Prototyping a New Audiovisual Instrument Based on Extraction of High-Level Features on Full-Body Motion

N. d'Alessandro, J. Tilmanne, P. Alessandrini, P. Barborka, F. Bayansar, F. Bernardo, R. Fiebrink, A. Heloir, E. Hemery, S. Laraba, A. Moinet, F. Nunnari, T. Ravet, L. Reboursière,

A. Sarasua, M. Tits, N. Tits, F. Zajéga

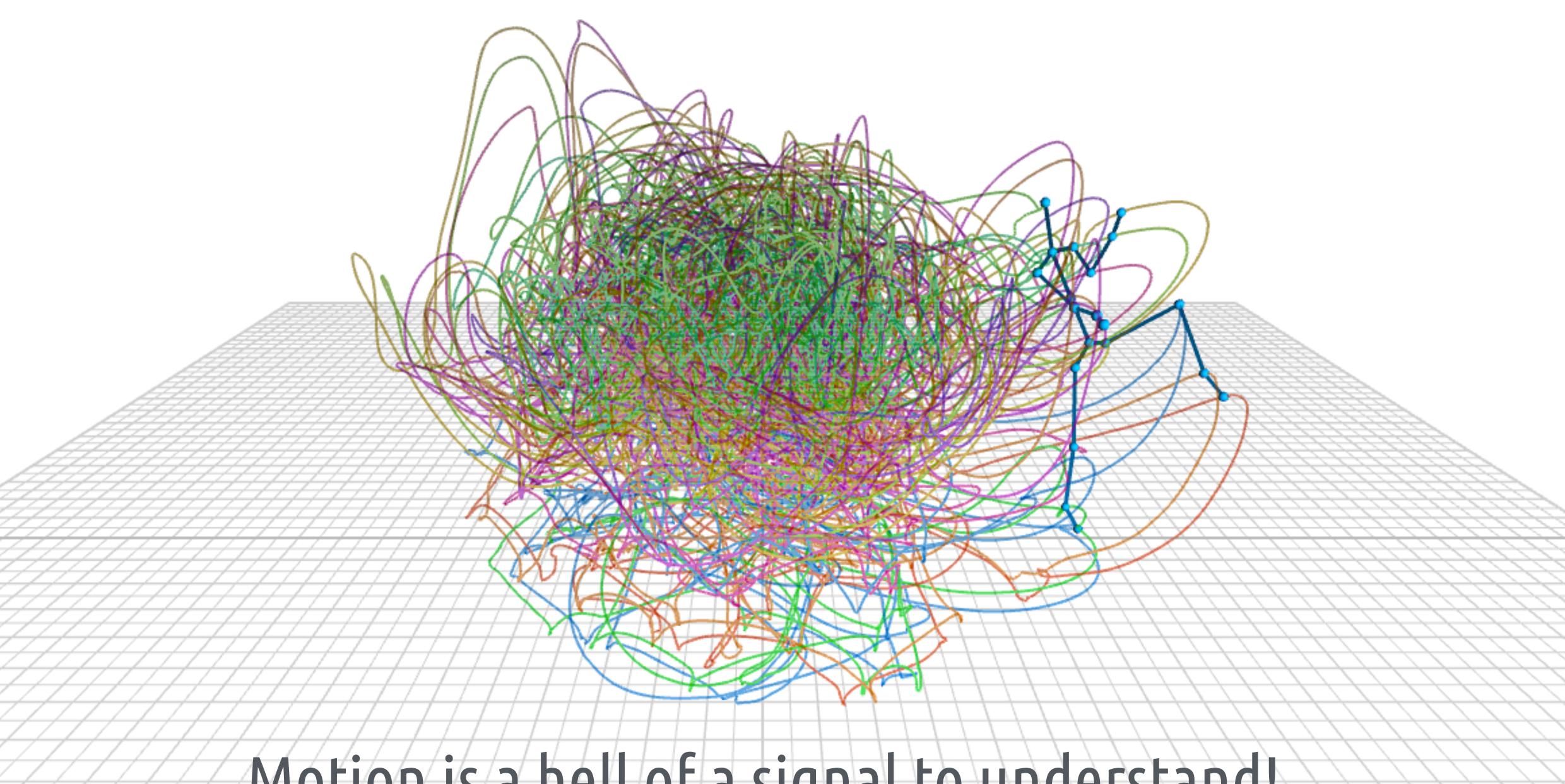






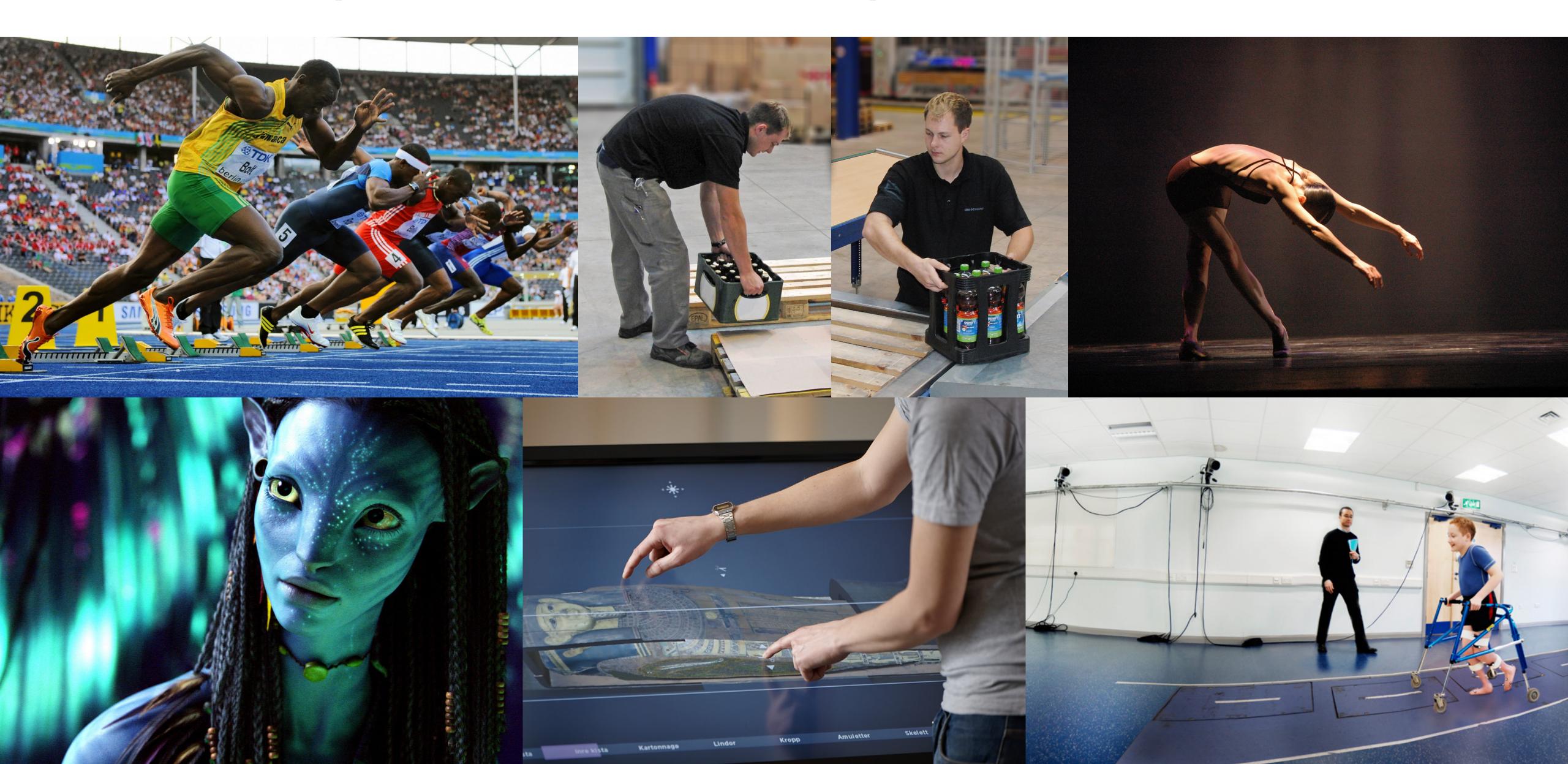






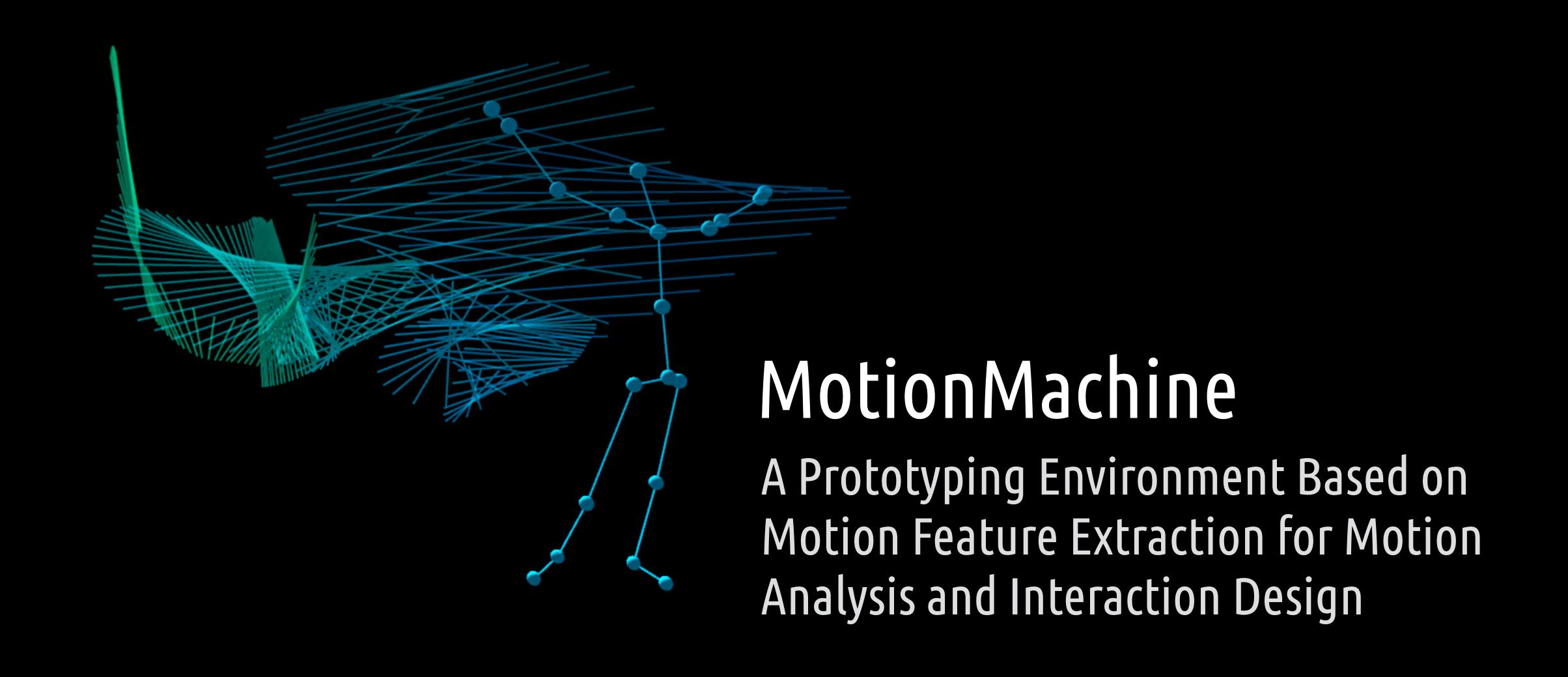
Motion is a hell of a signal to understand!

Motion Representation & Comparison



Motion Representation & Comparison

how to bring feature extraction, categorisation and distance metrics into a more explorable and intuitive design space?



Motion-Based Audiovisuals Beat kinect streamer motion representation CataRT and comparison local file MotionMachine streamer Blotar interactive mocap machine learning files Bloom Wekinator —

