

Adaptive Quests for Dynamic World Change in MMORPGs

Emmett Tomai

University of Texas – Pan American
1201 W. University Dr.
Edinburg, TX 78539, USA

tomaie@utpa.edu

Rosendo Salazar

University of Texas – Pan American
1201 W. University Dr.
Edinburg, TX 78539, USA

rsalazar6@broncs.utpa.edu

Dave Salinas

University of Texas – Pan American
1201 W. University Dr.
Edinburg, TX 78539, USA

dsalinasez@broncs.utpa.edu

ABSTRACT

The dominant MMORPG *quest* model suffers from a significant incompatibility between dynamic world changes, stemming from player actions, and the authored narratives that guide and motivate gameplay. Both features are highly valued, and developers are trying different approaches to have them co-exist. In this work, we examine one aspect of that problem: player impact vs. competition in so-called *kill* quests. We introduce an incremental model of adaptive quests and a simulation system with initial results showing progress towards mitigating the incompatibility.

Categories and Subject Descriptors

J [Computer Applications]

General Terms

Algorithms, Measurement, Design, Human Factors.

Keywords

Games, interactive narrative, simulation.

1. INTRODUCTION

The MMORPG genre has seen dramatic growth in the past decade. But while many diverse designs exist, the explosive popularity of first Sony's *EverQuest* and then Blizzard's *World of Warcraft* has entrenched a dominant model. One of the core elements of this model is *quest-driven* gameplay. In brief, players control avatar characters in a shared, persistent world. They are free to roam in the world, interacting with the environment and other players as they see fit. Throughout the world there are system-controlled entities (*Non-Player Characters* or *NPCs*) that the player can interact (speak) with to receive quests. These quests specify task requirements (e.g. kill 10 rats) and rewards (e.g. progress points and a shiny hat), and provide narrative text intended to situate and motivate the task (e.g. help us, the rats are eating all our food!). Players can accept, work on, put aside, abandon or complete multiple quests at a time. This non-linear, on-demand system of guidance and motivation has proven remarkably effective, in spite of the fact that the text is often trite and formulaic, and the tasks repetitive.

One of the critical limitations of the quest model is that it forces the shared world to be mostly static. To support multiple players working on quests at different times, it must be in an appropriate state for all quests at all times. The most successful games have

lived with this limitation, making mostly unchanging worlds. This shows in part the high value placed on telling stories. But developers continue to look for creative ways to add dynamic change in response to player actions. Two of the biggest MMORPGs, BioWare's *Star Wars: The Old Republic* and the later updates to *World of Warcraft*, have heavily used techniques to separate players into copies of the world at key times, enabling localized change. By contrast, Trion Worlds' *Rift*, one of 2011's significant successes, attempted to make a dynamic world, where player actions freely change the world. They found in testing that players felt disconnected without strong narratives. They re-added quests, creating two layers of gameplay: one static and one dynamic, with limitations on the latter [10].

In this work, we explore two specific problems raised by the conflict between dynamic change and quest-based narrative. We propose that these problems can be addressed by adaptive quest narratives that change to reflect the state of the world. We introduce an incremental step in this direction and a simulation system to evaluate its effectiveness.

2. RELATED WORK

There has been a rise in research on MMORPGs as the genre has grown, primarily focused on broad player motivations and behaviors (cf. [9]), and correlating them with practical, external concerns like network load [2], addictive behavior [4] and real-money trading [3]. Very few projects, to our knowledge, have explored modeling and altering gameplay systems like quests to assess their impact on in-game player experience.

Research in interactive narrative has been growing as well, but mostly focused on single-player, highly controlled experiences (cf. [5] [6]). There have been some preliminary investigations building on the quest model in multiplayer spaces (cf. [1] [8]), but focused on the constraints of automatic plot generation. It does not appear that either project is targeting large-scale player interaction dynamics. The True Story system [7] proposes and implements a quest generation system intended for MMORPGs, but it is not evaluated, and it is unclear how it deals with the problem of change in the world.

3. QUEST NARRATIVE PROBLEMS

We define two problems that are introduced by the standard quest model, in the context of *kill* quests, the most prevalent quest type.

3.1 Lack of Player Impact

Autonomous, mobile, system-controlled agents known as *mobs* are created in the world by *spawn points*. In a kill quest, the requirements specify a type and number of mobs to kill, and typically directions on where to find them. The mobs must be available at all times, at that location, for any player who might choose to work on that quest. To ensure this, the spawn point re-spawns mobs as they are killed. From a gameplay perspective, there is a lack of impact as the player can clearly see that the mobs

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

FDG'12, May 29-June 1, 2012, Raleigh, NC, USA.

Copyright © 2012 ACM 978-1-4503-1333-9/12/05... \$10.00.

being killed are coming back. The narrative is incoherent, as the player is thanked and honored for making a change that clearly did not happen.

3.2 Competition

A related problem arises because variable numbers of players are pursuing the same mobs to kill them. Mobs can become a scarce resource, and players are forced to race each other for kills in order to finish their quests. Some designs use this competition as a positive, but current trends view this as a frustrating experience to be avoided. Existing games often solve this problem by adapting the rate and/or maximum population of spawn points to meet demand (within limits). As more players kill more mobs, they re-spawn faster. This exacerbates the lack of impact.

