COURSE NOTES 9

IMPLEMENTATION OF IMMERSIVE VIRTUAL ENVIRONMENTS

Organizer
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Lecturers
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Chapel Hill

Implementation of Immersive Virtual Environments

Full Day Intermediate Course
Monday July 27 1992

Course Chair:

Steve Bryson

Computer Sciences Corporation/NASA Ames Research Center

Speakers:

Chuck Blanchard

VPL Research

William Bricken

Human Interface Technologies Lab
University of Washington Seattle

Lew Hitchner

RIACS/NASA Ames Research Center

Rick Jacoby

Sterling Software/NASA Ames Research Center

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Course Abstract

This course will describe the implementation of fully immersive virtual environments. The integration of hardware, software, and program design resulting in creating the illusion of virtual worlds will be covered. Developers who have designed the most famous and successful virtual worlds (that's us!) will discuss their work on a detailed level. After taking this course, the attendee will have a greater understanding of how to develop a fully immersive interactive virtual environment. Solutions to difficulties in the integration of hardware and software into a responsive, high performance system will be covered. Through several examples, various options in the development of virtual worlds will be learned. The attendee will know how to select the hardware for a particular virtual environment, outline the appropriate software structure, and implement that structure in a way which will give the greatest possible performance.

Speaker Biographies

Steve Bryson

Steve Bryson is an employee of Computer Sciences Corporation working under contract for the Applied Research Office of the Numerical Aerodynamics Simulation Systems Division at NASA Ames Research Center. In this position he is researching the use of virtual environment technology in various fields of scientific visualization, primarily the visualization of fluid flow. Prior to this position, he worked at the NASA Ames VIEW lab developing the first fully integrated virtual environment facility. Prior to that he was one of the original employees at VPL Research, Inc., a small company devoted to the development of virtual environment technology.

Steve Bryson's formal training is in mathematical physics, and he is most interested in virtual reality as a way to express abstract concepts and understand the real physical world. He currently teaches popular adult and children's classes in theoretical physics at the California Academy of Sciences. He is an active amateur musician, and has written sound tracks for sky shows at Chicago's Adler Planetarium.

Chuck Blanchard

Chuck Blanchard is the Director of Software Engineering at VPL Research and has been with VPL since it started in 1985. He has worked on all the key software and user interface issues created by VPL's unique user input devices. Chuck is the author of Body Electric, the visual programming language that brings Virtual Reality to life. Chuck is currently working on making VR as intuitive as normal reality. Chuck studied computer science at The Evergreen State College in Olympia, Washington. He has been working with computers for over 10 years and is co-author of two books on Macintosh programming.

William Bricken

Dr. William Bricken is the Principal Scientist at the Human Interface Technology Lab at the University of Washington, where he is designing and implementing the Virtual Environment Operating System and the interactive tools of the VR environment. His prior positions include Director of the Autodesk Research Lab, which developed the Cyberspace CAD application of virtual reality, and Principal Scientist at ADS, where he pioneered high-performance inference engines, visual programming systems, and instructable interfaces. Dr. Bricken holds a multidisciplinary PhD in Research Methodology, Education, Computer Science, and Psychology from Stanford, and degrees in Statistics (MS Stanford), Education (DipEd, Monash Australia), and Social Psychology (BA, UCLA). He specializes in experiential mathematics and void-based computation.

Lew Hitchner

Lew Hitchner's education includes a bachelor's degree in Mathematics from Dartmouth College, an M.S. degree in Operations Research from Berkeley, and a Ph. D. in Computer Science from the Univ. of Utah. At Utah he studied graphics and digital image processing. His dissertation topic was on software for true 3D volumetric displays. He also worked on remote sensing and medical image processing at Utah. His introduction to computer science was in 1962 when he graduated from the Moore School of Electrical Engineering Summer Session for Secondary School Students in Computer Mathematics and Programming, an NSF funded project taught by Moore School graduate student Andries Van Dam.

Lew's employment history includes 5 years as an Operations Research analyst in the MIS Dept. of ICI, America, Inc., "several" years as a Teaching and Research Asst. in Geography and Computer Science Depts. at Univ. of Utah, and 5 years on the Computer Science faculty at Univ. of Calif., Santa Cruz. At UCSC he taught undergrad and graduate computer graphics and digital image processing courses and conducted research in digital image compression and in the application of human visual perception to computer graphics and digital image processing. Prior to taking his current position he spent 9 months as a Visiting Scientist in the Image Science and Applications Dept., IBM Palo Alto Scientific Center. For the past 2 1/2 years Lew has been a Scientist at RIACS (Res. Inst. for Advanced Computer Science) at NASA Ames Research Center. While in this position he has been the technical director of the Virtual Planetary Exploration (VPE) project. VPE utilizes virtual environment techniques to provide "virtual exploration" of terrain surfaces of Mars and other planets to planetary geologists, mission planners, and mission operations managers.

Rick Jacoby

Rick Jacoby received his BS degrees in Physics and Mathematics at California State Polytechnic University at San Luis Obispo, and an MA in physics at the University of California at Davis. He has been an employee of Sterling Software at NASA Ames Research Center for the past 16 years, where he has lead teams and participated in the development of several simulation systems. For the past four years he has lead development of the software used in the Virtual Interactive Environment Workstation (VIEW) lab.

Rick is married and has a six year old daughter. He enjoys creating wood sculptures whenever he has the time.

Creon Levit

Creon Levit received his BS in computer science from Washington University in St. Louis in 1982. He joined NASA Ames Research Center later that year. For the last several years, he has been pursuing research in computational aerodynamics on massively parallel computers and in numerical flow visualization using computer graphics and virtual environments.

Warren Robinett

Warren Robinett is a designer of interactive computer graphics software and hardware. He was educated at Rice University and Berkeley, receiving a BA in "Computer Applications to Language and Art" in 1974 and an MS in Computer Science in 1976. In 1978, he designed the Atari video game Adventure, the first graphical adventure game. In 1980 he was co-founder and chief software engineer at The Learning Company, a publisher of educational software. There he designed Rocky's Boots, a computer game which teaches digital logic to 11-year-old children.

Rocky's Boots won Software of the Year awards from three magazines in 1983. In 1986 Robinett worked as a research scientist at NASA Ames Research Center, where he designed the software for the Virtual Environment Workstation, NASA's pioneering virtual reality project. In 1989, he came to the University of North Carolina to direct the Head-Mounted Display Project. In 1992, he became co-director of the Nanomanipulator Project at UNC, which interfaces a scanning-tunneling microscope to a head-mounted display to allow micro-teleoperation at atomic scale on the surface of a sample beneath the microscope.

Course Schedule

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