Tracking and Analysis of Different Traditional Dancing Styles in Sri Lanka

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Abstract: There are three traditional dancing styles in Sri Lanka called Upcountry dance, Low country dance and Sabaragamu dance where those originated from different areas in Sri Lanka. As the movements of hands and feet is fundamental to any dancing style, in this study, we focus on the hand moving patterns in order to analyze the differences between the three dancing styles. We analyzed the movement of hands with respect to time using the optical flow method.

Key Word-- Computer vision, learner support system, optical flow, traditional dance performances in Sri Lanka

1. Introduction

There are three main styles of traditional dance in Sri Lanka. Upcountry dance, which is also known as "Udarata Netum" or "kandyan Dance"[1], Low country dance known as "Pahatharata Netum" and Sabaragamu dance, which was originated in the Upcountry, Low Country and Sabaragamuwa regions in Sri Lanka. Those dancing styles were created for inflorescence gods, evils and planets. These three main traditional dancing categories differ in their patterns of body movements, especially feet, hands and gestures, as well as the costumes worn by the performers and the shapes and sizes of the drums used to provide rhythmic sound patterns to accompany the dance.

As the movements of hands and feet is fundamental to any dancing style, in this research we basically focus on the differences between hand and feet movements in dancing. Any beginner who is going to learn those three dancing forms have to practice twelve different movements of hands and feet called "Pa Saraba" and "Goda Saraba" or "Ath Saraba" respectively. There, the beginner first master the twelve feet movements of the particular dancing style and then starts mastering the twelve hand movements relating them to several feet and whole-body movement patterns. In this study, we particularly focus on the hand moving patterns in order to analyze the differences between the three dancing styles.

Lots of research have being carried out to detect dance motion structure using computer-based motion capture methods. However, application of this concept in Sri Lankan context is novel.

2. Proposed Method

In this research, we used the first hand movement (first goda saraba) in each form, and tracked the respective hand position in 2D space using sequences of images captured through a fixed camera. We analyzed the movement of hands with respect to time using the optical flow method, in which the positions of the hands in a 2D image sequence were tracked, the feature points of the objects (hands) were identified and the velocity information of the feature points of each hand was manipulated.

This research used the Shi and Thomasi algorithm for feature point selection and the Pyramid Luces Kanade algorithm for feature point tracking [2-7]. Once the feature points were tracked, we used the variance of the position of a feature point over time to compute its velocity and thereby to estimate the motion. If there were N feature points in motion, the position and velocity of two hands were given by the average positions in x-y plane and velocity of feature points. This method was evaluated for three traditional dancing styles using three dancers, having one for each style. The comparison of results revealed a significant difference in the hand movements of each dancing style. Moreover, we analyze the result with another six dancers and match their dancing pattern with the existing ones.

3. Future Works

There are many implications of this research in the field of performing arts education, where smarter learner support systems could be built using this technology to continuously improve the hand movements of the learners. A future improvement of this research would involve some input devices that can sense the dancer's hand movements.

4. References

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