Information Channels in MMOGs: Implementation and Effects

Michael Zyda, Marc Spraragen, Balakrishnan Ranganathan,
Bjarni Arnason, Huahang Liu
GamePipe Laboratory, University of Southern California
zyda@usc.edu; marc.spraragen@gmail.com; brangana@usc.edu;
barnason@usc.edu; huahang.liu@usc.edu

ABSTRACT

We have integrated information channels into Cosmopolis, a Massively Multiplayer Online Game (MMOG), providing news from the real world, commercial advertisements, in-game announcements, and chat capability. The means for display of these information channels may include player UI elements as well as in-game objects like bulletin boards and news outlets. The technologies employed for this integration and display include Natural Language Processing (NLP), artificial intelligence-driven software agent non-player characters (NPCs), knowledge / information dissemination algorithms, and player-based news generation tools. There are several predicted effects of this information channel integration on MMOG elements (the game world, its economy, NPCs, and player statistics).

INTRODUCTION AND MOTIVATION

A 2008 study by the National Research Council entitled "Behavioral Modeling and Simulation – from Individuals to Societies" [NRC 2008] discusses the need to expand research in modeling and simulation of individual and societal behaviors. In that study, it is pointed out that a technological infrastructure needs to be developed for behavioral modeling such that the researchers can properly develop, test and then deploy such models. That study, in fact, suggests the development of a massively multiplayer online game (MMOG) for that infrastructure. Such an MMOG can be utilized as a testbed for models of individual and group phenomena. We have developed an MMOG with an eye towards applying that MMOG for the understanding of issues of peace maintenance and globalization.

Cosmopolis, the MMOG we are developing [Zyda et al. 2009], doubles as a test bed for social and behavior modeling. As such, Cosmopolis contains a new approach to incorporating information channels into a game environment. Previous virtual environments do not have the ability to analyze information feeds from real-world events. Creating a more realistic in-game experience based on analysis of real-world news headlines is a new and, given the escapist nature of many on-line games and virtual worlds, a counter-intuitive proposition. However, such integration is an important factor for effective simulation of

virtualized social and organizational environments, as human reaction to various local and world news is a hallmark of global civilization.

RELATED WORK

In-game information channels, providing player chat and administrative announcements, have long been included in MMOGs and their Multi-User Domain (MUD) ancestors [Bartle 1990, 2007]. A more recent development is the inclusion of real-world advertisements in virtual world applications such as Second Life [Linden Research 2009]. There has also been some work on integration of real-world weather forecasts to simulate weather in sports games, such as the Madden football games enlisting data feeds from the Weather Channel [Bush 2008].

Principles strongly corresponding to real world economies were empirically shown to exist in virtual world economies [Castronova et al. 2009]. This mapping provides a background for experimentation with economic feeds from the real world to the game world, and by extrapolation studies that integrate other real world newsfeeds into the game world. One caveat found [Wikström et al., 2009] is that in order to engage players, real-world information integration needs to fit seamlessly into the game context (e.g., no car ads in a fantasy-roleplaying virtual environment).

APPROACH

Implementation of Information Channel Integration

In Cosmopolis, we structure our information system as a collection of channels through which messages flow. Channels may display news feeds from the real world or commercial advertisements; channels may publish in-game announcements publicly or regionally; channels may be configured as special chat lines between players. One of the goals of our project is to present messages efficiently and effectively to players, without breaking the immersion of the players' gaming experience.

Fig. 1 Cosmopolis: Newsfeed scrollbar (at bottom) and chat window (upper left)

For this purpose, we utilize some 2D UI elements (Fig.1). A scrolling line of text on the bottom of the screen displays important real-world and in-game headlines. The content of that line is generated automatically with the help of an open-source natural language processor. The intention is to capture users' attention without overly interfering with the 3D game world. The users can choose to see more details by clicking on the text. Elsewhere on the screen, there is a small scrollable window for in-depth observation of specific information channels. Users can also type into that window to broadcast messages to a channel, to chat with friends or NPCs, or to spread other kinds of news.

Another method of channel presentation in Cosmopolis is integrating information feeds within the 3D game world, using bulletin boards and message cubes. A bulletin board can be placed prominently as in the real world, to attract the attention of players and NPCs. For example, a bulletin board publishing general game announcements may be at the busy center of a city. A message cube is similar to a billboard, but more player-controlled and interactive. When players approach or click on a message cube, an in-game interface allows players to interact with the information channels they choose.

