Virtual Worlds, as Recognition, Mining, and Synthesis Application

Intro

Advances in compute technologies have enabled proliferation of virtual online worlds – computer-based simulated environments inhabited by user-created avatars. Today's virtual worlds are pretty elaborate fantasies, rich in real-world details that have been attracting the increasing number of users.

Virtual worlds have been growing in importance. For example, virtual online world Second Life today has five million residents [SecondLife07]. Another online world – World of Warcraft – is approaching eight million players. According to a recent PEW Internet and American Life Project, 51% of online American adults have taken virtual tours of another location online. That represents 72 million adults who have used the Internet to venture somewhere else. On a typical day, more than 5 million people are taking virtual tours online, up from 2M in 2004 [PEW2006].

Access to Virtual Worlds Remains Limited

However, access to the online worlds today remains pretty limited. This limitation works in two ways. First, consumers today have a single access point – their PCs (and soon Sony's PS3) – to access these worlds. Second, although the number of people using the Internet in 2007 exceeds 1 billion, this means that only 16% of the world's population today has access to the virtual worlds [IDC2007].

Today, transmedial access - cross-platform online access of virtual worlds from a whole range of converged consumer electronics (CE) devices – is barely making its first steps. Companies like Electric Sheep (www.electricsheep.com), Millions of Us (www.millionsofus.com), Metaversatility (www.metaversatility.com) etc., that specialize in building content in virtual worlds, have gradually begun introducing add-on software enabling transmedial access to virtual worlds. We expect that transmedial access from various consumer platforms will ramp significantly in the next 3-5 years, as the increasing number of CE devices will be adding Internet connectivity. By 2010, over one billion users worldwide will be accessing Internet – and likely virtual worlds - from mobile devices [ibid].

Recognition, Mining, Synthesis (RMS)

Transmedial access of virtual worlds implies more than mere abundance of Internet-enabled CE devices. Most virtual online worlds are platforms for the three key functions: social interactions, e-commerce, and gaming/entertainment. Making all these three functions seamlessly work across different devices presents a whole range of technical challenges that will need to be resolved – before individuals can access these worlds from transmedial platforms. For example, partitioning of physics, AI, and rendering between the server and transmedial client; optimizing search functionality and voice capabilities; selectively integrating technologies that make a virtual world such a visual and immersive environment on a PC into transmedial platforms.

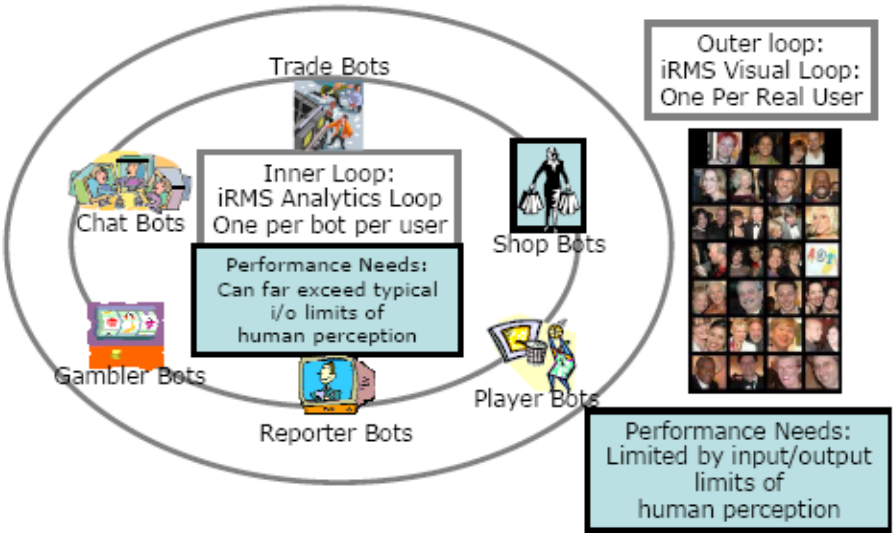
Virtual worlds represent a good example of the future Semantic Web applications that Intel calls RMS – "Recognition, Mining, Synthesis" [Liang2005]. With computers' increasing ability to perform a huge number of computations per second, RMS applications have been rapidly migrating from high-performance computing industries to our everyday lives, including gaming and entertainment.

Recognition implies a process when the computer is sifting through the data in real time and identifying that this is an object or a model, and then constructing that model. Recognition is a continuous process because new data is always being created. By learning, the computer constantly keeps building and updating the model.

Mining refers to a process when the computer is searching for instances of the model it has recognized and created.

Synthesis implies a process when the computer is running actionable data mining and discovering "what if" cases of a model. Synthesis is predictive in nature, as the computer is extrapolating from models and suggesting future scenarios and outcomes. If the model doesn't exist, the computer is able to create a potential instance of that model – and hypothetic outcome scenarios - in an imaginary world.

In virtual worlds (see figure below) these interactive RMS applications (or iRMS) are running in two loops – analytical and visual (output):



A virtual world as an iRMS nested loop instance [Yen2007]

Analytical loop performs data mining, image recognition, real-time time large data stream analysis and synthesis. In virtual worlds, users soon will be able to run multiple bots inside virtual worlds. Virtual world personalization and visualization (virtual loop) will happen on an individual gamer's PC (edge machine or transmedial platforms) – for privacy and security reasons, as well as due to bandwidth limitations.

Many of the virtual worlds today are still pretty simple (like Second Life), have limited AI, physics and graphics. With further increase in computer raw processing power, both analytical and visual loops will improve dramatically. In virtual worlds, personalized bots will be running for millions of end-users, in real time.

Summarizing, virtual worlds represent a proxy for the next generation of iRMS type bots. When developers will develop a standardized software stack that will be portable outside and beyond games and virtual worlds, we will learn how bots can be ported across transmedial platforms.

References

[SecondLife07] Second Life, March 26, 2007.
[PEW2006] “Virtual Tours”, PEW Online Activities and Pursuits Report, Nov 2006.
[IDC2007] “Internet Commerce Market Model”, IDC, Feb 2007.
[Liang2005] “Recognition, Mining, Synthesis Moves Computers to the Era of Tera,” Liang, Bob and Dubey, Pradeep Dubey. *Technology @Intel Magazine*, Feb 2005.
[Yen2007]. “Convergence of Recognition, Mining, and Synthesis Workloads and its Implications,” Yen-Kuang Chen, et al. Paper submitted to IEEE Proceedings, March 2007.