GAMIC: Exaggerated real time character animation control method for full-body gesture interaction systems

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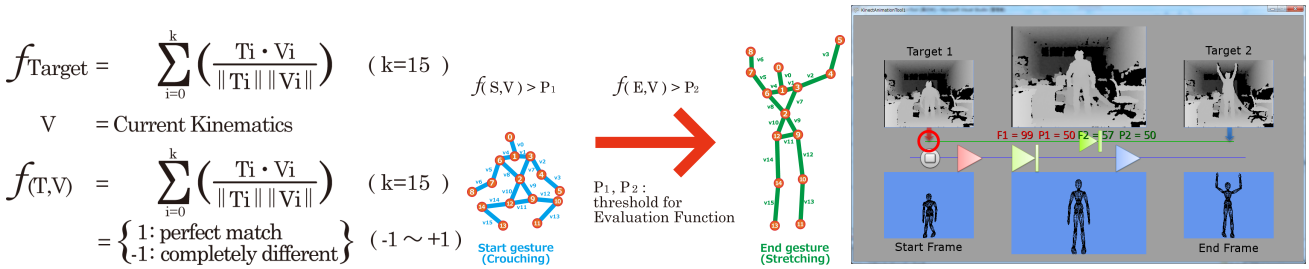

Figure 1: *Evaluation function and screenshot of GAMIC*

Abstract

This article reports a new method and tools for exaggerated real-time character animation control method for full-body gesture interaction systems. Game Action Motion Interaction Controller (GAMIC) is a motion interaction design tool that can be used by motion interaction designer with KINECT and WiiRemote. It comprises a generic evaluation function with thresholds and does not require any additional programming.

1 Motivation: intuitive animation control method and tool for KINECT generation

Real-time animation in-game avatars driven by full-body gesture interaction systems using real-time motion capture data are extremely appealing. Further, it is becoming more popular since researchers and developers can easily access consumer-priced depth sensors in Microsoft KINECT and OpenNI frameworks.

However, a system that can realize suitable real-time animations for each player actions is required. This article describes a new method and a tool for exaggerated but sophisticated interactive animation control systems for real-time animation playback timings. Our method can improve best player experiences without programming by offline/online GUI's for current video games and interactive systems.

2 GAMIC: Game Action Motion Interaction Controller

Game Action Motion Interaction Controller (GAMIC) is a tool that can link the timings between KINECT recognition and avatar animation playback by GUI, WiiRemote, and actual motions. GAMIC requires linking between physical players action and real-time avatar animation playback timings for the development of game systems that assume full-body gesture interactions using KINECT.

GAMIC defines a recognition timing of KINECT for animation playback timing by GUI. Motion Interaction Designer (MID) stores two target gestures for the start and end as ($T1$, T_2) using WiiRemote in front of KINECT on the GAMIC GUI.

This recognition can be expressed as an evaluation function of the current posture and its threshold of a target frame. The evaluation function expresses a similarity between the current player's kinematics and target postures from KINECT inputs, and it can be obtained as a summation of the inner products of target and current bones.

If a current posture V fits a target posture T, the evaluation function $f(T, V)$ outputs 1. Its threshold P_1 can control the recognition difficulty by $f(S, V)$ as a starting target frame S.

The trigger frame (TF) is an intermediate posture, and it exists between SF(T_1) and EF(T_2) as a result of the continuity of human motions. TF is an indescribable and dynamic posture but it can be expressed by an evaluation function $f(E, V)$ with its threshold P_2. TF must be set correctly. It can generate togetherness if the posterior half-animation is synchronous with the recognition.

GAMIC can control the recognition sensitivity, timing, and animation impressions simultaneously by adjusting P_2.

3 Conclusion

By using GAMIC, we realized a higher quality of animation-timing implementations with resource effective tools by non-programming methods. This process requires some staffs (MIA, Programmers, Actors) to create the core of the interaction sense.

It will be also integrated with physics and/or machine-learning-based posture estimations and animation blending to create effective interaction experiments in the near future. Template matching, physics- and learning; based approaches can improve player gesture recognitions and dynamic animation however, these techniques also require human decisions and large trial-and-error periods for improvement.

In contrast, GAMIC has the advantage that intuitive player actions can be explored for real-time animations by MID instead of machine-learning methods. Hence, assignment and linkage between player actions and predefined animations can be improved, especially for special actions that are otherwise impossible by physical motions.

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