ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 6, June 2018

Survey on Player Behavior Prediction in Massively Multiplayer Online Role-Playing Games

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ABSTRACT: Research has been done on modeling players in single-player games, the modeling of players in massive multiplayer online role-playing games (MMORPG) has remained relatively spontaneous. In this paper, we examined and evaluated three types of player modeling techniques: 1) manual labeling; 2) collaborative filtering; and 3) recognition of objectives. We discuss the strengths and weaknesses that each technique provides in the MMORPG environment the use of desired that describe the characteristics of an algorithm should own in an MMORPG. We hope this discussion, as well as the desired ones, can help future investigations done in this area. We also discussed how each of these types of techniques could be applied to the MMORPG gender. To demonstrate the value of our analysis, we present a case study of our work using it a collaborative model-based filtering algorithm to predict results in World of Warcraft. Let's analyze ours results in the light of the particular challenges faced by MMORPGs and shows how our desires can be used evaluate our technique.

KEYWORDS: Computational modeling, games, machine learning, data mining, and performance evaluation.

I. INTRODUCTION

While massively multiplayer online role-playing games (MMORPGs) become more popular, game designers are looking for new ways to innovate the genre to attract players to their products. One way to facilitate this innovation is to somehow incorporate player models into the genre MMORPG. The term modeling of the player, as we use it in this document, refers to a predictive and computational model of player behavior. The question of modeling players in games has been well studied over the years; however, player modeling research only applies to single player games or small-scale multiplayer games. In these studies, researchers used player models to adapt gameplay to specific types of players, generate content that more players would find satisfying, and even discover level design errors during game production. However, it is not necessarily clear how these techniques can be translated from the single player environment to the MMORPG environment. In this article, we present an idea that can be used to evaluate the effectiveness of player modeling techniques in an MMORPG environment. We also present a case study showing how player modeling techniques can be used in MMORPG environments. It also shows how our wishes can be applied to players' modeling techniques to determine their practicality in MMORPGs.
Finally, we studied different player modeling techniques and used our desires to outline their strengths and weaknesses in relation to their performance in a MMORPG environment. We will also describe the possible applications that you might have in the genre MMORPG. Specifically, we focus on how these techniques can be used to improve player experiences by improving game design. Discussion of other possible player modeling applications in MMORPGs (such as bot detection or trap detection) goes beyond the scope of this article. The three classes of techniques we will study are manual labeling, collaborative filtering and goal recognition. With this document, we hope to demonstrate that modeling players in an MMORPG environment is fundamentally different than a single player environment and therefore must take into account a different set of requirements. We hope this review along with our description will be useful for future researchers interested in designing player modeling algorithms for MMORPG environments. The rest of this document is organized as follows: in Section II we analyze in more detail the idea we will use to evaluate the different techniques of modeling players in MMORPG environments. Section III describes our case study, in which we used a collaborative filtering algorithm to predict the results of players in World of Warcraft. This section also provides

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a concrete example of how our wishes could be used to determine the effectiveness of a player's modeling technique in an MMORPG environment. In Section IV, we analyze four examples of the real world that we will use to illustrate how player modeling techniques can be applied to MMORPGs.

II. LITERATURE SURVEY

1. **S. Li and L. Shi, The recommender system for virtual items in MMORPGs based on a novel collaborative Filtering approach,'' Int. J. Syst. Sci., vol. 45, no. 10, pp. 2100_2115, 2013**.

   The recommendation system for virtual items in massive multiplayer online role-playing games (MMORPGs) has aroused the interest of researchers. Of the many approaches to construct a recommender system, collaborative filtering (CF) has been the most successful one. However, the traditional CFs just lure customers into the purchasing action and overlook customers' satisfaction, moreover, these techniques always suffer from low accuracy under cold-start conditions. Therefore, a novel collaborative filtering (NCF) method is proposed to identify like-minded customers according to the preference similarity coefficient (PSC), which implies correlation between the similarity of customers' characteristics and the similarity of customers' satisfaction level for the product. Furthermore, the analytic hierarchy process (AHP) is used to determine the relative importance of each characteristic of the customer and the improved ant colony optimisation (IACO) is adopted to generate the expression of the PSC. The IACO creates solutions using the Markov random walk model, which can accelerate the convergence of algorithm and prevent prematurity. For a target customer whose neighbours can be found, the NCF can predict his satisfaction level towards the suggested products and recommend the acceptable ones. Under cold-start conditions, the NCF will generate the recommendation list by excluding items that other customers prefer.

