

You Improving Gaming Experience Using Real-Time Adaptive Game Difficulty Adjustments by Utilizing Physiological Feedback

Speaker: Mr. Chang Hoon Yun, Ph.D. Candidate of Department of Computer Science at University of Houston

Abstract:

Designing well-adjusted levels of game difficulty to maximize the users' gaming experiences is one of the major challenges in the game development process. A successful design substantially increases the probability that the players will retain their interests in the game for several initial game stages. However, the time spent and the efforts made may cause the players to modify their expectations, resulting in a desire to adjust the difficulty level as the game continues to progress.

In this talk, I will introduce a novel methodology that improves the individual user's gaming experiences by automatically adjusting the game difficulty continuously, based on the user's physiological feedbacks. The physiological data of the player – blood flow in the supraorbital region – is continuously monitored using StressCam, a contact-free, real-time, thermal-image-based monitoring and analysis system. This stress level is utilized in adjusting the game difficulty to satisfy the player throughout the game.

The usability evaluations measure the successful gamer experience improvement by analyzing two major factors: (1) the interaction of the users' physiological state and the level of difficulty experienced and (2) the validity of the performance and the in-game subjective feedback readings along with the post-game evaluations. The results show successful real-time automatic game difficulty adjustments based on corresponding physiological feedbacks from the gamers. Furthermore, the results also demonstrate an increase in gamer performances as well as improvements in subjective ratings of perceptions of the game difficulty and the game entertainment values. I conclude that the user-centric approach successfully adjusted game difficulty automatically to accommodate the individual gamers and, consequently, improved the gaming experience of the gamers who had unique gaming expertise or preference.

Bio:

Chang Hoon Yun is a Ph.D. candidate in the Department of Computer Science at the University of Houston who is expected to receive his Ph.D. degree in May 2009. Mr. Yun's major research interests are human-computer interaction, computer-aided education, voice interface, computer game application, virtual Human Modeling and Animation. For the past two years, he has actively participated in the process of creating a game development curriculum in the department of computer science. He taught introduction to interactive game development and advanced game development courses as an instructor. The successful launch of these game development courses prompted his students being ranked as one of the top 20 teams in the Microsoft Imagine Cup 2008 competition and passing Round 1 in the Imagine Cup 2009 competition, which is ongoing.