DIGITAL HERITAGE PRESERVATION ON MALAY FOLK DANCE AND HOW IT COMMUNICATES IN THE DIGITAL AGE

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Abstract:
The main objective of this study is to digitise and preserve Malay Zapin dance movements using Motion Capture technology by recording and analyzing the dance movements in 360°. In this study, we present a primary work on recording the artistic movement's values on Zapin Lenga dance movements using one of the Laban Movement Analysis (LMA) element, shape. The values were represented by the dancer body on angle of rotation in Motion Builder software. Findings show technology enables intangible movements to communicate in the digital age, making it an easy reference for viewers to observe and learners to emulate the movements The digital simulation of the dance movements can be virtually re-enacted in 3D software to be used in other applications such as animation and games.

***Keywords*:** Digital Heritage, Intangible Culture, Motion Capture, Malay Folk Dance, Laban Movement Analysis

INTRODUCTION

Nowadays, the occurrence of new digital technology has permitted us to reach full potential in finding solutions in the aspects of preservation. Digital technology helps in fulfilling the important aspects within digital preservation. In the name of safeguarding, valuable resources can be digitised into digital environment. The documentations on tangible and intangible cultural heritage are rapidly digitised and made available over internet (Idris et al., 2017). According to Syu, Chen and Tu (2018), digital technology has become an important knowledge and tool for the preservation of cultural assets. This is significant since the collaboration between subject and technology can constructively impact society. Folk dances in Malaysia begin to adapt with digital heritage preservation trends. Mohd Herrow and Azraai (2021) focused on exploring motion capture technology as a medium to discover a micro visual of Joget dance movements. Research highlights the cross-cultural ideas to be used in identifying the culture's origin that can provide a local sense of belonging such as language in movements.

In this study, digital preservation of Malay traditional folk dance on Zapin Lenga using Lancang Kuning song through LMA had been conducted. Zapin Lenga is a Malay traditional folk dance within Zapin Melayu (Malay Zapin). Zapin Lenga originated in Muar district and the oldest Malay Zapin repertoire found in Johor state. One of the elements in LMA, which is shape had been adopted to identify artistic quality and human values on the dance movements. This is one of the researcher's approaches in a way to adopt cultural identity and adapt the identity with intercultural communication by using digital technology advancement. The usage of digital advancements is seen as a relevant effort to communicate in digital age that acts as the interconnection bridge between cultural

communities around the world to be closer with the emerging technologies that help in understanding and appreciating one's culture and heritage.

Hence the main objective of this study is to digitize and preserve Malay Zapin dance movements using MoCap technology by recording and analyzing the dance movements in 360°. The analysis highlights the body motion related to artistic movement's values of specific joints based on LMA. The research question involved is related to the appropriate technique that can be used to extract accurate MoCap numerical data and the method that can be applied for data analysis.

Until now, few attempts on preserving intangible cultural heritage using body motion and gesture recognition can be found in Malaysia. Most attempts in preserving the traditional folk dances are based on text descriptions accordance to dance history, capturing images, and recording videos of the dances. National Department for Culture & Arts Digital Archive is among the platform where users can retrieve information regarding Malaysia traditional folk dances. Digitizing Cypriot folk dance in Cyprus, preserving the Ba Jia Jiang performance in Vietnam is some of the examples on dance preservation using MoCap form other countries. Until recently, research in Malaysia related to preserving Malay Folk dances such as Mak Yong dance by Musa (2021) and Joget dance by Mohd Herrow (2022), highlighting on the usage of MoCap technology to preserve Malay Folk dances focusing on human body movements and aesthetic expression.

A relatively recent term which is called Intangible Cultural Heritage (ICH) represents living cultural attributes, which are identified as distinct aspects of identity. UNESCO has been working on safeguarding the ICH which has become a topic of international concern. Having said that, only few research has been done inventing new technologies to sustain intangible heritage (Alivizatou-Barakou, Kitsikidis, Tsalakanidou, Dimitropoulos & Giannis et al., 2017).

Zapin is among the oldest traditional performances dance in Straits of Malacca province. The coming of the Hadrahmi-Arab traders is the beginning on how Zapin had taken place amongst locale Malay Islamic Communities within the region. The denotation and word of Zapin is understood to derive from Arabic word, Al- Zapn. In Arab-Indonesian, the expression of Al-Zapn had been derived from the wzafana-yazfinu-zafnan which signifies 'move' or 'kick'. Meanwhile, the expression of Zapin had been derived from Al-Zapn which signifies 'move'. (Berg, 2007; Houston, Stuart & Taube, 2013; Meddegoda, 2013; Ritawati, 2017; Shuaib & Olalere, 2013).

