Avatars as Interactive Guides for Navigation Assistance in Three Dimensional Virtual Environments

Abstract

The complexity of three dimensional (3D) environments has increased, causing disorientation problems during navigation. This work suggests a methodology based on the use of “intelligent” avatars as interactive guides inside the environment to alleviate this problem and to aid information retrieval in virtual environments. The intelligence is represented through physical features, behaviors and knowledge that compose the avatar’s architecture. This approach makes the avatars intuitive and efficient guides. A 3D model of the Guggenheim Museum in Bilbao, Spain, is presented as a prototype environment for the validation of the proposed methodology. In the museum the guides are represented as fishes that, according to the user’s preferences, assume gender and age. They swim through the museum, following routes that take to the exhibitions indicated as of interest by the visitor.

Keywords: virtual reality, avatars, three dimensional environments, spatial navigation, cultural heritage, VRML.

1. Introduction

More sophisticated computational resources have allowed the modeling of 3D virtual worlds. These worlds arise as a new paradigm for the representation of information on the Web. The use of multimedia components such as imagery, sound and video, as well as the text already used in the hypertext paradigm (two-dimensional virtual worlds) allows the creation of more realistic and intuitive representation of information for the user. The complexity and amplitude of these environments has increased according to the enhancement of hardware and software resources, and to the growth of users needs, generating problems related to their exploration and usage. Some of the main problems encountered, using this kind of modeling, are disorientation during navigation and difficulties in gathering and retrieving information.

This work analyzes users navigation and orientation problems when exploring 3D virtual worlds, suggesting as a helpful solution. This solution is the use of intelligent avatars as interactive guides inside the environment. Some aspects of the use of such characters (avatars) in a virtual environment, as well as some guidelines about how the subject navigation is approached by the major research works are presented in the following.

A desktop-oriented web-based methodology will be used in this work. More active applications would require a more sophisticated platform.

1.1. Avatars

An avatar, in the context of this paper, is a representation of the user in a synthetic world [10], becoming a character of the same.