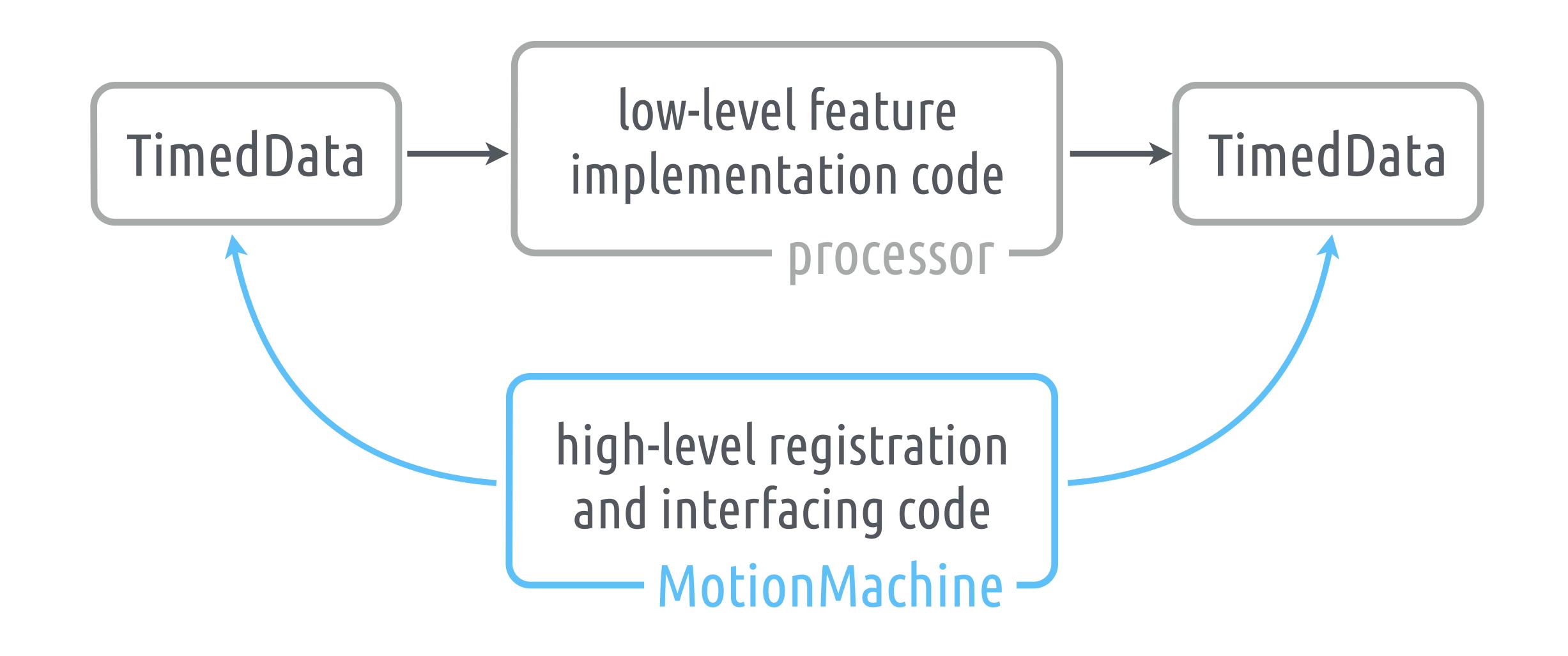
Project Achievements

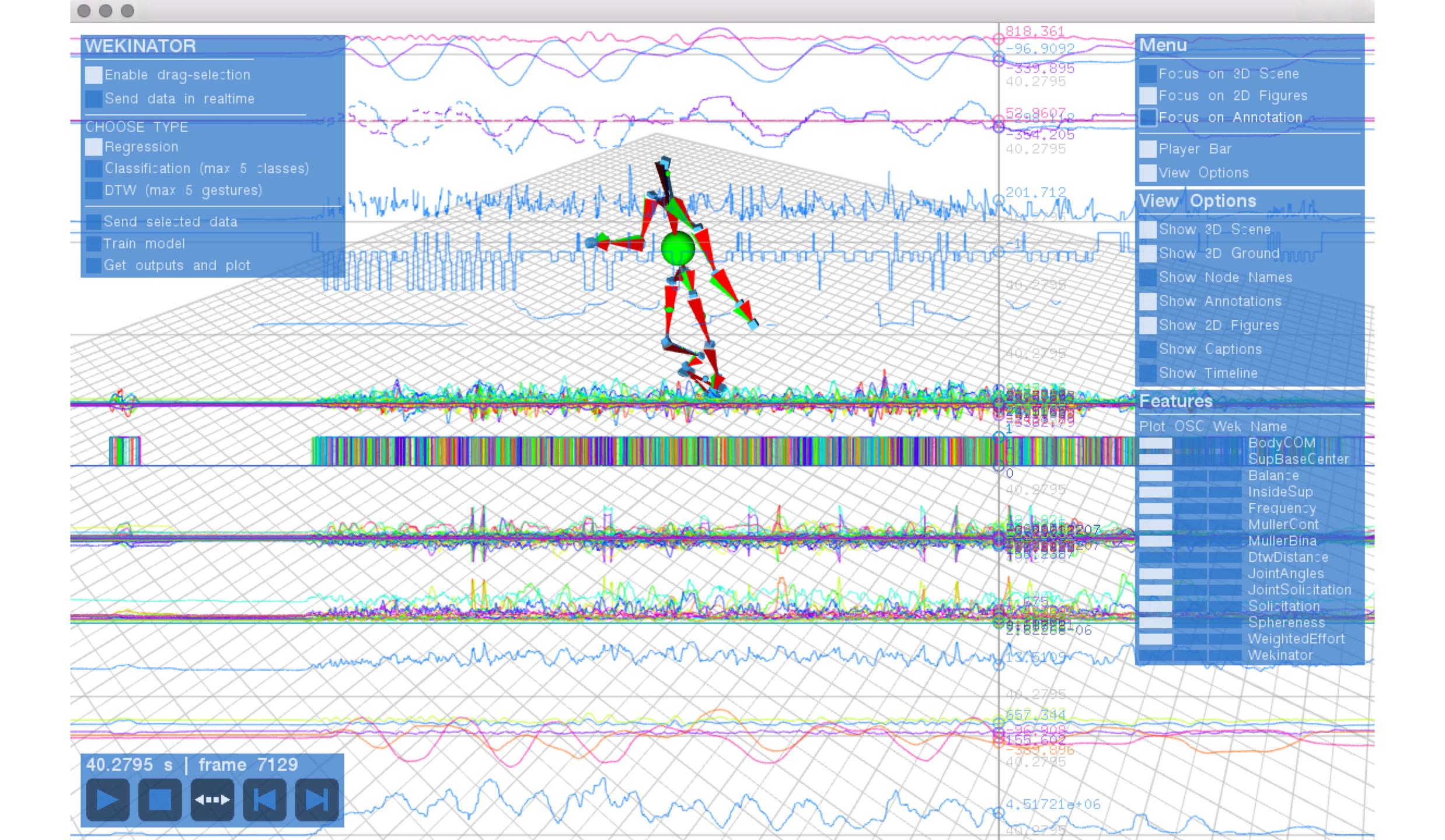
- Implementation of 20+ new motion features, available in a standardised C++ feature extraction/registration formalism.
- Redesign of the core time management framework: enabling the process of time-stamped data and real-time streams.
- Redesign of the user experience within the environment, fostering feature exploration and rapid prototyping.
- Integration of a third-party interactive machine learning software (Wekinator) through an OSC in/out proxy.
- Installation based on high-level motion features.