MoCap was specifically used for the purpose of digitalization of a folk dance. As several researchers know, folk dances are in big need of digitisation, since they not only slowly disappear but are still tremendously valuable for their respective countries' culture. That is why University of Cyprus carried out a project of Digitization of Cypriot folk dance (Stavrakis, Aristidou, Savva, Himona & Chrysanthou, 2012). They indicated that MoCap not only guarantees the retention of the whole gesture, but it may also be ideal for learning and teaching a dance.

LMA has been drawn from the study of dance, a formal language for human expression that has been extended to observational studies. LMA offers a movement analysis function by categorizing movement definitions into four components that include body, effort, shape, and space. Shape characterizes the structure of the body and its contextual changes. Irmgard Bartenieff (1890–1981), a Laban colleague, recommends using Effort and Shape as a way of observing gestures from a behavioral and descriptive viewpoint. Effort and Shape are the most important for adaptive movements among Laban components. The kinematic characteristics

of body and space explain shifts in the relationships between body structures. Meanwhile, the effort and shape of the non-kinematic elements lead to the movement's qualitative dimensions.

Human motion capture is a field which first gained popularity through the film and animation industry. Animated sequences from science-fiction movies are nowadays often created by mapping human motion to an animated figure. For this purpose, the motion must be captured in a way that allows for mapping. The VICON system, a marker-based tracking system using optical reflective markers, can be regarded as the gold standard, important for preservation purposes.

METHODOLOGY

In this study, the structure of several principles from different disciplines includes (1) the core elements in Malay traditional folk dance Zapin Lenga, movement, music and song; (2) one of the basic elements in LMA, shape; and (3) the stages of development in MoCap workflow, that will help to preserve another traditional folk dance. The intensity of the artistic action is measured by the angle of rotation at the hip and shoulder part. LMA has been applied based on their interconnection with Zapin Lenga dance movements. An experimental design examining the effectiveness of the system in recording and analyzing Zapin Lenga dance movements was carried out. Preservation of Zapin Lenga dance movements using MoCap is further discussed.

Experimental research was chosen, as the design can measure the dependent variables consist of preserving Zapin Lenga dance with music and without music through manipulating independent variable comprises of body, effort, shape and space under controlled condition. In this study, digital preservation of Malay traditional folk dance on Zapin Lenga dance movements using Lancang Kuning song through one of the LMA elements (shape) had been conducted.

Artistic movement's value is represented by the calculated angle of rotation at the hip and shoulder part. Method to determine the change of rotation on hips and shoulders is by calculating the angles of inclination of hips and shoulders in the y-axis and in the x-axis, respectively by extracting the numerical data from MoCap into Motion Builder as shown in Figure 1 below. Researcher then translated the coordination points (x, y, z) of the hips and shoulders from Motion Builder to a meaningful information so that the required calculation can be determined (Refer Figure 2). The change of rotation of hips and shoulder can be calculated in this manner (Nagata, Okumoto, Iwai, Toro & Inokuchi, 2004; Kojima, Nomura & Kida, 2015).

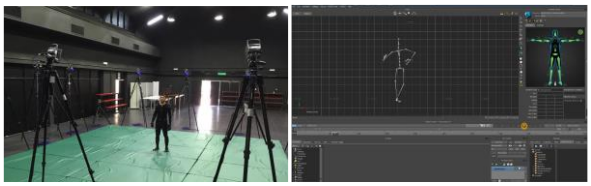

Figure 1. MoCap System Preparation and Data Recording

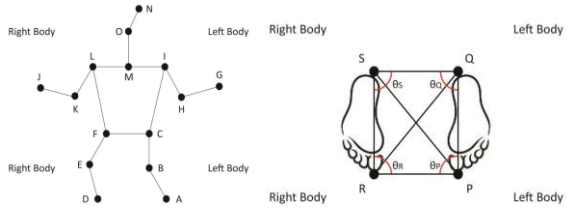

Figure 2. Body and Foot Classification in MoCap

RESULTS AND DISCUSSION

In this study, Motion Builder had been used to extract accurate Zapin Lenga artistic movement's values of specific joints from MoCap based on Laban Movement Analysis (LMA). Zapin Lenga dance movements performed by the professional Zapin dancer had been analysed by considering musical rhythm based on Lancang Kuning song using segmentation method. The results on correlation between digitized data in recording complex Zapin Lenga dance movements with the actual dance performed by the professional

Zapin dancer with music and without music are discussed as follows.

