The Quality System - An Attempt to Increase Cohesiveness Between Quest Givers and Quest Types

Daniel Brogaard Buss, Morten Vestergaard Eland, Rasmus Lystlund and
Paolo Burelli

Aalborg University Copenhagen
{dbuss12,meland12,rlystl12}@student.aau.dk
pabu@create.aau.dk

Abstract. In this paper we present our efforts to try to increase cohesiveness and connectivity between quests generated by a recreation of an existing procedural quest generation system, with an addition of a progressive tier system called Quality System. A study gave strong indications that the Quality System successfully produced a positive effect on the feeling of cohesiveness and connectivity between the generated quests amongst Role-playing- and Massively Multiplayer Online games players.

Key words: Procedural Content Generation, Cohesiveness, Quests

1 Introduction

Quests are a basic component of in-game story-telling, they are small narrative elements involving the player used to gradually unveil information to the player about the story's context and content. A quest within a role playing game requires the player to complete a set of tasks given often by non-player character (NPC) and including some form of reward, such as items, experience, or money.

The study presented in this article investigates the process of procedural quest generation (i.e. automatic generation of quests by an algorithm) with the aim of creating a stronger cohesion within a series of generated quests. To do this a system to connect several quests together, based around NPCs motivations is introduced. The system, called the Quality System, aims at ensuring a sense of progression, by providing the players with a series of quests based on previous events. The Quality System is named as such to reflect the gradual ranking of objects and NPCs within the system.

This project was inspired by the work on procedural generation of quests performed by Sullivan et al.[1] and Lee et al.[2], which suggest cohesiveness as an important factor to consider when generating series of quests. In this article we will first present the logic driving the Quality System and then we will showcase an implementation and a user-evaluation of the system.

Profession	Motivations	Items	Skills	Enemies
Farmer	Knowledge 3, Comfort 2, Serenity 4, Protection 3, & Equipment 1	Seeds, Farmingtools, 5, Food/harvest		Rats, Boar, Moles, Critters.

Table 1. An example of Motivations, Items, Skills, and Enemies fitting the Farmer profession

2 Quality System & Structure

Based on the structural analysis of role-playing-games quests performed by Doran and Parberry and on their quest generator [3], we designed a system capable of generating coherent quest series linked by the context in which the quests take place, ensuring a connection between the quest NPCs, the quest that gets generated and the previously generated quests.

For this purpose, we have introduced the concept of *NPC profession* and *NPC tier* which are used to allow the generator to guide the progression of the quest and maintain coherence in the quest assignment. The first concept describes the main role of the NPC responsible of providing a quest to the player, influencing the types of quests that can be generated, while the second concept describes the rank of the quests that can be generated in terms of influence and level of responsibility of the NPC.

With the addition of these two concepts, instead of initiating the quest generation from an initial random motivation, the Quality System starts by randomly generating an NPC with a profession which is responsible of providing to the player a randomly generated quest that fits his or her profession. For instance, a blacksmith NPC might ask the player to gather some iron ore or deliver a finished suit of armour, whereas a king NPC might ask the player to go and rescue a princess or kill a dragon.

Furthermore, to provide the player with a sense of progression, professions are categorized into different tiers with an ascending quality (e.g. minor, major, and epic) and each tier has categories containing NPC professions, motivations, skills, and enemies/items, each fitting to the quality of the tier they are in. Table 1 shows an example of a profession categorized as "minor with its corresponding motivations, items, skills and enemies.

It is important to note that Table 1 only shows an example of NPC profession. The name of the profession, the motivations, skills, and enemies/items can easily be swapped, removed, or added, to fit any specific game in which the system can be used.

Based on this arrangement of professions and NPCs in different tiers, the system attempts to provide a sense of progression. The first quest generated is always a minor quality quest; once that quest is completed, the system will

Question	Set A	Set B	P-value
Between-quests connection	0.035	1.421	0.000
Internal coherence	0.289	1.316	0.000
Preference	0.158	0.737	0.002
Applicability	1.105	1.658	0.001

Table 2. Average answers given by the participants expressed through a 5 points Likert scale defined between -2 and 2.

perform a calculation to determine if the next quest to be generated should be another minor quality quest or if it should advance to the next tier, in this case, a major quality one.

A change in the quest tier corresponds also in a change of the NPC providing the next quest so, in case such a progress happens, the system provides a connection text giving the player a reason why they should visit this other NPC to help out. As the player progress through the quests in the different tiers, the chance increases each time for them to advance, meaning that the player always need to complete one quest, from a given tier before being able to move on. At each quest completion, the tier of the next quest is determined randomly with an increasing chance of progress dependent on the number of quests completed in the current tier. In the implementation tested in this article a 20% progress chance was used for minor quests and a 33% progress chance for major quests. With this configuration, the player can receive a minimum of three quests in a chain of quests and a maximum of 11.

3 Evaluation

A study has been conducted with a total of 38 participants (34 of them male) with the purpose of evaluating the quest generation mechanism described in this article. All of the participants were role-playing game (RPG) and/or massively multi-player on-line (MMO) players, with several different nationalities represented (Danish; English; Canadian; Korean; Bosnian; Vietnamese; Dutch; Romanian; Greek; Croatian; French) and ranging in age from 18 to 45.

The evaluation was performed in the form of a within subject experiment in which each participant was asked to rate, through a 5-point Likert scale, four aspects of two sets of printed quests: one set generated through a recreated version of the generator proposed in [3] (set A) and one set generated through the Quality System (set B). As shown in Table 2, the questions focused on the participants' perception of the level of connection between the quests and of the coherence of each quest taken singularly, on their preference and on the perceived applicability to a computer game.

The resulting data reveal that, in every question, set B was rated significantly higher than set A. To evaluate the significance of this difference, we first performed a Kolmogorov Smirnov test to check for data normality. As the test

revealed that the answers to all the four questions for both sets were not normally distributed, we performed a non-parametric Wilcoxon Signed Rank test finding that the difference between the ratings given to the two sets is significant for all four aspects taken into consideration.

4 Conclusions and Future Work

The aim of this work was to find a way to increase the feeling of connectivity and cohesiveness between procedurally generated quests in an existing complex PCG quest system, as well as increase the appeal of said quests amongst RPG and MMO players. For this reason we designed and improved version of the generator proposed by Doran and Parberry [3], which focuses on ensuring coherence between NPCs, quests and player progression. The data gathered in a comparative evaluation with the original generator shows a strong indication that the addition of the Quality System did impact positively the players' perception of cohesiveness and was generally positively welcomed.

In its current version, the Quality System still has much space for potential improvements, such as additional content or new structural features. For instance, a better connection between the individual quests within the same tier of the Quality System could potentially improve further the perception of cohesiveness. Another possible improvement could consist in allowing the system to generate several different NPCs of the same tier with the same profession, creating greater diversity. Furthermore, to further evaluate the effects of the system and further understand potential improvements, we believe it is necessary to implement it into an actual game.

References

1. Sullivan, A., Grow, A., Mateas, M., Wardrip-Fruin, N.: The Design of Mismanor: Creating a Playable Quest-Based Story Game.
2. Lee, Y-S., Cho, S-B.: Context-Aware Petri Net for Dynamic Procedural Content Generation in Role-Playing Game. In: Computational Intelligence Magazine, IEEE. (2011) pp. 16 - 25.
3. Doran, J., Parberry, I.: A Prototype Quest Generator Based on a Structural Analysis of Quests from Four MMORPGs. Technical report, LARC-2011-02. (2011)