircraft carrier getting controlled via a 7 inch tablet computer

Data gloves used as input devices with attached marker spheres for optical tracking

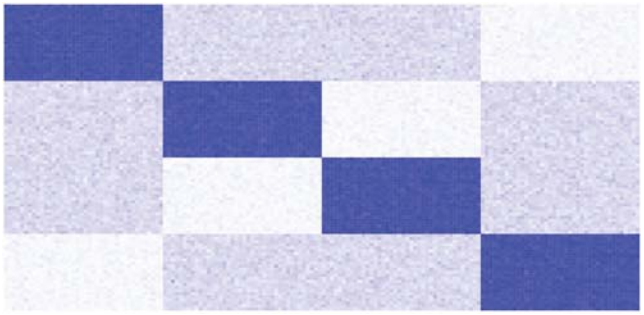
Logitech gamepad modified as input device for virtual environments with optical tracking

In addition, results from cognitive sciences can feed back into the visualization to make the visualization more user-friendly. For example, more intuitive input devices, such as cyber gloves which track the position of a user's fingers, could be used to intuitively make selections or view modifications.

The Appenzeller Visualization Laboratory at Wright State University is in a perfect position to enable research in all of these areas mentioned above. Sophisticated display systems are available which provide full immersion, ranging from single screens and head-mounted displays to full-size CAVE-type displays. Input devices can be fully tracked, such that orientation and position is known at all times, to enable a highly interactive visualization environment that is very intuitive to use. As input devices, standard gamepads can be used but also data gloves or even tablet computers.



Parallel coordinate plot of a General Recognition Theory (GRT) data set (confusion matrix)



Visualization of a series of confusion matrices from General Recognition Theroy in an accumulating block structure to maintain original layout

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Advanced Visual Data Analysis