Web3D-Technologies for Java-based online simulation

Andreas Bischoff, http://prt.fernuni-hagen.de/

VRML as a text-based language is a powerful, nevertheless simple language to build 'virtual worlds', which include 3D objects, light sources and animations. The functionality and degree of user interaction for a VRML environments can be enhanced, if the 'External Authoring Interface' (EAI) of VRML is considered for integration of a Java applet. User interfaces via comfortable Java applets can be build in order to give access to the VRML environment and to allow higher-level modifications.

One disadvantage of VRML is the need of a client browser-plug-in. The Web3D consortium has developed a new 3D-data format called 'X3D', which includes a small subset of VRML and enables the implementation of Java-based VRML browsers. Meanwhile Java-applet-based VRML and X3D browsers are developed by Blaxxun (Blaxxun3D) and Eyematic (Shout3D).

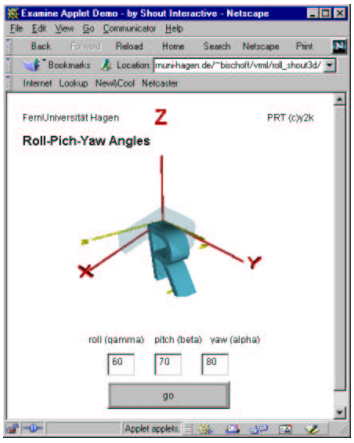

Figure 1: Applet implemented with Shout3D

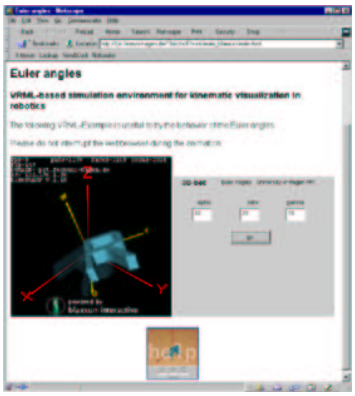

Figure 2: Applet implemented with Blaxxun3D

Both of solutions are working with pure-Java and the earlier Java 1.1 Java virtual machines, so that for almost all web users no extra plug-in is required to see 3D-content. Both products doesn't implement the full VRML97 specification nor the 'External Authoring Interface' (EAI) of VRML but each product has his own API to support the developer with EAI-similar features. The rendering quality and the rendering speed of the different solutions vary, because only software based rendering is possible with current JVM's. The alternative Java3D-API supports hardware graphics acceleration but requires the newer Java 1.3 JVM, which is available as plug-in for IE and Netscape 4.xx browsers (already integrated in Netscape 6).

We have ported two of our Java applets to replace the EAI with the specific Blaxxun3D and Shout3D-API.

These applets, which provides an easy interface to explore the rotation transformation with Euler angles and Roll-Pitch-Yaw angles, are now platform independent and useable without any browser-plug-ins. The rendering quality of the Shout3D applet is better and faster than the Blaxxun solution, which has on the other hand a more standardized API-interface (X3D). These tools were developed to support our online robotic courseware.

[1] http://prt.fernuni-hagen.de/~ bischoff/virtreal.htm

[2] http://www.web3d.org

[3] http://www.blaxxun.de/support/developerguide/developer/blaxxun3d/indexcontent.html

[4] http://www.shout3d.com/shout3d_doc_dir/index.html