Motivation
- Large motion capture DB's widely used in the film and video game industries
- This has created a desire to be able to search these databases for logically similar motions

Project Overview
- InfoVis environment for visualizing MoCap DB under a given similarity metric

CMU MoCap Database
- Publicly available database of MoCap data (mocap.cs.cmu.edu)
- Project considers a subset of the CMU database
  - 110 walking sequences
  - 45 running sequences
  - 18 jumping sequences
  - 5 boxing sequences
  - 3 cartwheel sequences

Li's Similarity Metric
- Treat each frame as a point in high-d space

\[ \mathbf{x}_i \rightarrow x_{i1} \ldots x_{id} \]

Hypothesis: Similar motions will have a similar principal axes as determined by PCA
- Angle between principal axes is used as the similarity measure

Conclusions
- Environment for aiding understanding of a MoCap-based similarity metrics
- Provides information about a similarity metric that is hard to obtain from:
  - analyzing numerical results
  - existing visualization environments

Literature
- Implemented similarity metric:
- Other similarity metrics:
- Related InfoVis papers:

Dimensionality Reduction
- Three dimensionality techniques considered:
  - PCA / Classic MDS (linear, fast)
  - Metric MDS (nonlinear, slow)
  - Non-metric MDS (rank order, slow)
- With 2 dimensions:
  - Classic MDS has a stress of ~0.08
  - