Automated choreographic annotation for ballet using computer vision

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Introduction

The notation of dance choreography is necessary for the accurate preservation of dance works [1]. Choreographers often have the need to keep their original works accurately documented with the original intent of the work captured in a dance notation format [2]. This research aims to develop a model that can automatically translate video footage into a written dance notation. The study will investigate multiple computer vision methods for the recognition of movements, which will result in a rendered dance score.

Methods

A vocabulary of static and dynamic ballet movements will be selected and captured as a starting point for the model. The result should be rendered dance notation as shown in figures 1 and 2 .

Fig. 1. Basic example of Benesh Movement Notation [3]

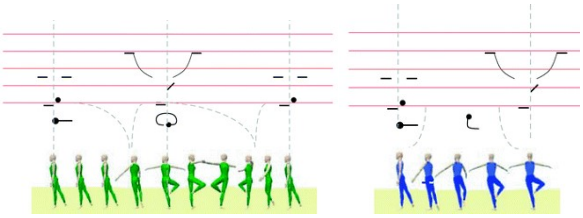

Fig. 2. Sample Benesh Movement Notation for a turning movements [4]

A high level visualisation of the model and the tasks involved can be seen in figure 3 below. The model will be formulated using a created dataset along with experiments using pipelines that contain varying methods. The main tasks involve pose estimation, pose transcription as well as fine grain action detection. An end-to-end deep learning architecture will be used to achieve automated choreographic video transcription. Once the representations are generated, the rendering of those representations to an appropriate dance notation can take place.

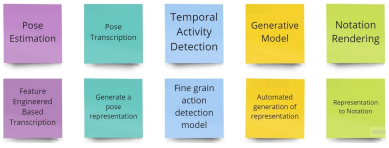

Fig. 3. High-level model tasks

Results and Impact

The study will result in a model consisting of various pipelines of computer vision methods to recognise ballet gestures and translate them into a dance movement notation.

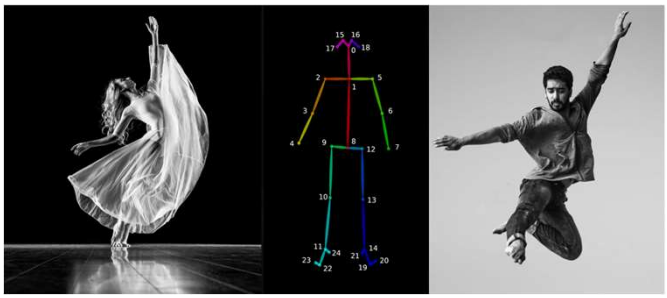

Fig. 4. Dance images and OpenPose skeleton [5, 6, 7]

The overall validation metrics will focus on comparing the generated notation against the ground-truth data. Regression metrics will be explored to determine the most relevant approach to determine the accuracy of the model. Furthermore, the translated movements can additionally be verified by expert choreologists.

Dance notation is a valuable and accurate way to tangibly document and preserve dance heritage [9].
The novelty of the study involves automation of choreography notation, comparing computer vision methods and the creation of a video-based choreography dataset. Additionally, the study will provide understanding of the mapping between dance notation and video footage.

Conclusions

The anticipated contribution of the proposed study is a model which allows choreographic works to be more quickly and accurately preserved through the utilization of computer vision technology to translate choreographed footage into a relevant dance notation.

The study has the potential to provide choreographers, choreologists and dancers with an additional avenue to document created choreographic works accurately and to learn more about dance movement notations.

References

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