The Novel Method of Adaptive Multiplayer Games for Mobile Application using Neural Networks

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ABSTRACT

The rapid development of the games industry and its development goals were not just for entertainment, but also used for educational of students interactively. Unfortunately the development of adaptive educational games on mobile platforms in Indonesian language that interesting and entertaining for learning process is very limited. This paper shows the research of development of novel adaptive multiplayer games for students who can adjust the difficulty level of games based on the ability of the user, so that it can motivate students to continue to play these games. The authors propose a method where these games can adjust the level of difficulty, based on the assessment of the results of previous problems using neural networks with three inputs in the form of percentage correct, the speed of answer and interest mode of games (animation / lessons) to produce 1 output. The experimental results are presented and show the adaptive multiplayer games are running well on mobile devices based on BlackBerry platform.

Keywords: Adaptive Game, Blackberry, Education Games, Games Industry, Mobile Platforms, Multiplayer, Neural Networks

INTRODUCTION

Nowadays, the application of games on mobile devices is growing rapidly and in great demand by students for entertainment or just increase their knowledge. Drastic increase occurred in the use of games for a fun and educational tool for students and effective discussion about the use of adaptive games to enhance interested learning and entertaining to various aspects of education (Nikola, 2011). The Net Generation (Tapscott, 1998) has already arrived at university and college. They differ completely from the people in charge of their education (their teachers and parents) in the role that ubiquitous technologies have played in their everyday lives.
Today, students have grown up using devices like computers, mobile phones, and video consoles for almost every activity, from studying and work to entertainment and communication. This has probably altered the way they perceive and interact with the environment, both physically and socially (Prensky, 2001b).

To meet the different cognitive requirements of the new generation, the educational community is considering new ways of learning. In particular, there is a wide interest in trying to engage students with the appealing features of videogames and Internet tools (Prensky, 2001a). Computer games are an incredibly successful genre that captivates children as well as adults and that instantly mirrors the spirit of a time and the state-of-the-art in computer technology. Computer games combine art and technology in a fascinatingly natural and convincing way. The games’ success is reflected in enormous sales figures, economic growth, and numbers of users (Kickmeier-Rust, Mattheiss, Steiner, & Albert, 2000). The motivational potential along with the high level of interactivity and the large degrees of freedom in computer games for educational purposes may open entirely new horizons for educational technology (de Freitas, 2006). Playing games, in general, is not only one of the most natural forms of human activity but also one of the most natural forms of learning.

User adaptation in e-learning can be characterized as the ability of a system to personalize the learning experience to different individual conditions over time. In general, the adaptation process includes three stages (Brusilovsky & Maybury, 2002): gathering information about the user; processing this information to initialize and update a user model; and using that model to provide the adaptive behavior. One of the students’ features that can be considered in this paper is their learning styles.

Adaptive games-based learning style aims to support and encourage the learner considering his needs, strengths and weaknesses (Spring-Keller, Schauer, 2006). The best known of the games-based learning is to increases the motivation of learners (Ming Chun, 2005; Shelton, Satwicz, & Caswell, 2011) and the relationship between games and constructivist theory (Gluskhova, 2008) because the games are well made can have pedagogical value of learning to produce a satisfactory outcome, because the student can cope with issues, work / play together and learn from previous experience. Technological pedagogical content knowledge is described as complex interaction of content, pedagogy and technology. The ways knowledge about tools and their pedagogical affordances, pedagogy, content, learners, and context are synthesized into an understanding of how particular topics that are difficult to be understood by learners, or difficult to be represented by teachers, can be transformed and taught more effectively with ICT, in ways that signify the added value of technology (Timur & Tasar, 2011).

A crucial factor for adaptivity is challenge. It can result from adapting the level of difficulty of the tasks to the learners’ ability level so that a constant challenge is felt. Not only the level of difficulty of the tasks is adjusted to the learners’ ability level, but also the system reacts to personal learning styles and preferences (Spring-Keller, Schauer, 2006). The entertaining videogame industry has grown and it is a mature industry that caters for all ages and genders. Driven by a commercial pressure to entertain different player profiles, successful games have developed sophisticated adaptation mechanisms. Most games adapt their behavior to suit different levels of proficiency, adjusting the difficulty of the game (Torrente, Moreno-Ger, Fernandez-Manjon, 2008).

Developing adaptive educational games software for the BlackBerry device is an exciting area of development. Although it can be relatively simple, the task can also be daunting depend on the requirements, logical thinking, technical talents, resources and mindset. A difficulty many people encounter is in visualizing how to create a useful and adaptive educational game for a smart phone device. With desktop-based solutions reigning supreme for so long, it’s often hard to visualize creating something...
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