Performatology: A Computational Framework for Modeling Artistic Gesture

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Feature Selection & Metrics
- **Balance:**
  - Skill in articulating the torso angle off the center line;
  - Creates the impression of movement in the torso posture.
- **Asymmetry:**
  - Skill in articulating the limbs differently across the center line;
  - Mirroring is minimized while visual information is maximized.
- **Readability:**
  - Skill in composing the limbs in relation to the torso;
  - Occlusions are minimized while pose intelligibility is maximized for viewer.

DFS Experimental Results
- A C4.5 decision tree classifier was trained on half the data of skilled/unskilled performers.
- Predicted the skill level of the remaining (unseen) performers’ poses with up to 91.3 percent accuracy.
- The top ten PCs were used, collectively representing 99.6 percent of the overall data variance.
- A two-tailed test showed that performers who were considered ‘unskilled’ and ‘skilled’ had game scores from two distinct distributions (p-value = 0.0016).

Pilot Study
- C4.5 decision tree implementation in the Weka machine learning library to learn the performers preferences given binary ratings for each pose along with its BAR features.
- Using a 10-fold cross-validation procedure, the resulting decision tree was able to rate ‘unseen’ poses with an accuracy of 79.7 percent.

AI Research Context
- Performatology formalizes how figure artists use composition rules to create visually interesting poses, and is the layer of procedural content generation (PCG) that is associated with acting. Figure composition is one dimension of play in avatar role play.

Dance for Science! (DFS)
- **Setup:** Participants played Michael Jackson Experience (MJX) Kinect game on a markerless Organic Motion mocap stage, skeletal data captured into Motion Builder.
- **Data:** 20 performances by male and female dancers age 18-47, a practice session followed by main dance, high game scores recorded, 4 choice self survey classified as 10 skilled and 10 unskilled dancers.
- **Analysis:** Principal component analysis was done using our BAR metrics and 114 pose parameters.

Videogame Design Context
- Performatology ASO model inverts and expands on the popular MDA design framework, with acting. Figure composition is one dimension of play in avatar role play.

Critical Technical Practice
- **Thesis:** Computational aesthetics experiments to quantify artistic gesture data, consisting of composition metrics and viewer preference studies that correlate performer skill with pose quality.
- Will provide a performatology model for operationalizing the art of figure control.
- Semi-autonomous avatars for role play will converge all figure control methods into a new virtual instrument for artistic performance.

Future of Avatar Control
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References
- More Performatology info: www.performatology.com