Polytechnical University of Catalonia

Virtual Reality and Computer Graphics Group
(Virtual Reality Center, Software Department,
Institute of Robotics and Informatics)
CRV, IRI
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Core Competence

Volume and Geometric Modelling, Medical Applications, Virtual Reality, Octree and discrete models, Multiresolution and automatic simplification Deformable models, Virtual and Augmented Environments, Data visualization

Head of the Institute
Pere Brunet

History

Computer Graphics activities started in the first 80?s initiated by Pere Brunet. Lectures on computer graphics are given since 1984. About 30 PhD?s have completed their work since then. In 1993 the group organized the annual Conference Eurographics?93 in Barcelona. Together with the Gedas company, a Virtual Reality Center was set up in 2000. The group has been strongly involved in the evolution of Computer Graphics in Spain, and has a strong and fruitful cooperation with the group in Girona and with other groups in Spain and abroad.

Rooms and Locations

The laboratory occupies 700 square meters and is located in the U building of the Barcelona south campus of the Polytechnical University of Catalonia. It includes several labs for virtual reality and visualization.

Staff

1 Professor: Pere Brunet
5 Associate professors: Carlos Andujar, Lluis Solano, Isabel Navazo, Toni Susin, Alvar Vinacua
1 Assistant professor: Marta Fairen
6 Ph. D. students: Jordi Esteve, Eva Monclus, Maximo Mero, Lyudmila
Odamila Rodriguez, Marta Franquesa, Joan Jou
8-12 Research assistants: Antoni Chica, Victor Cebollada, J.Oriol Esteve, Dani Marin, Alex Rios, Jordi Rovira, Guiu Tio, Ramon Trueba, David Valor, Josep Vila
Technicians and a *Secretary*

Financing

As part of the Polytechnical University of Catalonia, the basic staff (7 people), our physical location and basic infrastructure are being financed by the Spanish government and by the government of Catalonia.

Most of the research assistants and some additional staff, as well as most special equipment are paid from

projects funded by industries, by the spanish and the Catalonia government, and by the EU.

Current Structure and Important Partners
The group works on Virtual Reality applications (Carlos Andujar), medical applications (Isabel Navazo), advanced modelling techniques and surface design (Alvar Vinacua), virtual prototyping for industrial applications (Lluis Solano) and affordable VR systems (Marta Fairen). Virtual Reality applications are done in close cooperation with Gedas in the framework of the UPC-Gedas Virtual Reality Center of Barcelona, and with the Vall d'Hebron Hospital in Barcelona.
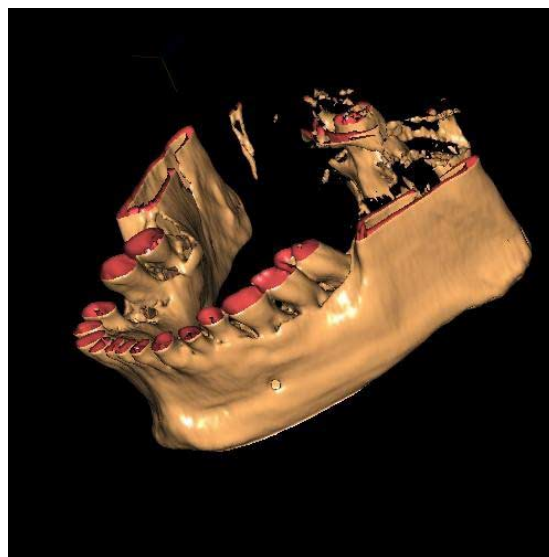
Current Research
The group is presently working in the following topics and projects:
- Algorithms for Real-Time Inspection of Very Large Geometric Models: Multiresolution and automatic simplification, visibility pre-processing and visibility culling, collision detection in very large VEs, cooperative VR systems, and discrete models for efficient visualization.
- Algorithms and techniques for industrial design: specific tools for ship hull design, advanced modelling techniques with rational surfaces.
- Algorithms and techniques for medical applications: hybrid volume-surface modelling and visualization, deformable models, applications for diagnose and surgery planning (maxilar surgery, dynamic model of the human heart, inspection of organs).
- Affordable VR systems: PC-based immersive VR table, portable VR systems, augmented reality, direct and haptic interaction.
- Virtual Reality Applications: immersive virtual prototyping for ship design, architecture and urban planning, reconstruction and inspection of historical heritage elements and objects.

Important Recent Project Participations
- "Fiores", EU-IST project, BE-96-3579, rkk.mv.uni-kl.de/FIORES
- "ViHAP 3d", EU-IST project, vihap3d.org
- "Maxilo", CICYT-Feder-EU project, TAP-2FD-1997-1511, www-iri.upc.es/people/maxilo
- "VirtualHeart", CICYT project TIC-2000-1009, www-iri.upc.es
- "Multimold", CeRTAP-CIRIT funded project, Generalitat de Catalunya, www.centrecim.com/main.htm

Important Recent Industrial Partners
Sener, Gedas Iberia, Minolta Europe, Pininfarina, Taurus, Matra Datavision, BMW, Saab

Future of the Lab
The group will continue close cooperations with its current partners. It will continue with the international projects and cooperation activities. The future research activities will develop towards immersive modelling and interaction techniques, advanced cooperative tools and interactive manipulation of very complex virtual environments.