4. ADAPTIVE QUESTS

The straightforward solution to increase player impact is to let players reduce and defeat the mob populations they are fighting. To mitigate the increase in competition that would cause, we propose a model of adaptive quests. It is a deliberately incremental step from the current model. We analyzed a number of quests from *World of Warcraft* to identify opportunities for adaptation. Two that immediately stand out are altering the locations and the mob types referenced in the quest text to match changing mob populations in the world. In essence, load balancing the players. Because this is a complex multiplayer system, the impact of these changes on aggregate player dynamics must be systematically investigated. Before delving deeply into the text manipulation problem, we are evaluating those dynamics with a lightweight MMORPG simulation we have created.

The simulator implements the standard quest model, with quest-giving NPCs, mobs and spawn points. Simulated players seek out, accept and complete quests, with a model of preference determining what they decide to work on. This setup is most similar to the early part of real games, where completing quests is by far the predominant activity. Our simulator can run with *aggressive spawn points* that dynamically increase re-spawning, as described in section 3.2. It can also run with *defeatable spawn points* that raise player impact by allowing kills to actually reduce the number of mobs in a region, even eliminating them entirely. It can also switch between standard quests and our adaptive quests, which dynamically create new spawns in empty areas and alter locations and mob types to match the world and distribute players. The simulator is instrumented to collect data about competition among players in terms of *frustration*. Frustration is calculated by the percentage of time players are in the field attempting to kill mobs, and unable to do so because they are all taken.

We ran initial experiments showing that, as expected, competition is much higher with defeatable spawn points than aggressive. We then confirmed the hypothesis that adding adaptive quests to defeatable spawn points can mitigate this problem. In fact, that condition showed *less* competition than aggressive spawn points as the number of concurrent players increased. These tests ran for 20 minutes of simulated game time, with 10, 20, 30, 40 and 50 simultaneous simulated players in a single area.

5. CONCLUSION AND FUTURE WORK

Our initial results show that a specific move towards defeatable spawn points and adaptive quests can allow more player impact in a shared world, without increasing competition, under the quest narrative model. This is important because it improves the trade-off between a responsive, interactive world and the ability to tell

stories. We are encouraged by this result, and are pursuing this direction further. First, we are running more extensive simulation tests to explore how zone topology and quest ordering constraints alter the trade-off between impact, competition and other factors. Second, we are improving the simulation to include other quest types and to allow real, interactive players to connect and play. We intend to run controlled play tests to gather data which we will use to improve our simulated player models and verify predictions of aggregate behavior with novel quest systems. Third, we are working on a NL system capable of performing quest text adaptations, in conjunction with an authoring support tool.

6. ACKNOWLEDGMENTS

This material is based upon work supported in part by the U.S. Army Research Laboratory and the U.S. Army Research Office under grant number W911NF-11-1-0150.

7. REFERENCES

- [1] Fairclough, C., Cunningham, P. 2003. A Multiplayer Case Based Story Engine. Dublin, Trinity College Dublin, Department of Computer Science, TCD-CS-2003-43, pp6.
- [2] Feng, W., Brandt, D., and Saha, D. 2007. A long-term study of a popular MMORPG. In *Proceedings of the 6th ACM SIGCOMM workshop on Network and system support for games (NetGames '07)*. ACM, New York, NY, USA, 19-24.
- [3] Fujita, A., Itsuki, H., and Matsubara, H. 2011. Detecting Real Money Traders in MMORPG by Using Trading Network. In *Proceedings of the 7th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*.
- [4] Hsu, S. H., Wen, M. H. and We, M. C. 2009. Exploring user experiences as predictors of MMORPG addiction. *Computers & Education*. Volume 53, Issue 3, November 2009, Pages 990-999.
- [5] Mateas, M., and Stern, A., 2002. A Behavior Language for Storybased Believable Agents. In *IEEE Intelligent Systems, special issue on AI and Interactive Entertainment*.
- [6] Mott, B., Lee, S., and Lester, J. 2006. Probabilistic Goal Recognition in Interactive Narrative Environments. In *Proceedings of the Twenty-First National Conference on Artificial Intelligence*, Boston, Massachusetts, pp. 187-192.
- [7] Pita, J., Magerko, B. and Brodie, S. 2007. True story: dynamically generated, contextually linked quests in persistent systems. In *Proceedings of the 2007 conference on Future Play (Future Play '07)*. ACM, New York, NY, USA, 145-151.
- [8] Riedl, M., Li, B., Ai, H., and Ram, A. 2011. Robust and Authorable Multiplayer Storytelling Experiences. In *Proceedings of the Seventh International Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*.
- [9] Yee, N. 2006. Motivations for Play in Online Games. *CyberPsychology & Behavior*. December 2006, 9(6): 772-775.
- [10] Zacny, R. 2012. Rift Executive Producer Scott Hartsman explains how dynamic content drives the world of Telara. *PC Gamer* website. <http://www.pcgamer.com/2012/03/06/rift-executive-producer-scott-hartsman-explains-how-dynamic-content-drives-the-world-of-telara>