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Classification of dances using AlexNet, ResNet18 and SqueezeNet1_0

Khalif Amir Zakry, Irwandi Hipiny, Hamimah Ujir
Faculty of Computer Science and Information Technology, Universiti Malaysia Sarawak, Sarawak, Malaysia

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ABSTRACT

Dancing is an art form of creative expression that is based on movement. Dancing comprises varying styles, pacing and composition to convey an artist's expression. Thus, the classification of any dance to a certain genre or type depends on how accurate or similar it is to what is generally understood to be the specific movements of that dance type. This presents a problem for new dancers to assess if the dance movements that they have just learned is accurate or not to what the original dance type is. This paper proposed that deep learning models can classify dance videos of amateur dancers according to the similar movements of actions of several dance classes. For this study, AlexNet, ResNet and SqueezeNet models was used to perform training on multiple frames of actions of several dance videos for label prediction and the classification accuracy of the models during each training epoch is compared. This study observed that the average classification accuracy of the deep learning models is 94.9669% and is comparable to other approaches used for dance classifications.

Corresponding Author:

Khalif Amir Zakry
Faculty of Computer Science and Information Technology, Universiti Malaysia Sarawak
Jalan Datuk Mohammad Musa, 94300 Kota Samarahan, Sarawak, Malaysia
Email: 21020463@siswa.unimas.my

1. INTRODUCTION

Dancing is a type of performative art that is based on movement and actions of the performers. Professional dancers in the field of performative arts can identify and distinguish between several different types of dances based on their professional experience. Amateur dancers on the other hand, may have difficulty in distinguishing a type of dance due to the wide variety of dances that are present in the world of performance art. Ballet for example, can easily be assessed by a professional ballerina on how accurate one's performance is to be a representation of that dance type, while an amateur would find it difficult. On another note, deep learning models have been used to classify human actions and movements [1]. Dancing however, unlike previous work that has been done to classify human actions; is slightly different because there exists a metric of how accurate the specific movement of the dancer is to what is generally considered to be a dance style of a specific dance type [2]. Therefore, it is difficult for a non-expert to assess how accurate a dance is to its generally understood dance interpretation.

This paper introduces using deep learning models to classify dances according to several dancers' general interpretation of a class of dance and how accurate the dances are to the deep learning models' understanding of that dance class. We proposed using AlexNet [3], ResNet18 [4] and SqueezeNet1_0 [5] deep learning models to classify and evaluate the accuracy of dances to its class. Several works have been done to classify human movements such as proposed by Yildirim and Çinar [6], Kumar and Harikiran [7] and Zamri *et al.* [8] that uses deep learning models. However, those works are similar in method whereby the authors utilized singular images of