VR Interface for Creating and Editing Dance Movements with Time and Space Parameters

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***Abstract*—This study aims to support the creation of choreographies in dance. We developed a system for changing inputted movements by preparing transformation movement patterns to create dance, developing a formula, and allowing the parameters to produce the movement to be changed. We used a VR device to input the user's movements and edit the parameters. To intuitively input the parameters in the VR space, we proposed two methods using the controllers. Users can create a variety of movements by changing the parameter values using two methods.**

Keywords—VR, Support creation, Dance, Interface

I. Introduction

Posting dance videos has become a popular trend on social media. Choreographing new dance movements can be challenging and time-consuming, and what dance movements are possible may differ for each person depending on their physical abilities. Conversely, virtual reality (VR) devices are widely used, and transforming and amplifying movements is easy in the VR space. Therefore, we developed a movement creation system using VR devices in real time to support the creation of dance choreographies. This allows users to create and simulate movements beyond their own physical capabilities by processing the input user body movements. We thus prepared transformation patterns as a formula that can be useful for dance creation. The parameters of the formula can be changed to transform and edit the user's movements.

II. System Overview

Figure 1 shows an overview diagram of the system. This system uses Meta Quest 2 as the VR device. The user first inputs partial body parts movements with the VR devices: a head mounted display (HMD) and two hand controllers. The inputted movement is processed based on the formula prepared for each pattern. For example, one of the patterns, called Zigzag, transforms the user's linear input into an oscillating movement perpendicular to the direction of the input. The user can preview the transformed movements on a CG avatar in the VR space as a whole-body movement using inverse kinematics (IK). The parameters to compose movements included in the formula can be edited by the user's inputs with the controllers. This allows users to create a variety of movements by changing the parameter values. The parameters include the concept of space, such as distance and angle, and the concept of time, such as period and speed.

III. Input and Edit of Time and Space Parameters

The Zigzag has the parameters of amplitude as a space parameter and period and frequency as a time parameter. We propose a method for editing these parameters with VR device input. To intuitively input a space parameter in the VR space, we proposed two methods for inputting length using the controllers. The first method used two hand controllers and the distance between controllers was used as the length. The second method used one hand controller and the distance between the point where the button was pressed and the point where it was released was used as the length. The frequency of the time parameter can be easily operated to add 5 Hz by tilting the controller's stick to the right and subtracting 5 Hz by tilting the controller's stick to the left.

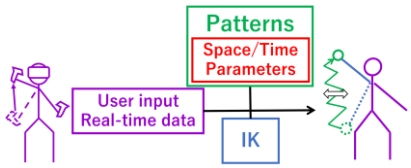

Figure 1. Overview diagram of the system

(a) Length:0.5m, Amplitude:0.25m, Frequency:20Hz

(b) Length:1.0m, Amplitude:0.5m, Frequency:30Hz

Figure 2. Examples of inputting the length and changing the parameters of Zigzag

Figure 2 shows examples of inputting the length and changing the parameters of Zigzag. In this example, we used the method with two hand controllers to input the length. Figure 2 (a) is an example of Zigzag inputting a length of 0.5 meters. The amplitude is 0.25 meters of a half scale of the inputted length and the frequency is 20 Hz. Figure 2 (b) is an example of Zigzag inputting a length of 1.0 meters and tipping the stick twice to the right from its (a) state of 20 Hz. The amplitude is 0.5 meters of a half scale of the inputted length and the frequency is 30 Hz.

IV. Conclusion

In this study, we developed a system for changing inputted movements by inputting space and time parameters for the transformation patterns of movements to create dance. To verify the necessity and operability of the system's functions, we asked four dancers to use the system. The results of the questionnaire showed that the necessity of changing parameters related to time and space was high and operability was good. In future tasks, we will resolve the complexity of the system's button operations, as several buttons are used for switching patterns and measuring length.

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