

The Design of a Virtual Information Environment

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The technology responsible for virtual reality has opened up a number of exciting areas of study, entertainment, and application. The areas garnering most of the initial attention by researchers and industry developers are the development of virtual environments that focus on the sense of immersion, the visual 3D graphics of the environment, and the means of navigating through that virtual environment. These are all challenging issues but they don't address one of the primary ways that we utilize computer systems, as information workers searching, examining, and manipulating information. This demonstration will illustrate a virtual information environment (VIE) that differs from many current VE efforts with a focus on the visualization, navigation, and manipulation of information.

We have designed an interactive VIE that displays large to very large image collections with an emphasis on enhancing the user's ability to see patterns within the data and interact with the information in a very direct and natural way that spans across multiple human senses. This VIE integrates multiple sensory inputs from the user. The use of eye gaze from embedded eye-tracking allows for easy selection of objects while use of hand gestures allow for direct manipulation of information in much the same way people interact with physical objects. Lastly, voice commands help communicate intent to the system. Each of these input modalities are powerful techniques in their own right but their integrated use could potentially provide the user with a unique and very flexible way of interacting with digital information.

The VIE demonstration will allow people to experience the VIE first hand through a head mounted display or by watching others interact with it through a secondary monitor. This demonstration will also include lessons learned involving information visualization within VEs that involve dealing with current hardware limitations, 2D vs. 3D information presentation, and how graphic design should be integrated into any VIE space. The challenges associated with designing and deploying a multi-sensory input system will also be discussed that include how to overcome the limitations of camera based gesture recognition systems, how to enable gesture use for long periods of time without user fatigue and discomfort, and how machine learning techniques can be applied to input recognition systems.