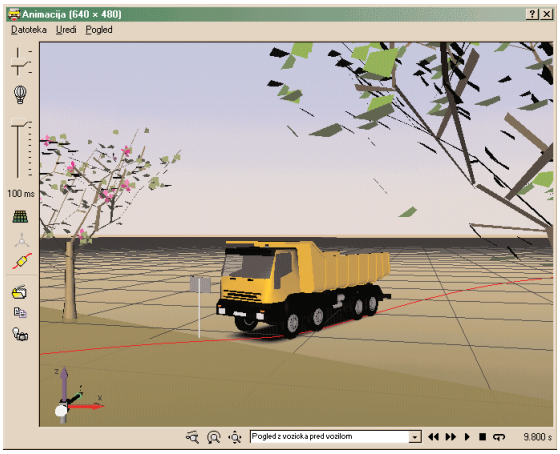
3D Vehicle Dynamics Simulation

Overview



The Center for Element and Complete Design Modelling (CEMEK) of the Faculty of Mechanical Engineering at the University of Ljubljana in Slovenia has developed a mathematical model for the simulation and analysis of the driving dynamics of road vehicles. The model allows for the reconstruction of vehicle motion immediately before a traffic accident with a simultaneous analysis of the driving and control dynamics. The model is based on the data that is usually available at an accident scene and allows for a reasonably accurate reconstruction of the accident.

The Challenge

The challenge was to present the results obtained from the driving dynamics model in the most visual way. The vehicles and other objects had to be presented so that they could be recognized from every point of view at every stage of the accident. Another goal was to achieve a balance between the complexity of a model (which needed to be kept as low as possible to meet the requirements of real time animation) and its resemblance to the real vehicle.

The Solution

The most effective way to achieve this was with 3D visualization. The 3D models of vehicles were created with photomodelling software and then converted to a format suitable for use in animation by means of conventional 3D CAD software. VRML was chosen as the final format for the 3D vehicle models, as the VRML specification is publicly available, and allows for the use of simple animation.

CEMEK then used ParallelGraphics Cortona SDK to connect the mathematical model with the display in the virtual 3D environment (Cortona SDK describes how ParallelGraphics 3D technology can be integrated with applications written in VB, Delphi, C/C++ and any other applications that support ActiveX control). CEMEK have created a Visual Basic application (VRMLPath™) that automatically generates 3D animations based on the mathematical model output data and allows for a qualitative analysis of the simulation results. Created animations are also exported as digital video for presentation and demonstration purposes.

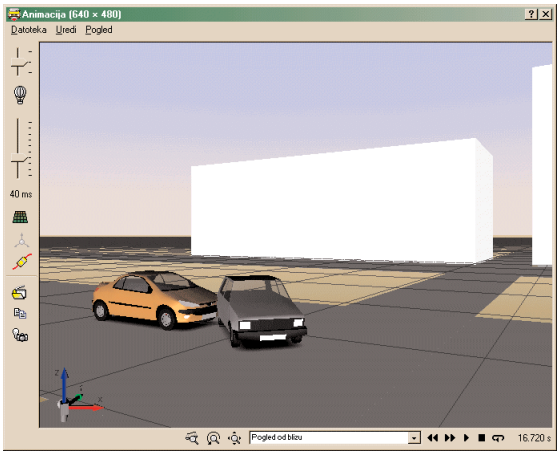
Links

Cortona SDK homepage:
http://www.parallelgraphics.com/products/sdk

Video samples and more detailed information about the project:
http://www.fs.uni-lj.si/cemek/eng/raziskave/lapn/frm3.htm

About ParallelGraphics

ParallelGraphics is a world leader in the provision of Web3D graphics solutions with a proven track record of innovation and development over the last decade. The company's technologies and tools have been used widely in providing online training solutions, remote user support, virtual manuals for technical maintenance, and interactive applications for design and modeling. The Company's list of clients includes Boeing, NASA, Ford, MAN Roland, Siemens and Samsung. ParallelGraphics is a privately held Irish company, with its headquarters in Dublin, Ireland and an R&D center in Moscow, Russia.



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