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inFlow: Adapting gameplay to player personality

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Resumo

Neste artigo, propomos uma solução na forma de um jogo adaptativo que está constantemente a monitorizar o desempenho do jogador. Usando modelos de jogador baseados em diferentes tipos de personalidade, o jogo tentará adaptar-se continuamente às preferências do jogador, até o jogador se instalar num estado de flow. Uma série de testes aleatórios serão feitos para entender se a solução proposta tem, efectivamente, um efeito positivo sobre o divertimento dos jogadores.

Palavras-chave: Flow, Divertimento, Jogo adaptativo.

Abstract

In this research we propose a solution in the form of an adaptive game that is constantly monitoring the player's performance while playing. Using personality-based player models, the game will continuously try to adapt to the preferences of the player, until the player hopefully settles in a flow state. A series of random trials will be made to understand if the proposed solution has indeed a positive effect on the enjoyment of players.

Keywords: Flow, Enjoyment, Adaptive game

Introduction

Each player is different, looks for different games and enjoys different things within the same game. To satisfy different types of players, the game has to be able to adapt to the preferences of the player. The experience a player has from playing a game is always different from another person that plays the same game. (Chen, 2007)

Modern games have evolved greatly in the past few years, with astonishing graphics, amazing sound effects, flawless character animation and so on. However, the problem is that it is very hard to encompass a game designing balance that appeals to a large audience. Usually, a game designer has a vision of what the game experience is supposed to be like, and then tries to transform the design into a more user-oriented experience so that players actually feel what he is thinking.

Eventually, a game is condemned to lose its charm and the interest of the player, but by then the game should already have presented all of its key features. The problem is that many games stop being fun before they have the chance to do that. This happens because either the players don't like the challenges they are being given or they don't appreciate the reward the game is giving them for their effort. (Chen, 2007)

Objectives

In this research we explore how technology can contribute to the maximization of the player's experience while playing a videogame. The objective is to create a game that tries to approximate the gamer type of the player, so that it can adjust itself based on the premises of existing player models. Our vision consists of a game in which the personality of the person is constantly being inferred through actions, decisions and performance, thus

making use of the game's full potential for learning in real-time. By correlating the personality with the Demographic Game Design player model, the game will then try to adapt in accordance to the supposed preferences of the player that are detailed in the model. We hypothesize that this automatic adaptation, based on premises of player models and preferences will have a positive impact on the enjoyment of the player.

Related Work

Almost forty years ago, the psychologist Mihaly Csikszentmihalyi introduced the concept of Flow (Csikszentmihalyi, 1975), the feeling of complete and energized focus in an activity, with a high level of enjoyment and fulfillment.

The author stresses the importance of the fact that enjoyment does not depend on what we do, but rather on how we do it, and if we feel flow or not. (Csikszentmihalyi, 1991)

Videogames have taken a major role in the entertainment of today. Game designers understood this fact and the importance of games as a source of enjoyment and, as a result, started to design games that intentionally tried to include the eight components of flow (Chen, 2007). Flow has also served as a basis for the GameFlow model that was created as an evaluation tool for games, mainly to understand whether or not a game is enjoyable. This model creates a mapping between some elements of Flow and principles on game design (Sweetser & Wyeth, 2005). GameFlow defines eight elements that include a set of criteria for achieving enjoyment in games – concentration, challenge, skills, control, clear goals, feedback, immersion, and social interaction.

One of the first things to worry about when designing a game is to make it user-oriented. In order to do so, we must know what users want. This led to the definition of several player typologies that cluster gamers in different classes. (Bateman & Boon, 2005)

Bartle (1996) was one of the first to define a more detailed model of players. Based on the Multi-User Dungeons that were played in that time, four player types were defined: Socializers, Achievers, Killers, Explorers.

As means to improve the sales of their games, private game companies also started to define the market of gamers. Electronic arts devised a model that is a little different, which defines three types of players: Hardcore gamers, Cool gamers and Mass market casual gamers. By the same time, International Hobo defined a model that was similar to the one that EA presented, which also has 3 types of gamers: Hardcore gamers, Testosterone gamers and Mass market casual gamers (which was then divided in two, Lifestyle gamer and Family gamer). In 2004, International Hobo created the Demographic Game Design Model based on the Myers-Briggs method for classifying individuals regarding their personality preferences (Hobo, 2004). The Myers-Briggs Type Indicator(MBTI) uses four bipolar dimensions to classify the personality of a person: Introversion (I) or Extroversion (E); Sensing (S) or Intuition (N); Thinking (T) or Feeling (F); Judging (J) or Perceiving (P). (Myers, 1986)

