U.K. London

University College London

Virtual Environments and Computer Graphics (VECG)
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Core Competence

Virtual Reality, Global Illumination, Real-time Rendering, Virtual Reality Systems and Networking, Image Based Rendering, Understanding of Human Factors of Virtual Reality, Virtual Clothing, Avatar Simulation, Collaborative Environments, Mixed Reality

Head of the Institute
Mel Slater

History

The Virtual Environments and Computer Graphics group at UCL started in 1996 when Mel Slater moved to UCL from Queen Mary, University of London. Soon a group of about 10 researchers formed, and most of the work concentrated on virtual environments and presence research (with Research Fellows Martin Usoh and Anthony Steed), including VE systems (with Anthony Steed), and computer graphics issues such as visibility rendering (with Yiorgos Chrysanthou). Since that time Céline Loscos, formerly at iMAGIS/GRAVIR lab, Grenoble University, France and Anthony Steed have joined the full-time faculty. The group consists of about 20 researchers in all, continuing to concentrate on graphics rendering issues, understanding of virtual environments, and systems including mixed reality.

Staff

Faculty: Céline Loscos, Mel Slater, Anthony Steed
Research fellows: Andrea Brogni, Pip Bull (and PhD student), Pankaj Khanna (and PhD student), Alexandre Meyer, Daniela Romano, David Swapp (Manager of the Immersive VE Laboratory), Vinoba Vinayagamoorthy (and PhD student), Insu Yu (and PhD student)
Current PhD students: Jesper Mortensen, Maia Garau, Andreas Loizides, Manuel Oliveira, Maria Roussou, Franco Tecchia, Mette Thomsen (jointly with Bartlett School of Architecture)
Current eng Doc students: Bernhard Spanlang (supervised by Bernard Buxton), Howard Towner

Rooms and Locations

The group occupies much of a first floor large laboratory in the Computer Science Department. There is also a special room that houses a Cave-like system, which is a Trimension ReaCTor with 4 projection walls, and Intersense Trackers.

Financing

Finance is from the UK government research councils (EPSRC), the EU, and industry.

Current Structure and Important Partners

The group is part of a larger group called VIVES (Vision Imaging and Virtual Environments). The Vision group is led by Prof. Bernard Buxton, and the medical imaging group by Prof. Simon Arridge, both in the Department of Computer Science. We also have close collaboration with the Bartlett School of Architecture at UCL and the Clinical

Subgroup of the Department of Psychology.

Current Research

The research carried out by this group spans the range from real-time computer graphics rendering to human factors issues in virtual reality. A common theme is that we want to understand how to make virtual reality effective. So we carry out experiments with participants, in order to examine just what makes a difference to their sense of presence in the virtual environment, and their sense of co-presence with other people. To enable such experiments we need to provide interactive, collaborative virtual environment systems

Much of our work concentrates on the issues of modelling, rendering and populating virtual cities. Our models are quite extensive (e.g. 170sqkm of central London) and thus we are developing visibility algorithms and data management process. We are also populating such environments with crowds since we know from our experimental work that empty environments, places without people, don't make users “believe” in the simulated environment.

In a similar context, we are very interested in making our avatars 'realistic', so that you will want to engage with them. But what does 'realistic' mean in this context?

It does not mean photo- or geometrically accurate realism. It does mean avatars that carry out those tiny gestures and movements that we take so much for granted in everyday experience that we don't even notice them; and these are the most difficult to identify and to simulate.

We also carry out research on real-time rendering, and are particularly interested in how real-time can be maintained even in the context of global illumination for realistic lighting.

Our ultimate goal is a theory of virtual reality: to make it 'work' in a given application context and with given resources, what is the best approach to take, what is the best algorithm, interaction and rendering style to use? We don't know if any group will ever have a solution for this, but the quest is a driving force.

Important Recent Project Participations

- Virtual Light Field, EPSRC, www.cs.ucl.ac.uk/research/vr/Projects/VLF/index.htm
- VR in Psychotherapy for Social Phobias, Welcome,www.cs.ucl.ac.uk/research/vr/Projects/SocialPhobias/
- CREATE, EU, www.cs.ucl.ac.uk/create/
- Equator Mixed Reality, EPSRC, www.cs.ucl.ac.uk/research/equator/
- Collaborative Virtual Environments, EU COVEN, www.cs.ucl.ac.uk/research/vr/Coven/index.html

Important Recent Industrial Partners

BBC, British Telecom

The Future of the Lab

The group will continue research in the current areas of real-time rendering, virtual reality systems and applications, including applications in the realm of psychiatry. An important new development is a EU FET research project funded from October 2002, called PRESENCIA, which will study presence in virtual environments in collaboration with neuroscientists.