Motion Features

- Balance: segment/body CoM, support base (SB), SB center, CoM-SB center distance, CoM inside SB, node convex hull.
- Ergonomics: node-specific solicitation, full-body solicitation, bounding sphere (radius), distance to spherical (sphereness).
- Effort: velocity, acceleration, time/space/weighed effort.
- Relational: Muller continuous and binary features.
- Similarities: DTW on Muller features, HMM decoding.
- Periodicity: PDS, auto-correlation, frequency.
- Symmetry: left-right angular limb symmetry.
- Force: dispersion of node torcs (OpenSIM).

Motion Features





kinect streamer

local file streamer

> mocap files

motion representation and comparison

MotionMachine

interactive machine learning

Wekinator —

Beat

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Blotar

Live Demo!

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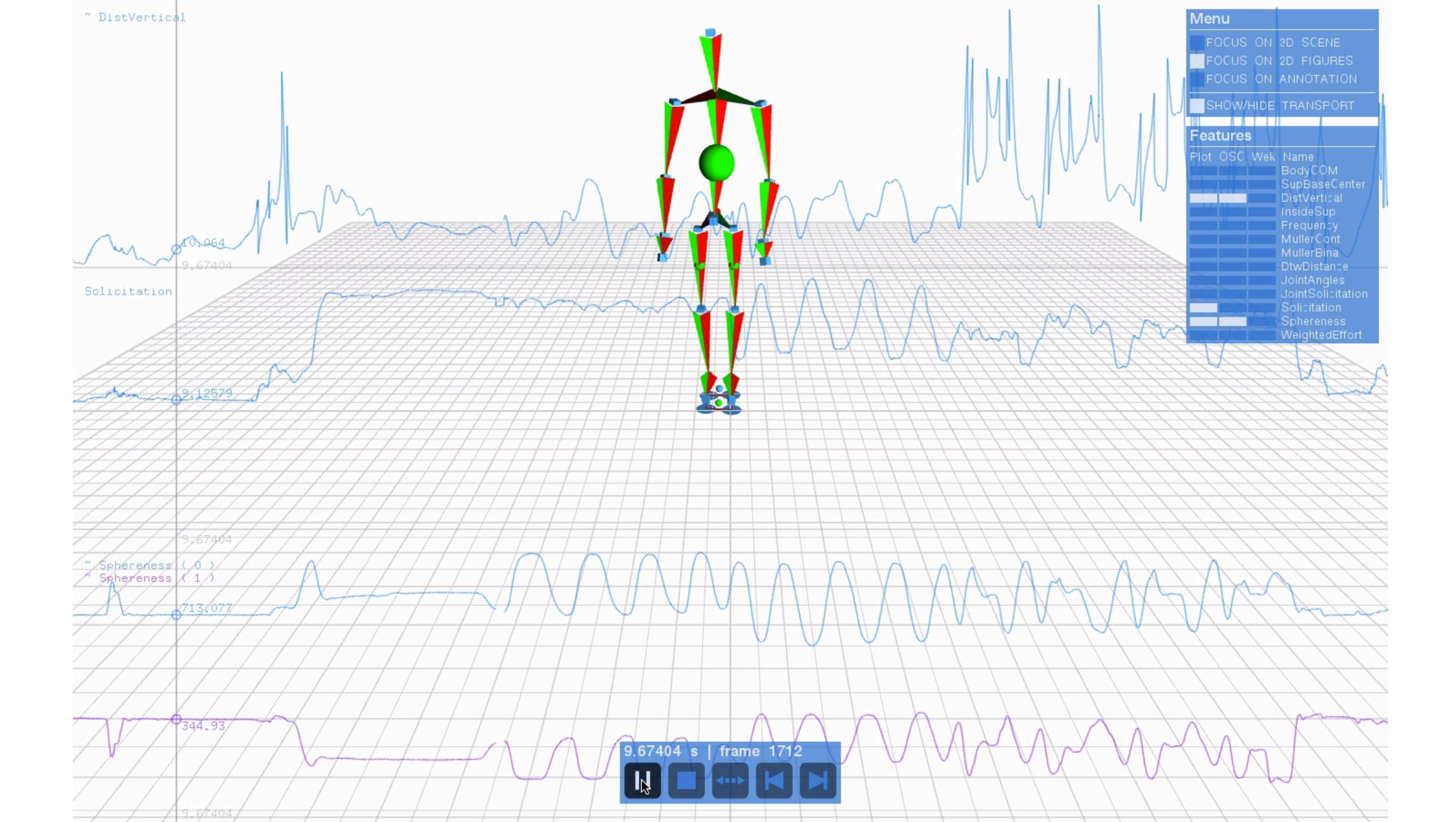
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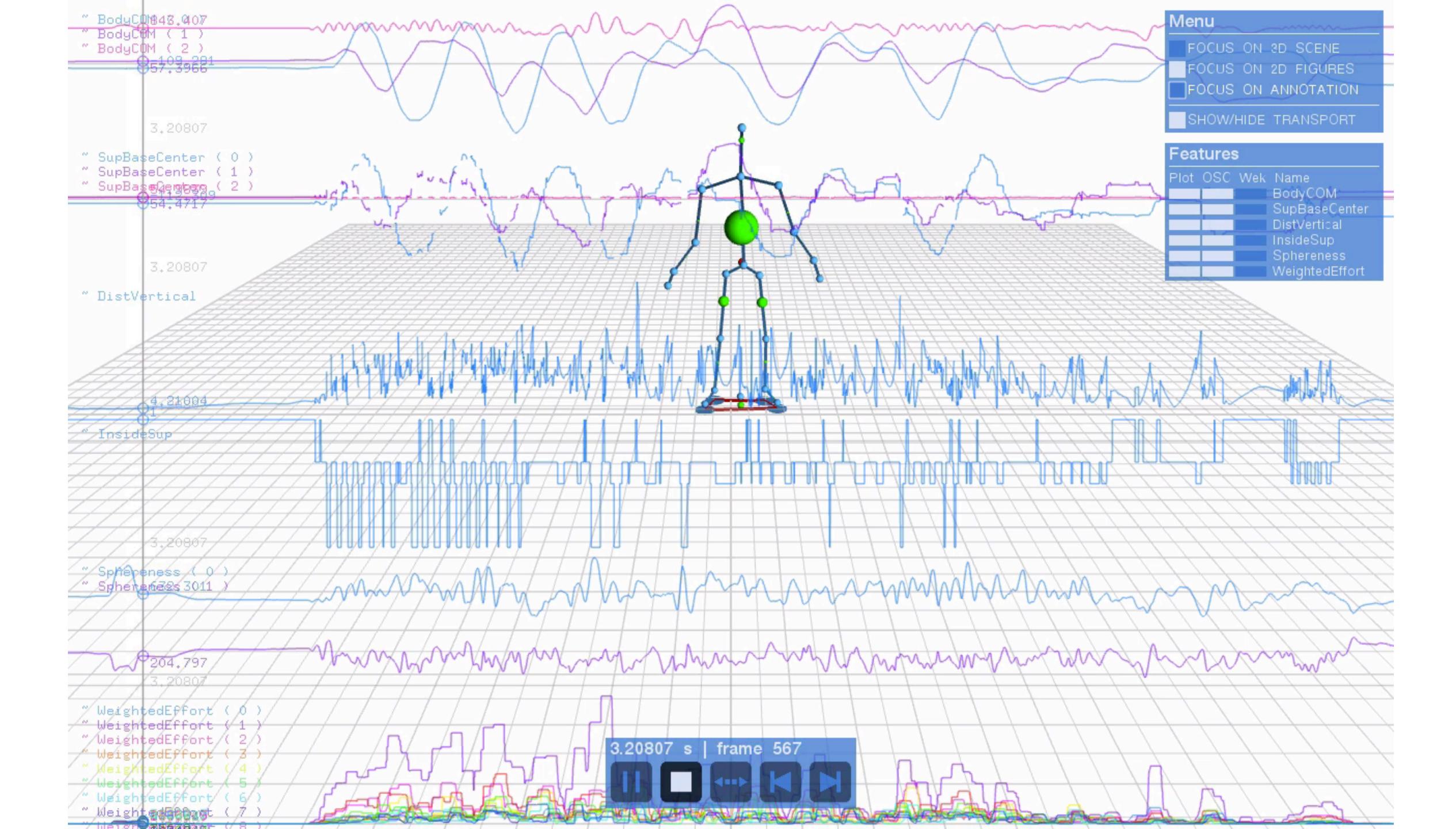
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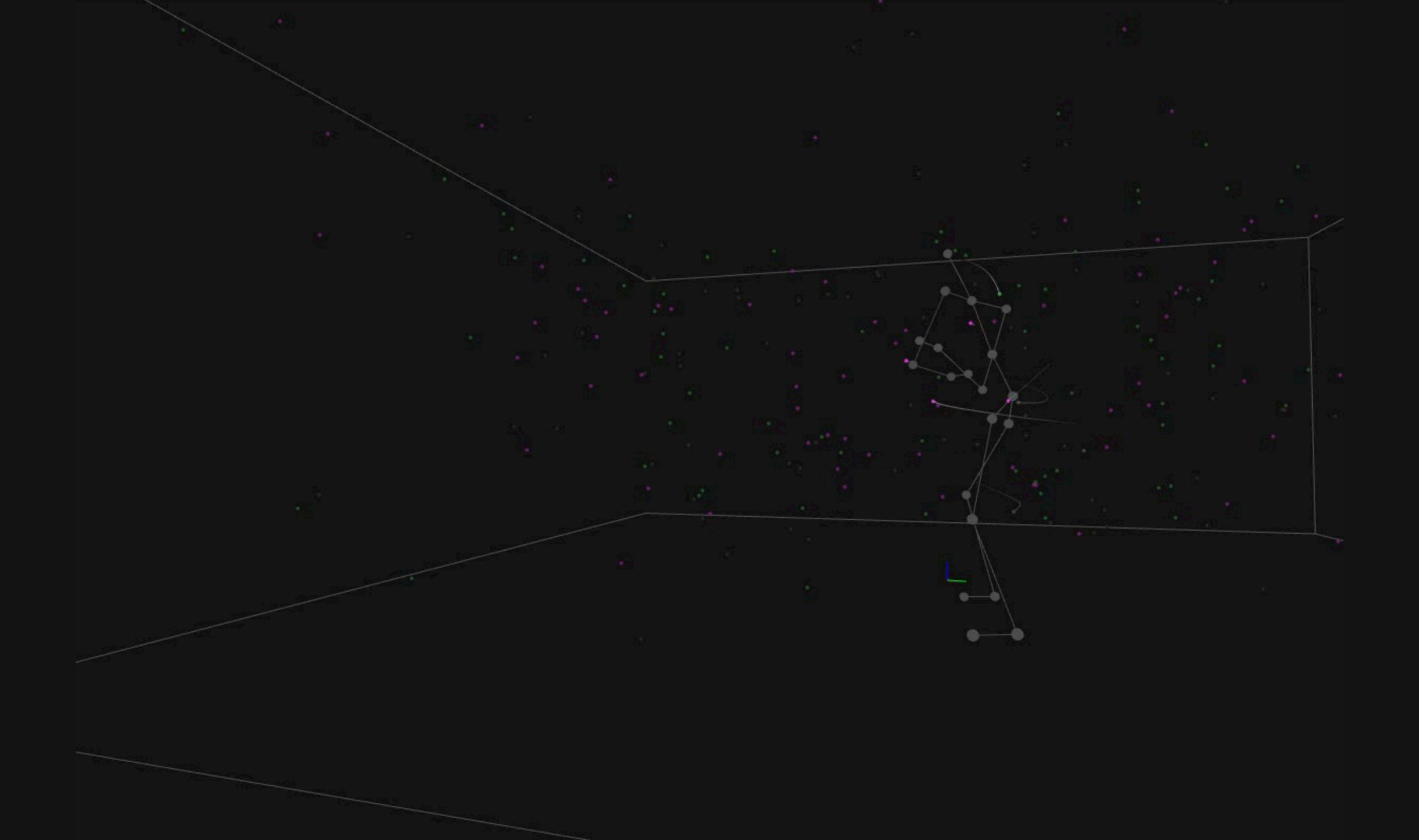
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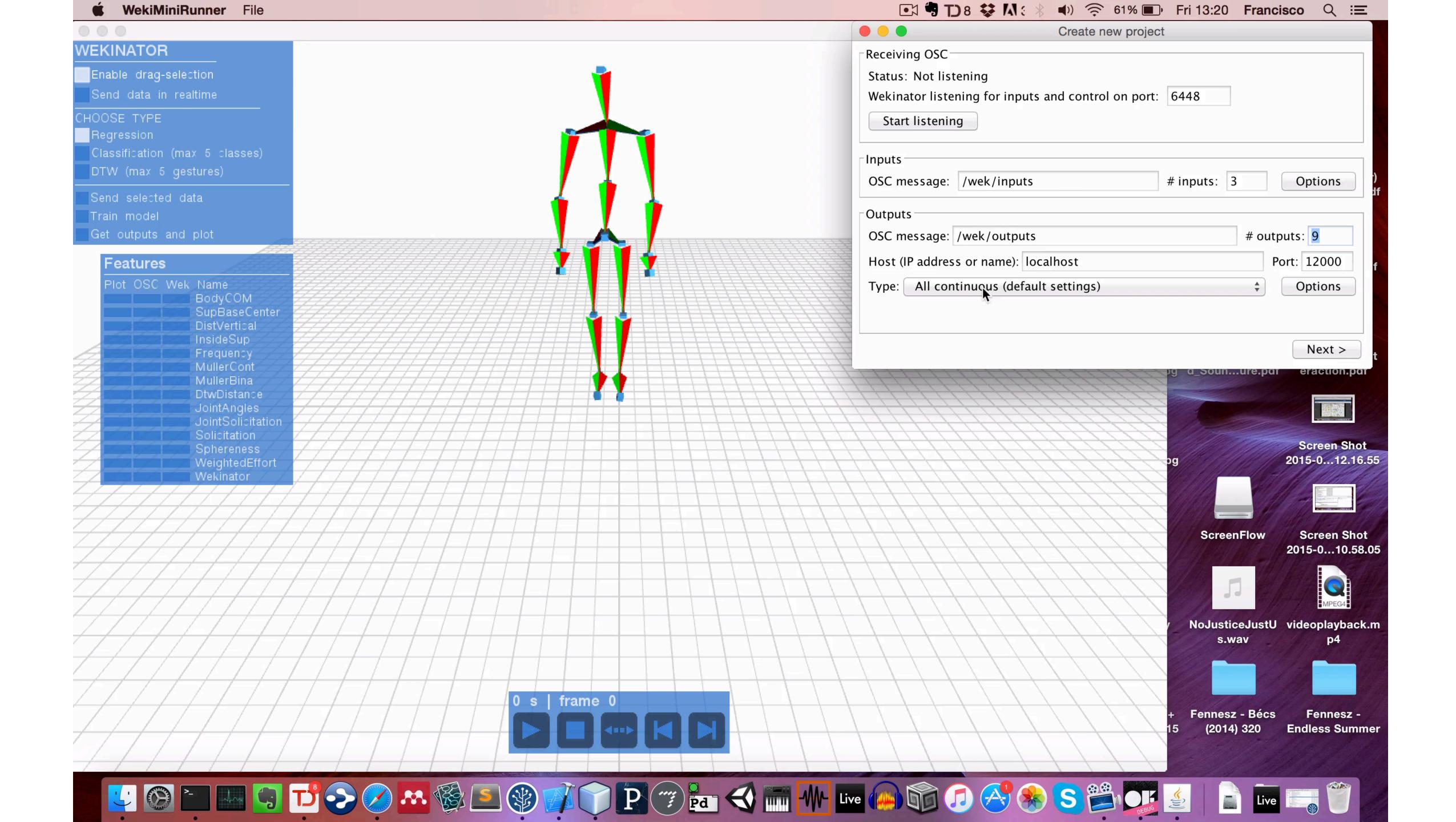