Effects of Information Channel Integration

Effects on the game environment

We are building an in-game virtual economy system that has a commodity market and currency exchange market. Commodity prices and currency exchange rates are synchronized periodically with incoming real-world rates. We will maintain a database of real-world commodities we are tracking, and updates to this database 1) will be available when in-game commodities are updating their prices and 2) may trigger a news broadcast or alerts to configured devices/applications.

Weather is similarly synchronized. Different weather conditions in the real world trigger different graphics renderings in our game. For example, different skyboxes, environment maps, lighting, and particle effects are used to simulate different weather conditions. Similar to a. above, our database contains regional mappings of real-world weather conditions, for 1) lookup when in-game weather changes, and 2) broadcast of extraordinary in-game weather conditions.

Effects on NPCs

People in the real world may behave differently according to the information they receive. In our game, by using data extracted from information channels, we change the behaviors of NPCs (implemented as artificial intelligence-driven software agents). An NPC exposed to news broadcasts may be configured to change state (i.e., take on a new action/belief/goal). News processors, one for each NPC and more generally, one for each different region or group, determine which news events will trigger responses from particular NPCs. For instance, a news warning of "earthquake imminent in region 1" published via UI or in-game objects may cause flight or other defensive behavior for NPCs in that region. Rumors of "Unrest" may coincide with NPCs behaving in a less friendly manner towards players or each other. A more mundane example: weather forecasts

may cause changes in attire, behavior and mood. Stock market gradients can also change the aspects of NPCs, e.g. increasing stock prices makes certain NPCs happier.

Also, knowledge as a transferable commodity may spread through communities. Besides spreading rumors, NPCs and players may teach each other particular in-game skills that can only be learned through channeled knowledge-exchange transactions with other characters.

Effects on players

As our news channel system is relatively untested, it is an open question as to all the ways players will react to it. However, some speculation is possible. First, our system provides an efficient way for players to get real-world news while playing the game. Players can also be influenced by the game world's or NPCs' responses to certain events as described above. For example, NPCs are programmed to respond to earthquake predictions properly, and the players can learn from NPCs' actions. Another example is that players may choose to move to a region where commodities are becoming relatively more valuable.

Furthermore, we provide a mechanism for players to spread news of their own. Each player will have a dedicated channel to send news messages. Their friends' news updates may be merged into an optional incoming stream or streams in a player's UI. As a player can spread any kind of message, it is important to encourage good use of the system. To achieve that effect, we borrow the ratings idea of "digging" and "burying": messages that get more "digs" will be displayed more frequently/prominently, and players will get reputation boosts or decrements as their messages get dug or buried, respectively.

CONCLUSION

Information flow in the real world is fairly complex. Because we are building an MMOG test bed for behavioral models, we are trying to address that complexity by bringing together the real world and the MMOG world with an information channel system. We intend to show via our own and third-party experimentation that our system will create a realistic simulated environment for behavior models.

REFERENCES

Bartle, R. Early MUD History. Linnaean.org, 1990. http:// www. linnaean. org/ ~lpb/ muddex/ bartle.txt

Bartle, R. …On the State of Virtual Worlds. The Guardian, 2007. http://www.guardian.co.uk/technology/gamesblog/2007/jul/17/idcloseworld

Bush, E. Real-Life Weather Effects come to Madden NFL 10 Games. Planet Xbox360, 2008. http:// www. planetxbox360. com/ article_7414/ Real-Life_Weather_Effects_Come_to_Madden_NFL_10_Games

Castronova, E., Williams, D., Shen, C., Ratan, R., Xiong, L., Huang, Y., and Keegan, B. As real as real? Macroeconomic behavior in a large-scale virtual world. *New Media Society* 2009; 11; 685-707.

Linden Research, Inc. Advertising in Second Life. http:// wiki. secondlife. com/ wiki/ Advertising_in_Second_Life, 2009.

National Research Council. Behavioral Modeling and Simulation: from Individuals to Societies, Committee on Human Factors, Division of Behavioral and Social Sciences and Education, National Research Council, National Academies Press, Washington, DC, 2008, ISBN 0-309-11862-X.

Wikström, P., Comas, J., and Tschang, T. Once Upon A Social Web: Social Media And Firms' Learning Behavior In Two Worlds. Copenhagen Business School, 2009.

Zyda, M., Spraragen, M., and Ranganathan, B. Testing behavioral models with an online game. *IEEE Computer 42*, 4 (Apr. 2009), 103–105.