A Research of VR Application using Intuitive Physical Motion

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This paper introduces two VR applications based on novel interaction method using intuitive physical movement as an input. The first VR application “Ton^2”, taking the theme of Japanese traditional game “Paper-craft Sumo”, has two types of interaction model; one conveys the power by the act of jumping and another conveys the power by the act of pushing down the water. The second VR application “Tomte”, taking the theme of “Hand Puppet”, is an interaction model that renders character animation controlled by finger movements. These two suggestions are aimed, to any people regardless of age and sex, that can easily play using their body, and also feel the high affinity for virtual and real world by operating objects intuitively.

Ton^2 is a new body sensory style VR application that is implemented by using intuitive and robust interaction model. This application captures the player’s motion data as displacement values by means of the distance sensors, and uses the data for its interaction model. We have revived the old traditional game in Japan, “Paper-Sumo”. Normally, we play this game on board using papers and cardboards, but for this Ton^2, there are two types of interaction models. Ton^2 Ver.1 is the model that uses “Jumping Pad” as the platform of the input. In this system, it conveys the power of the player’s jumping motion, by jumping on the Jumping Pad. The player will enjoy the application, by the shaking of the pad, which influences the Sumo-Wrestler in the virtual world displayed on the screen, as they play the match-up. Ton^2 Ver.2 is the model that could be played at underwater. Ton^2 used the water

as the media, not just to enjoy the game, but the players could also feel the comfort of holding down the water. Moreover, making the application in one package, player could feel the feed back of the opponent as they play the match-up. At the 3D imagery, which is projected on the floating screen, the powerful performance of Sumo will be fought by the movement of the Sumo-Wrestlers, influenced from the both player pushing down to the field of water. These two types of VR applications proved that distance sensor (or should I say displacement data) will develop, high robust and wide application model.

Tomte is another body sensory style VR application, which captures the player's hand motion as an input, to control the virtual character, in the theme of "Puppet Play". Tomte can be played in real-time, controlling the virtual character in many ways.. The system renders the character animation which is controlled by the player's hand motion captured with the USB camera. This application realized a novel method for character animation that enables to play it intuitively, and also no need to wear any device. Tomte proved the possibility of controlling the computer without a device, and also an application of the gesture recognition.