Based on the survey analysis by International Hobo, four main player types were defined using only the last two, and most significant, axis of MBTI: Conqueror (Thinking & Judging), Manager (Thinking & Perceiving), Wanderer (Feeling & Perceiving), Participant (Feeling & Judging). Designing a game that is enjoyed by everyone is hard. However, we can see clear differences in the way that people play, allowing us to focus our efforts when

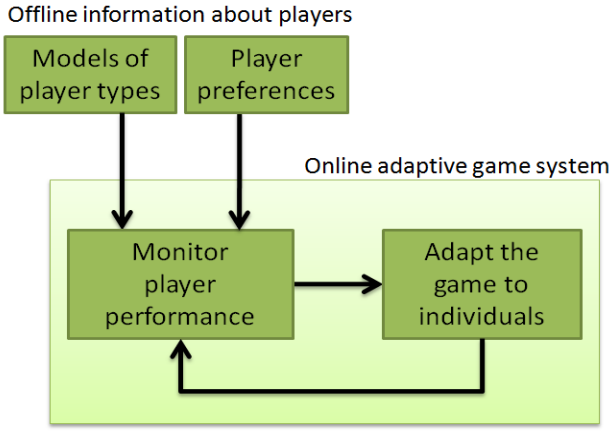
we want to design a game for a certain type of public. If we look in a commercial perspective, it's obvious that we always want to maximize customers and sales, and towards that end, adaptive techniques may be used to extend the target customers.

Developing a game that has different levels of difficulty is probably the most commonly used method for adapting a game for players with different levels of skill. This is usually done by asking the player which is his skill level, right at the beginning of the game. There are innumerous ways to change the difficulty setting in a game: using different behavior from the opponent non-playable characters (Charles, McNeill, McAlister, Black, Moore, Stringer, Kücklich & Kerr, 2005); limiting the access to resources such as life or ammo; creating additional puzzles, etc.

This type of system is one of the most basic, since it only receives the input from the player regarding his preferences. This is just a scratch on the surface of the possibilities for adaptation that a game may offer. Asking a player his skill level can be disastrous because he may not be totally aware of it. This is why some games devise strategies to help balancing the game according to the real skill of the player. For example, the highly acclaimed game Call of Duty: Modern Warfare 2 (Infinity Ward & Activision, 2009), uses a training camp to test the skill of the player, and in the end of the training session, the game suggests a difficulty setting according to player statistics such as accuracy, total time, civilians killed, etc.

The latest installment by id Software, Quake-Live, requires a player to register on the website in order to be able to play for free. After the registration, each user is required to enter in a portal, out of three portals available: Beginner, Intermediate, Expert. You have the Beginner portal available at start, but in order to reach the Intermediate portal, you have to perform a Rocket Launcher jump, which only a quake familiarized player should know. For the Expert level, you have to make a series of fast jumps in order to reach the portal in time, and only an expert player of Quake 3(id Software) should be able to do it on time. After you enter the portal, you have to duel an AI controlled character. If, for some reason, an expert player happens to enter in the beginner portal, the opponent AI will re-classify the player as he plays and automatically adjusts the difficulty setting in order to correctly face the player's skills. This process serves as a trial in order to match the real players by their skill, creating more balanced games.

Considering that a videogame is a highly interactive application, especially if it is a storytelling game, the game should take the opportunity to retrieve information from the player and adapt to him. Thue et al (2007) developed an interactive storytelling system (PaSSAGE) that uses dialogues to automatically learn the player's preferred style of play, and then uses those preferences to dynamically select the content of the game. The game has different types of quests that can be offered to the player depending on his preferences. Results from this study indicate that adapting the game based on



(supposed) player preferences can increase the enjoyment of playing a computer role-playing game for certain types of players.

Solution

With this work, we aim to accomplish a game system that will be responsible for collecting information about the player, and transform it into relevant knowledge that can be used to stimulate the player's transition into the flow state. The solution will be composed of two main components:

User model component: For this component of the solution, we will use the knowledge of the Demographic Game Design Model, allows us to correlate the personality of the player with the corresponding player type, giving access to his preferences while playing videogames. Theoretically, the player model could be retrieved in real-time by careful analysis of the player's actions. However, it is something that shall be addressed in future works.