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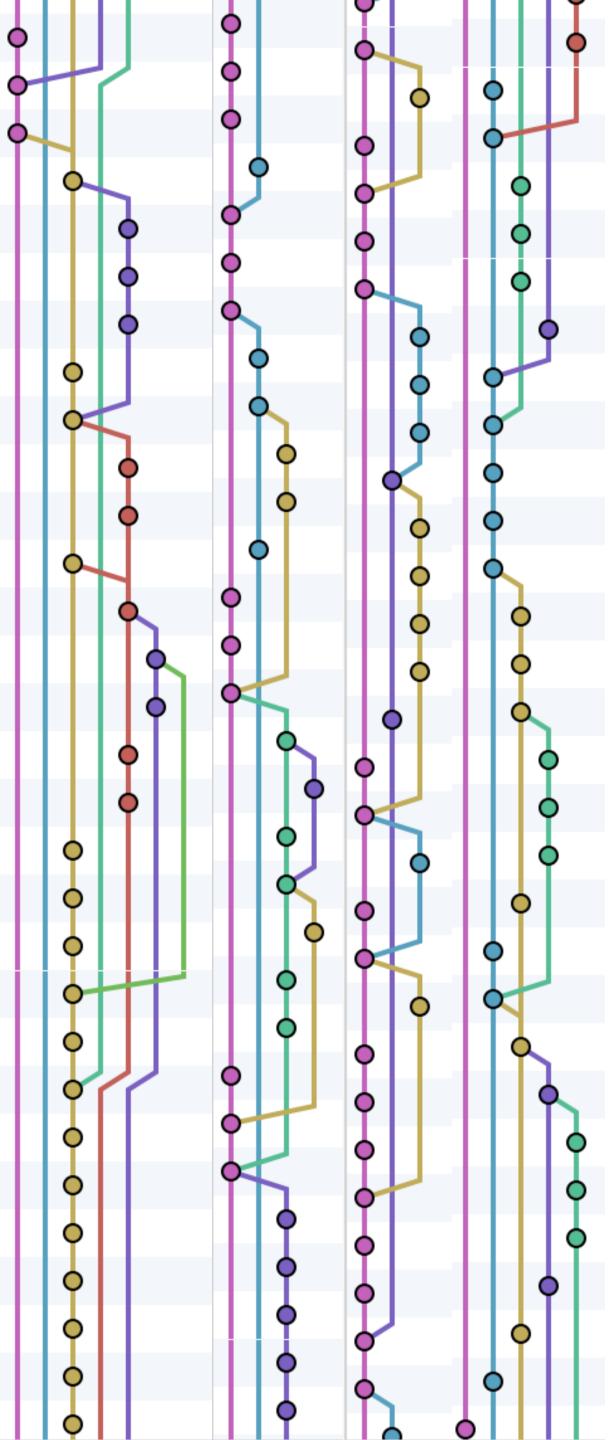


Conclusions

easy access to motion data, motion representation and motion processing does make a real difference

some need an environment, some need a framework, integrating both makes collaborations very possible

the creative coding language paradigm is suitable for both science and arts



Thank you all!

https://github.com/numediart/MotionMachine