2. **N. ThaiSon and L. Siemon, ``Impact of sequence mining on webpage recommendations in an access-log-driven recommender system,'' Free Univ. Bolzano, Bolzano, Italy, Tech. Rep., 2012.**

   Information is overloaded in the Internet due to the unstable growth of information and it makes information search as complicate process. Web recommendation systems assist the users to get the exact information and facilitate the information search easier. Web recommendation is one of the techniques of web personalization, which recommends web pages to the user based on the previous browsing history. It is done either content based approach or collaborative filtering approach. In this paper web usage mining is considered as the major source for web recommendation in association with Collaborative filtering approach, association rule mining and Markov model to recommend the web pages to the user.

3. **H. Yu and M. O. Riedl, ``A sequential recommendation approach for interactive personalized story generation,'' in Proc. 11th Int. Conf. Auto.AgentsMultiagent Syst., vol. 1. 2012, pp. 71_78.**

   In story-based games or other interactive story systems, a Drama Manager is an omniscient agent that acts to bring about a particular sequence of plot points for the user to experience. We present a Drama Manager that uses player modeling to personalize the user's story according to his or her storytelling preferences. In order to deliver personalized stories, a Drama Manager must make decisions on not only which plot points to be included into the unfolding story but also the optimal sequence of the events the user should experience. A prefix based collaborative filtering algorithm based on users' structural feedback is proposed to address the sequential selection problem. We demonstrate our system on a simple interactive story generation system based on choose-your-own-adventure stories to evaluate our algorithms. Results on human users and simulated users show that our Drama Manager is capable of capturing users' preference and generating personalized stories with high accuracy.

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4. **R. Houlette, ``Player modeling for adaptive games,'' in AI Game Programming Wisdom 2, S. Rabin, Ed. Stamford, CT, USA: Cengage Learn., 2004,pp. 557_566.**

When we say that a game has "good AI," we typically mean that the characters in the game exhibit consistent and realistic behavior, reacting appropriately to the actions of the player and other characters. For certain genres of games-for example, first-person shooters and real-time strategy game goodA I" also refers to the ability of the game to challenge the player on a tactical and strategic level. While these are certainly worthy and important goals to strive for in your game, they tend to overshadow a third, seldom-mentioned component of good game AI: the capacity to adapt over time to the quirks and habits of a particular player.

5. **B. Harrison and D. L. Roberts, ``Using sequential observations to model and predict player behavior,'' in Proc. 6th Int. Conf. Found. Digital Games, 2011, pp. 91_98.**

In this paper, we present a data-driven technique for designing models of user behavior. Previously, player models were designed using user surveys, small-scale observation experiments, or knowledge engineering. These methods generally produced semantically meaningful models that were limited in their applicability. To address this, we have developed a purely data-driven methodology for generating player models based on past observations of other players. Our underlying assumption is that we can accurately predict what a player will do in a given situation if we examine enough data from former players that were in similar situations. We have chosen to test our method on achievement data from the MMORPG World of Warcraft. Experiments show that our method greatly outperforms a baseline algorithm in both precision and recall, proving that this method can create accurate player models based solely on observation data.

III. PROPOSED SYSTEM

In this paper, we explored the use a collaborative filtering technique using clique-based graph clustering on a dataset consisting of 1289 achievements from World of Warcraft (WoW). Achievements are milestones that you can complete in games by performing certain, usually somewhat obscure, actions. Achievements can be obtained for doing many different things, so our reasoning was that this technique could be used to recommend content to players based on their achievement preferences. In other words, using this clustering algorithm, we wanted to be able to guide players towards achievements that we felt they would enjoy doing. Our CF technique can be can be broken down into two high-level steps:

1) Build cliques of highly correlated achievements
2) Calculate the probability of completing achievements

During gameplay given a player's achievement history during the first step, a computational model of achievements is created by clustering achievements based on how likely they are to be completed together. This is done by first making a complete correlation graph of achievements. In this graph, nodes represent achievements and edges between nodes are weighted with the correlation value between those two achievements. Once this has been done we downselect edges so that only edges between highly correlated achievements remain. Next, we find all maximal cliques in this graph. A clique is a set of nodes that are all connected to each other. A maximal clique is the largest clique that is not the subset of another clique. Finally, we must downselect cliques to ensure that we have cliques that only contain achievements that players are likely to complete together. Since we use correlation, the resultant cliques contain achievements that players behaved similarly on. If many players completed all of the achievements together, they will be in a clique. If players did not complete the achievements together, they will also be in a clique. This downselection is performed inorder to remove the latter type of cliques from the dataset.

