Proposal for PhD Research Ahmad Assaf 2011
Aa673@st-andrews.ac.uk

Enabling Virtual Worlds as a Platform for 3D Web Applications

Overview

The World Wide Web started as a document warehouse and is quickly developing into a complete virtual environment that provides services, interaction and communication on a global scale. The current Internet is organized as a "flat abstract mesh on interconnected hierarchical documents" [1]. This two dimensional aspect bounds the human interaction with the web and limits our control over where the web will take us with the next click.
Our brains are naturally practiced to remember spatial relationships, a 3D Internet will provide an HCI framework that can reduce the mental doors and open new ways to do business (E-Commerce), visit places (Digital Tourism) and learn (E-learning).
To make the virtual-world experience as rich as possible, it is important to find ways to reliably render objects across multiple worlds (including Avatars which represent a user in the virtual world) and platforms. Another challenge is that it is difficult to offer virtual goods and services in more than one location. This research will investigate the issues of making the 3D experience more user friendly and enhancing the user experience; how can a user preserve his identity and objects when different virtual worlds are connected together. The research will investigate the use of WebGL to create virtual worlds in the 3D Internet; WebGL is a Web-based Graphics Library. It extends the capability of the JavaScript programming language to allow it to generate interactive 3D graphics within any compatible web browser; it is supported by most of the new versions of the famous browsers like Google Chrome, Safari and Firefox.

Questions for research may include the following:

- How can a virtual world be represented as an integral part of the Web?
- How can differences between virtual worlds and the web be overcome to enable them to be rendered in a web browser?
- Does WebGL help solve the compatibility issue between virtual worlds?
- How can a user identity (avatar) and personality (objects) be preserved and transferred between different virtual worlds and platforms?
- What are the system and usability issues in virtual worlds and how can they be addressed?

Methodology

It is envisaged the research will include a practical research element to investigate questions raised in the study, primarily targeted at virtual World users.

The research will progress through the following stages. First there will be an evaluation of the state of the art. This will include a thorough literature survey and a measurement study of current systems. The outputs of this phase of research will

inform the next stage which is system design. A system will be designed and developed which addresses the core issues for the investigation:

- The development of web browser based virtual world clients.
- Preserving the user identity and objects across heterogeneous virtual worlds.

The system developed will then be evaluated from both a systems and user perspective.

From the system perspective requirements for network traffic, CPU and memory will be measured and related to the responsiveness of the system and the fidelity with which the world can be represented.

From the user perspective: questionnaires, based on a standard format, will be used to to obtain mainly qualitative responses from users. This will be complemented by interviews and focus groups. Transaction logs may be inspected to see how users have used a certain virtual world client.

Proposed development

- Year one: literature review, Piloting of tools to be used, development of research techniques, familiarize with Virtual worlds programming interface and WebGL standards.
- Year two: Main system design and development phase.
- Year three: Analysis, supplementary literature review, Complete writing up

References

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