Abstract

Title   **Study of Interactive System by using Real-time Recognition of Emotional Body Motion**

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Abstract

Nowadays, as the increasing demands of digitally recording and analyzing human body motion, motion capture technologies have been developed and wildly used in various fields such as entertainment, medical, and education. The conventional motion analysis methods typically use off-line processes on pre-captured motion data. However, with rapid development of the motion capture technologies, handling the streaming motion data in real time is no longer a dream.

In this dissertation, under the background described above, we develop a collaboration system that enables the interaction between the user and computer graphics characters using motion capture and virtual reality technologies. We propose the "Virtual Dance Collaboration System", which is based on the concept of using human body itself as an interactive device and interact with the virtual dancers in a virtual environment.

To realize the proposed system, core technical issues including real time dance motion recognition, KANSEI information extraction, and motion generation of virtual dancers are required to be solved. Chapters 3 and 4 describe the approach of real time dance motion recognition. Chapter 4 describes the recognition method that extracts dance steps from continuous dance motion. The experimental results show that the proposed real time motion recognition system achieved an average recognition rate of 96.8%, while the average response time was 0.73 second. Chapter 5 describes the method of generating new motion with certain KANSEI information by numerically modifying the existing motion data. We compared the generated motion data with the captured motion that has the same KANSEI information. The difference was evaluated by statistical significance. Chapter 6 investigates the corresponding physical features of KANSEI appearances in dance motion. The relationship between KANSEI information expressed by body motion and physical features was analyzed using neutral network. A model of their relationship was then constructed using multiple regression analysis.