Result on Hip in Zapin Lenga

The given table and graphs show the comparison data on change in angle of rotation on hip taken from the MoCap Artist (Zapin Lenga Professional Dancer) with music and without music.

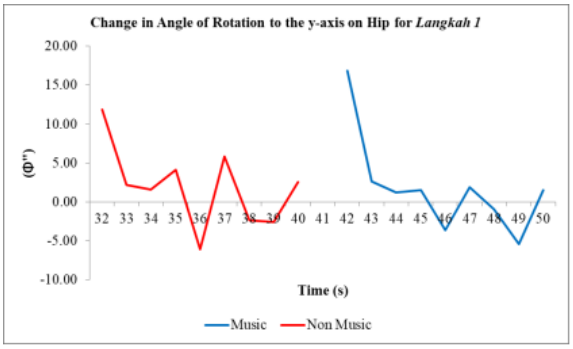

Figure 3. Change in angle of rotation on hip

The beauty and uniqueness of a dance is it artistic movement (lenggok/air tarian) and this movement needs to be preserved. Here we proposed a quantitative method to preserve the artistic movement of the Zapin Lenga dance. This can be done by calculating the change of the rotation of the hips and shoulders of the dancing movements of the dance. In this study, we reported the artistic movements of the Zapin Lenga dance by measuring the change of rotation of the hip through motion capture of the dance performance with music and without music with identical movement (Langkah 1). Figure 3 is a plotted graph to compare between the change of rotation of the hip in the y-axis with music and without music.

As stated, the objective of the research is to preserve and analyze Zapin Lenga artistic movement's values of specific joints based on one of the LMA elements, shape. Variables were determined based on Zapin Lenga body motion. Preservation with music and without music had been chosen as dependent variables in order to analyze to what extent the influence of music towards body motion and gesture recognition. To ensure reliability on safeguarding, the following null hypotheses are presented.

H0(1): There is no significance different between the angle of rotation on Zapin Lenga dance movements with music and without music.

In this research, the preservation on Zapin Lenga dance movements had been conducted with music and without music. To compare means between two related group of Zapin Lenga with music and without music on the same continues dependent variables, the researcher used the paired sample t-test to find if there any significance differences in preserving Zapin Lenga dance movements with music and without music by the research independent variables consisting of (angle of rotation).

Table 1. Result t-test on Angle of Rotation Hip

	Mean	Standard Deviation	t value	p value	d value
With Music	0.112	15.132	-0.022	0.982*	386
Without Music	0.135	14.779			

Note, n = 387; t = t-statistic value; p = p-probability value, *significant at the significance level of 0.05; d = effect size. Conditions; $t(386) = -0.022$, $p < 0.982$

Based on Table 1, the t-test showed that the p-value is more than the specified significance level (0.05). This means that there are no significant differences in preserving Zapin Lenga dance movements with music or without music by the means of angle of rotation on hip at the y-axis. Hence, null hypotheses H0(1) was accepted. Table 1 above shows that there are no significant differences between preserving Zapin Lenga dance movements both with music and without music. Thus, it reveals that the preservation on the Zapin Lenga dance movements can be conducted with music or without music. In the early study, researchers found that there is contradiction between Adiguru and scholars in performing Zapin dance with music and without

music. As a matter of practice, Zapin dances were sometimes conducted with music and without music. Therefore, the researcher believes there is a significant importance to carry out this research on finding whether music influenced the movements of Zapin.

CONCLUSION AND RECOMMENDATION

This is the first attempt to calculate body movements accurately for Malay Traditional Folk Dance. It will be used for another similar dance in Malaysia particularly in Zapin. The possible relationships between dance movements and music using optical MoCap Vicon system (passive markers) can create interesting approaches and tools to analyze dance motions (Zapin Lenga) and music (Lancang Kuning). These possibilities can further research towards new application, knowledge, challenges, and direction to achieve a better preservation method in the domain of digital heritage how it communicates in the digital age.

Digital information is increasingly important to our culture, knowledge, and economy. The usage of digital technology in preserving our cultural heritage is one of the ways in protecting our legacy through the generation. It is important to know that digital cultural heritage itself can be comprehensive and effective to preserve our valuable belongings. Digital preservation is necessary to make sure digital contents or objects can be located, rendered, used, and understood in future. The results of this study will contribute to the development of the theory and method in relation to digital preservation of dance movements, specifically within the Malay traditional folk dance.

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