

Study on Real-Time Active Particle Based on Kinect Principle

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Abstract. This article studies on implementing way of particle based on Kinect mechanism. The suggestion in this article is to make two-way interaction rather than one-way interaction in term of output if particle system is applied based on Kinect mechanism between audience and work. The purpose was to enhanced particle through interactive communication with Kinect's developed technology such as Heart beat recognition, Muscle mass recognition, and face recognition.

Keywords: Particle, Kinect, Interactive, Real-time

1 Background

Recently, Microsoft's game console, Xbox One Kinect adopted new technology to build enhanced interactive system and is developing to interactive format which attracts person's participation. The purpose of this study is to implement Kinect simulation with the support of particle system on the image of which, actions are clearly expressed and more perceptible. The implemented simulation is a interactive structure based on enhanced Kinect technology, enables audiences to participate with more pleasure.

2 Principle of real-time reactive Kinect

Kinect is designed to enables audiences to control device without contacting it using depth sensor. Color image is acquired by passive acquisition which measure the quantity of light entered through sensor like ordinary camera, the depth image is acquired by active acquisition which estimates the depth value measured by triangulation of the infrared pattern which is projected on the scene, after captured by infrared camera. The measured depth is not the same lineary, but considerably accurate in the limit of certain range(app. 3m).[1]

Current technology can implement recognition of joint, muscle, heart beat, and face, by noticing real-time moving person, it outputs high definition image. It indicates on screen texts such as the emotion of the person, or whether the person is talking, mouth is moving, wearing glasses, left or right eye is closed or opened by face recognition. Moreover, it can recognize plural persons even in dark place. [Fig.1]

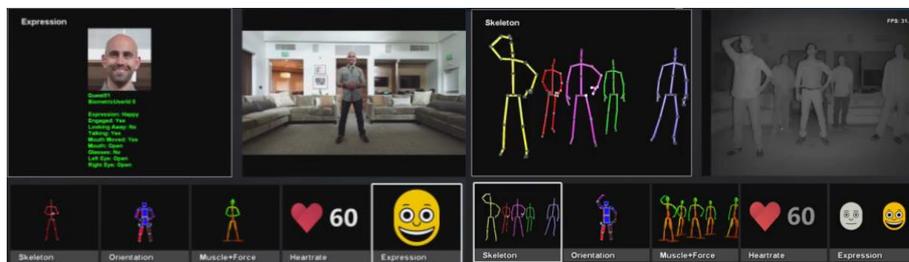


Fig. 1. New Xbox One: Kinect-Game|Life-WIRED Exclusive

3 Particle structure

Particle system enables collision or division produced by particles's reaction to a phenomenon with position, direction, velocity, gravity.

Particle system has lifespan because the particles are under the rule which defines the number, and creation and extinction of whole particles included.[2]

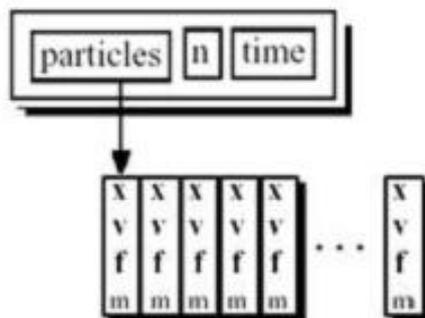


Fig. 2. Particle system[2]

4 Study on particle implementation work based on Kinect principle

There are works to which Kinect principle is applied, the audience or performers implemented based on Kinect principle.

[Fig.3]depicts a scene that particles are bouncing off on silhouette lines perceived as human body, where Kinect installed in show window enabled interaction with audiences(France)

[Fig.4]is a scene where the images slected by pushing buttons on screen which are listed to be selected by performer. The free choice of particle is a merit.



Fig.3. mai 2013 inauguration des Rives de l'orne vitrine interactive



Fig.4. The V Motion Project - Can't Help Myself [Official Music Video]

In the contrary, to work in [Fig.5], movements of particles and also performer were applied, differently from existing type as using Kinect principle. This work shoes quality, but is not interactive work.



Fig. 5. Amazing Japanese Dance Using LCD Projector

5 Conclusion

This study would implement a real-time reactive interactive work based on Kinect principle. Until now the implementation of Kinect in past works reactive to audiences, supported by particle system was focused on the motions of performer, as mentioned above, if recognition of Heart beat, Muscle mass, Face is used for interaction as two-way interaction for performer and audience, will enable wide range of visual reproduction. Furthermore, along with particle's limitless implementation, performer will perform more naturally on stage, and including audiences handicapped who cannot perform big motion, all audiences' motions can be expressed, so not ceased at one-way interactive work but two-way interaction will be performed which uses various expressive way in real-time manner.

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