Analyzing Dynamic Motions in Artistic Contexts

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Abstract: There is a large amount of studies from psychology and neuroscience that support a strong link between action perception, action generation and action simulation by the concept of a shared motor representation. Observing an action involuntarily and unconsciously evokes a simulation within the observer's motor system. It has been proposed that this effect is also present in processing abstract art, particularly action art. We present a mathematical methodology that can be used to analyze the role of dynamic motions both during the painting process and the perceiving process of action art paintings.

We performed inverse inverse optimal control analysis on motion capture data which we recorded from a collaborating artist. We identified different objective functions corresponding to the verbal description of the motions given by the artist.

We created new paintings with a robotic platform by generating dynamic motions based on the identified objective functions and performed web-based perception studies, showing these robot-generated paintings to test subjects.

First results indicate that there is a high correlation between the verbal description of the motion by the artist and the clustering and desctiption of the robotic paintings crated by the corresponding objective functions. This indicates that the identified objective functions indeed correspond to a motor representation in the brain.

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