Deep learning with multimodal time-series

Recent and ongoing work
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Tracing from Sound to Movement with Mixture Density Recurrent Neural Networks

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This work presents a method for generating 3D tracings of perceived sound features, *sound-tracings*, using a mixture density recurrent neural network (MDRNN). By training the model on a dataset of single point sound-tracings and the sound features extracted from short sounds (2 to 4 seconds) the model learns to generate novel tracings using multi-modal input.

This work will be published in proceedings of the 6th International Conference on Movement and Computing (MOCO'19)
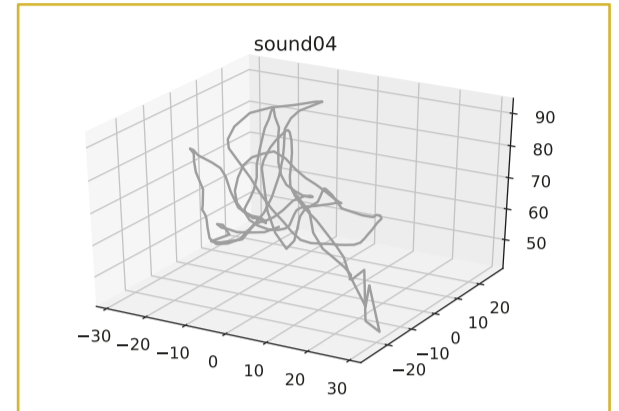

Sound-tracing generated by the MDNRNN model

Data collection Deep Dance: Training deep learning models to generate dance from music

This fall we will be collecting training data in the RITMO Motion Capture lab. The data consists of full body movement data (Motion Capture) generated by several dancers and choreographers improvising to a set of music excerpts.

Training a generative deep learning model to create movement to music, allows us to perform *analysis-by-synthesis*. A deep ANN trained to synthesise dance data may be able to model important information about the relation between music and movement.

The aim for this model will be to understand more about how deep learning can be used to capture salient features of human movement, and especially dance movement.
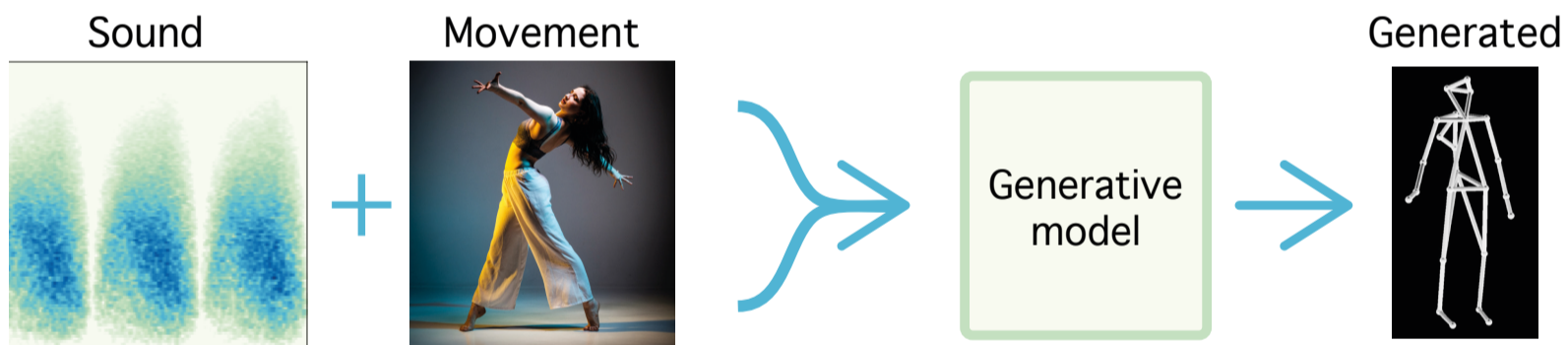
Outline of dance generation pipeline.

Enjoying the Macarena: An ongoing Movement Similarity Study:
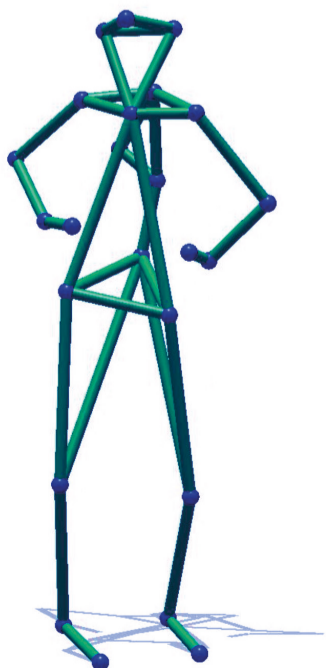
When examining human motion, particularly dance, we are intererrsted not only in *what* movement is performed, but also *how* it is performed. In collaboration with Jorge Poveda we collected a dataset of motion capture recordings of people dancing the macarena with varying degrees of enthusiasm.

Our aim is to use current state of the art methods to cluster similar ways of performing the macarena based on both movement content and quality.

Movement quality features:
Flow vs. Jerk
Direct vs. Flexible
Gentle vs. Firm
Sudden vs. Sustained

Movement content features:
Joint angle sequences
Key pose detection