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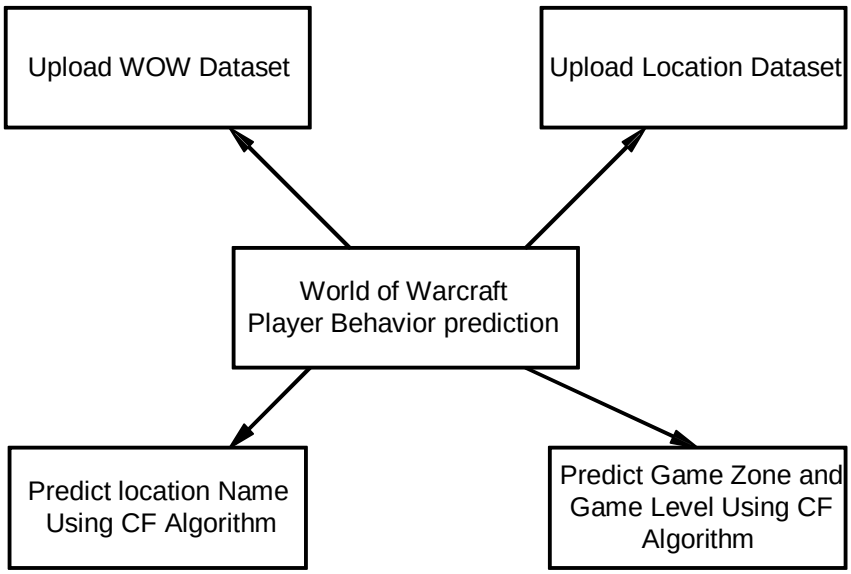
IV. PROPOSED SYSTEM ARCHITECTURE



V. CONCLUSION

In this Paper, we have evaluated how many popular techniques for modeling players in games could be translated into the MMORPG genre and how effective they would be to address many of the inherent challenges that the genre brings with it. In addition, we have provided some evidence, through the use of a case study, that some of these techniques are very promising if game designers choose to use them in an MMORPG. This case study also shows how our desiderata can be applied to evaluate the effectiveness of player modeling techniques in an MMORPG environment. In the future, we would like to see some research on the application of some of these techniques to MMORPGs. The MMORPG genre has been relatively unexplored when it comes to player modeling, and it is doubtful that there is a better source of player observations on the field. By focusing research efforts in this area, we would not only be advancing our understanding of player modeling, but we would be providing the much needed innovation for a genre that seems to be plagued with imitations.

REFERENCES

[1] S. J. Gross and C. M. Niman, ``Attitude-behavior consistency: A review," Public Opinion Quart., vol. 39, no. 3, pp. 358_368, 1975.
[2] B. Harrison and D. L. Roberts, ``Using sequential observations to model and predict player behavior," in Proc. 6th Int. Conf. Found. Digital Games, 2011, pp. 91_98.
[3] C. Lewis and N. Wardrip-Fruin, ``Mining game statistics from web services: A World of Warcraft armory case study," in Proc. 5th Int. Conf. Found. Digital Games, 2010, pp. 100_107.
[4] R. Bartle, ``Hearts, clubs, diamonds, spades: Players who suit MUDs," J. MUD Res., vol. 1, no. 1, p. 19, 1996.
[5] C. M. Bateman and R. Boon, 21st Century Game Design. Hingham, MA, USA: River Media, 2006.
[6] I. B. Myers, M. H. McCaulley, and R. Most, Manual: A Guide to the Development and Use of the Myers-Briggs Type Indicator. Palo Alto, CA, USA: Consulting Psychologists Press, 1985.
[7] R. Houlette, ``Player modeling for adaptive games," in AI Game Programming Wisdom 2, S. Rabin, Ed. Stamford, CT, USA: Cengage Learn., 2004, pp. 557_566.
[8] D. Thue, V. Bulitko, M. Spetch, and E. Wasylishen, ``Interactive storytelling: A player modelling approach," in Proc. Artif. Intell. Interact. Digital Entertainment Conf., Stanford, CA, USA, 2007, pp. 43_48
.[9] R. D. Laws, Robin's Laws of Good Game Mastering. Austin, TX, USA: Steve Jackson Games, 2002.
[10] X. Su and T. M. Khoshgoftaar, ``A survey of collaborative _ltering techniques," Adv. Artif. Intell., vol. 2009, Aug. 2009, Art. ID 421425.