Virtual society: extending the WWW to support a multi-user interactive shared 3D environment

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The main goal of this paper is to propose a global architecture and a set of protocols to realize a multi-user interactive shared 3D environment in a WWW setting and based upon VRML. We call such an environment Virtual Society. This paper also discusses our initial implementation of Virtual Society and some experimental results from its use.

The concept of Virtual Society is simple and intuitive. Our goal is to provide a shared 3D environment in which "world builders" can construct 3D worlds and populate those worlds with services. However, rather than construct sterile 3D models as is currently possible with VRML, we wish to construct worlds in which many people can participate, and can interact. For example; shopping together or viewing a film together. In a sense, Virtual Society combines elements of a shared chat space, 3D based CSCW and the WWW. We believe that users and service providers will benefit from this more natural interaction model and feel that the ability to interact both with other users and autonomous agents is a necessary part of the development of the WWW.

The Virtual Society model is an natural extension of the WWW and VRML browsers. Selecting a VRML file using a web browser, a 3D scene appears in a window and the user can navigate through the 3D scene, manipulating objects in the scene. However, we want the 3D scene to be shared. That is, you will see 3D representations of other users that move autonomously in the scene. These representations are actually controlled by other users who can also access the same scene simultaneously and can independently navigate through the scene. Any transformation of the objects in the scene, such as movement of another user's representative or a user moving a scene object will be observed by all the users sharing the scene. There are a number of 3D shared virtual environments currently in the research domain. At a gross approximation they can be categorized into systems that support a high degree of application specific interaction, often as a basis for CSCW, (see [DIVE] [MR]) and systems whose primary goal is large scale simulation ([NPSNET]). However, in the former case they support a limited number of users and are often LAN based. In the later case they support limited interaction. As far as we are aware, there is no work currently reported that integrates the WWW model with a shared virtual environment as we propose.