The Department of Computer Science and Engineering

University of Nevada, Reno

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Immersive Visualization and Analysis of Ground Penetrating Radar Data

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Science
with a major in Computer Science.

by

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Abstract: Ground Penetrating Radar data are pulses that are sent from a transmitter into the earth and reflected pulses are collected by a receiver. This data is then used by geologists to obtain a view of terrain underground. This data is typically viewed using a desktop interface where the user usually interacts using a keyboard and mouse. Visualizing the data in a slice by slice 2D format can be difficult to interpret. Instead of performing the visualization and interaction this way, we designed a program for an immersive visualization environment that uses tracked input devices. The visualization is done using real-time stereoscopic, perspective-corrected, slice-based volume rendering. To aide with the visualization the user can modify the display of the volume using integrated tools, such as transfer functions, lighting, and color maps. Users are also given data analysis tools that provide natural interactions. These tools allow users to take application-specific measurements such as dip, strike, other angles, and distances in 3D. Compared to typical desktop interface interactions, the 6-degree of freedom user interface provided by the immersive visualization environment makes it notably easier to perform the application-specific measurements.

12:30 pm, Monday, May 3, 2010

Computational Research and Visualization Building (CRVB) room 209 @ DRI

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