

Chapter 5

Semantic Entities in Virtual Worlds: Reasoning Through Virtual Content

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ABSTRACT

This chapter explores how a parallel semantic knowledge base describing the virtual world can improve the utility of virtual world environment by enabling virtual agents to interact and behave like their peer human participants. To a computer, the virtual world is nothing but a set of triangles derived from tessellated shapes comprising the virtual environment. The burden of instrumenting physical interaction is placed on algorithms to check physical constraints and object properties for each time step. These 3D object properties can be defined in a domain knowledge base where semantic descriptions of these objects contain not only physical properties, but relationships, inheritance, polymorphic properties, past history, course of action, acceptable effects, desired objectives, and purpose, resulting in a much richer architecture for defining the behavior of and interactions between various virtual entities.

INTRODUCTION

In the context of virtual worlds the discussion of application of metadata has centered on the issues of interoperability for virtual worlds. Semantic tagging and classification of virtual agent actions, virtual objects, and other entities can certainly help define a common language or framework to enable interoperability between virtual environments and virtual world platforms

(MMOX, 2009). The first step towards this has already been made as XML is becoming a tool of choice for describing 3D models and, therefore, virtual environments. (Soto, Allongue, Pierre, Curie, & Jussieu, 1997) Although virtual worlds seem to be a 21st century phenomenon, virtual world timelines (Ok, 2009) indicate that in fact virtual worlds have, over the past decades, enjoyed bursts of activity interspersed by “winters” where there was relatively little progress (Damer, 2008). Gartner (2009) indicates that present day public virtual worlds have passed the Peak of

DOI: 10.4018/978-1-60960-077-8.ch005

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Inflated Expectations, plunged into a Trough of Disillusionment and are set to climb a Slope of Enlightenment towards a Plateau of Productivity. The strengths of virtual worlds platforms are now emerging in applications for government, defense, healthcare, education and business collaboration. Motivators for adoption of virtual worlds include cutting the various costs (monetary, time, quality of life, risk to life) of commuting and business travel, enabling meetings to be scheduled for the time they take rather than including days of travel time, and placing expensive people in realistic simulations of expensive, dangerous or impossible locations – from city center disasters, burning oil rigs and war zones to the interior of an atom, a brain or the sun.

Mass virtual world adoption has been enabled by the evolution of technology which has seen the user interface develop from the one dimensional command line, through two dimensional graphical user interfaces and the present day “flat web” internet to three dimensions. Once 2D user interfaces were established, there was no going back to the command line, because content was being created and consumed in 2D in ways which could not be supported by a command line user interface. By the same token, there will be no turning back

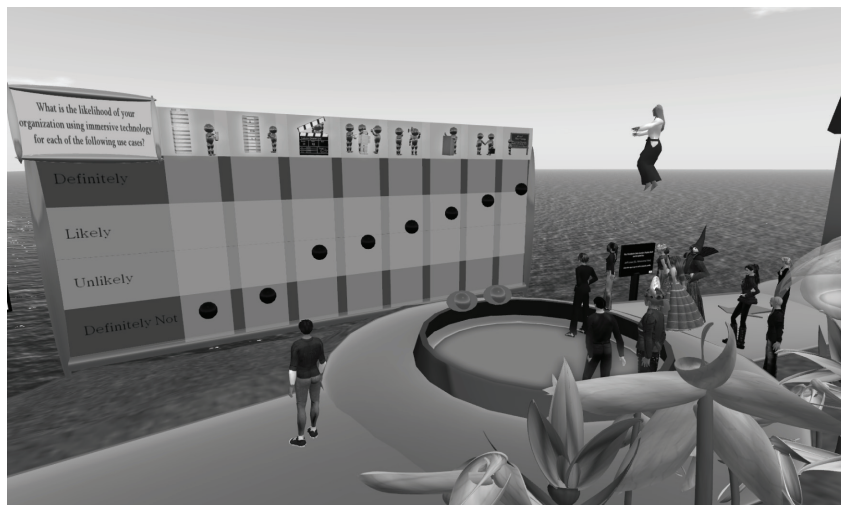
from virtual worlds when users routinely create and consume valuable content in 3D.

For example, rather than loading a PowerPoint presentation into a virtual world slide viewer, sitting avatars on chairs and mimicking a real world presentation, virtual world presenters will create static, animated or interactive 3D presentations and lead audiences on tours around them (ThinkBalm, 2009). The following example from a ThinkBalm Data Garden tour illustrates the increased engagement offered by this approach.

The ThinkBalm Data Garden is a 256m x 256m island in Second Life®. Visitors land at a defined start point and are directed to follow a path which leads them on a circular tour of the island’s exhibits. Circular blue decks are used to indicate resting points where the avatar may stop to view an exhibit. Figure 1 shows how a flat chart can be made more engaging by allowing the visitors to toggle data sets on and off using the red and green ball controls on the resting point.

Presented information can be animated to engage emotions. In the ThinkBalm Data Garden the possible alternatives to immersive technologies (e.g. web conferencing, in-person meetings, video conferencing and more) are represented by spheres sized according to merit (each sphere has

Figure 1. ThinkBalm Data Garden – flat data made engaging. © 2009 ThinkBalm. Used with permission.



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