Game tuning component: This component of the system is the essential part of the solution, and will be integrated in the game as an extra layer between the player and the game environment. It will retrieve relevant information from the player's performance and after that, based on the player's preferences, his supposed player type, and his performance, the game will keep auto adjusting its settings to favor the player's experience.

Experiment

Grim Business[1] is the name of the game we are creating in Unreal Development Kit (Epic Games, 2009). You have to shoot through enemy packed levels using a top down 360º shooting with futuristic action scenes. Players will experience a ruthless dark ambience in a mix between an advanced civilization and its current state of decay. Players control one character on his quest to avenge his family, armed with three unique weapons: chainsaw, semi-automatic machine gun and shotgun.

In order to adapt Grim Business, we looked at the characteristics of each of the four player types to understand which aspects of the game could be changed.

Most of the Conqueror type of players give great importance to winning, and enjoy the feeling of control over the game, and when combined with their higher than the average tolerance to failure, it lets us set a higher general difficulty of the game for this type of players. This will be accomplished by modifying a series of parameters of the game that will include increasing the number of enemies, accuracy, damage and resistance, and thus resulting in a decrease of the survivability of the player. Deaths will also be punished more severely for this type of

[1] http://grimbusiness.webs.com/

player, as most of them enjoy challenges and have a higher tolerance to failure. The Conqueror type also favors evolution/progression and enjoys knowing all there it to know about a game. To explore this trait, they will be able to read and discover which upgrades and power ups they want to buy from the grim business shop with the limited money they gain by killing enemies. In terms of story, these players don't consider the story important, so it will not be presented to them, reducing interruptions, and hopefully increasing immersion.

Managers tend to give less importance to the win, unless it is deserved, meaning that the difficulty of the game has to be fair, not too easy and not too hard. This type of players like tactical and strategy challenges, and the financial management needed to buy from the shop may also appeal to them as it can lead to the creation of different strategies, depending on what they buy and when. This adds up to the already strategy-favored level design, with open and large areas, with many hiding places and corners. Managers also have considerable lower tolerance to failure, and since we want to keep the player entertained, the best to do is to help the player recover from error without much penalty. Managers tend to enjoy a good, consistent story, and will probably value a world-oriented narrative. These players also show preference for games that don't have a specific endpoint, and specific objectives, and rather enjoy setting their own objectives.

Participant and Wanderers share the fact that they tend to develop emotional links with characters, thus making us believe that a narrative that focus in characters is much more appropriate for these players. This type of narrative gives less importance to the general plot, and focus on the feelings and ties that bind each character with others. For Participants and especially Wanderers, the sense of progression being imprinted on screen is very important. To this end, the upgrade system will be automatic, and will reward the player for their progression giving ample feedback of those rewards. They play for fun, and have low tolerance for failure, meaning that the difficulty has to be set to easy, and the failures won't be punished.

Participants enjoy feeling that they are unique, and they have indeed an impact on the game. On the other hand, Wanderers like playing with style, and enjoy games that are visually attractive, and we will give it to them by giving positive and stylish feedback about the progression of the player with announcements such as a slow-motion kill camera that focus on the enemy that dies.

Evaluation

This will start with the selection of the participants, which will be divided into four groups, one for each type of personality. Ideally, these groups will have equal number of participants. Each group will then be sub-divided in two halves, where one sub-group will experiment the game that tries to satisfy the preferences of their personality, and the other sub-group will play the game that does the opposite. Each individual that is participating in the experiment knows which group he belongs to, but he isn't aware of which sub-group he was drafted into.

Each participant will begin by answering a survey to determine his personality type. After that, the subject will have the opportunity to focus completely on the game, without external distractions. There will be no need to retrieve external data related to the player's

performance, since the proposed solution already does that. Finally, at the end of the test session, we will hand out a small questionnaire that will collect information about his experience. This information will be very useful in conjunction with the logs that are created automatically by the game to validate some of the elements of GameFlow and help understand if the game is enjoyable to the player.

With this analysis, we expect to verify the hypothesis that the sub-groups who play the game which positively tries to meet the player's preferences, will report a higher enjoyment rate than the sub-groups who experiment the game that does the opposite.

Conclusion

In this work, we have presented some aspects of game design, player modeling, and adaptive game techniques that contributed to the development of the solution's framework that will be incorporated in the Grim Business game. We seek to explore how technology can contribute to the maximization of the player's experience, and we hope to verify the hypothesis that automatic game adaptation, based on premises of player models and preferences will have a positive impact on the enjoyment of the player.

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