Virtual Reality for Collaboration and E-Learning Planet MID in Second Life

Case Study / Prototype

Summary

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1 Executive Summary

The goal of this case study was to design the virtual extension of planet MID, a place in cyberspace where students and faculty members can meet and cooperate. After designing several prototypes using different tools, a decision was made in favor of the Second Life commercial 3D environment by Linden Labs. With the help of several students, a Second Life island with the planet MID buildings was modelled. In the virtual planet MID, video clips about the university can be watched, for instance.

Furthermore, the interaction between Second Life 3D models and standard web sites was programmed successfully with the help of the Linden Scripting Language. For example, the daily menu from the university canteen is extracted automatically from the WWW and displayed on a panel inside the virtual planet MID in Second Life.

To accompany the 3D environment, a standard 2D website with productivity tools for working groups was established.

2 Problem Statement

Communication and cooperation is often supported by online communities. Our approach is to use a 3D simulation environment (virtual world) for this purpose. Users take the form of avatars and can be seen in this form by others. Chatting is a straightforward way of communication – typing text makes it visible to avatars nearby.

Speaking and listening to others is also possible, provided that a headset is used. In this way, a multimodal communication is supported comprising written text, speech, basic facial expression, and movements. Communication relations like one-one, one-many, and many-many are possible. Objects can be created and modified using a direct manipulation interface.

As a technical basis, we favoured a 3D environment that runs in a standard browser or in a free software client. After extensive prototyping, Second Life was chosen to be the software environment for the virtual planet MID. Students and faculty members can meet, communicate, and interact on a Second Life island in the posession of the University of Applied Sciences and Arts, Hannover.

However, some things can be managed better in 2D: dealing with a large amount of textual information, for example. Therefor, a supporting 2D website with productivity tools for working groups was established. Two competing approaches use the content management systems Typo3 and Joomla, respectively. Both variants allow everyone to start a group cooperating on a common task and to use tools like forums, wikis, shared bookmarks, and project management software in no time.

3 Alternatives

Several approaches were considered and tested in prototype systems. We favoured a 3D environment that runs in a standard browser (with plug-in) or in a client that is free of charge.

- VRML/PHP/MySQL: This approach made use of W3C web standards like VRML (Virtual Reality Modelling Language) and open source software like the PHP

programming language and the MySQL database. In the prototype, PHP functions are used to create VRML 3D objects, which are displayed in the browser and stored in a relational database. After logging in, the user is allowed to manipulate the 3D world and to comment on it. However, the design of 3D objects other than simple geometrical forms turned out to be too difficult. Thus, a detailed 3D model of Planet M was out of reach in this approach.

- SketchUp/Multiverse: In this approach, the 3D objects were built in advance with the help of the Google SketchUp software, then in a multi-step process exported to a web-based collaborative 3D environment called Multiverse. Multiverse is a network and platform for Massively Multiplayer Online Games (MMOGs) and 3D virtual worlds. Multiverse provides its technology platform cost-free for development and deployment. Income comes through revenue-sharing. Development teams host their own servers and retain 100 percent of their world's intellectual property.
In a first prototype, a simple exhibition space with objects was modelled. The design of complex 3D objects was possible using an interactive WYSIWYG-environment. However, deploying the virtual scenery to a locally installed Multiverse host turned out to be not reliable enough. Parts of the system were not running on some current MS windows operating systems, and Multiverse updates made the self-developed system fail, so that re-development was necessary after the update. Thus, the system was regarded as lacking reliabiity.

- Second Life: Finally, the commercial platform Second Life (by Linden Labs, Inc.) was tested as an environment for a virtual Planet M. Unfortunately, the system does not allow the import of 3D objects. So the 3D scenery had to be developed from scratch using simple geometrical building blocks inside Second Life. This turned out to be tedious, but feasible, as Second Life offers a direct manipulation interface to create 3D objects. A group of students designed the virtual extension of the Planet M on a Second Life island that was aquired with money from the university. An account to develop and maintain the system until summer 2011 was installed and payed for, and this is intended to be continued afterwards.

4 Conclusion

Multimodal communication and cooperation between remote actors can be supported effectively using 2D and 3D internet environments. Synchronous interaction takes place in the 3D virtual planet MID, where avatars representing their owners come together to chat, to speak, and to interact with the environment collaboratively. For asynchronous interaction and text intensive tasks a 2D website is more suitable, and our approach comprises simple-to-use tools for working groups of any kind.

To realize the case study and the technical implementation of the SecondLife prototype several students were involved: Dimitri Schilmover, Tatiana Drabkina, Janina Finkemeyer, Georg Wehrhahn, Bastian Vollmer, Niko Lipphardt, Alexander Graf, Sebastian Hillmar, Boris Korinth, Marija Vidojevic, Julia Diener, Marina Gartner, Britta Diehm, Fabian Meier, Denise Orlean, Mario Finke.

5 Implementation

The virtual Planet M in Second Life was presented on two occasions at public events, allowing visitors to explore and interact in the virtual planet MID. There, it was successfully used to attract young people to get interested in studying information management at our faculty.
In the future, it is planned to use the system as a communication tool for bachelor and master students as well as an exhibit at public events.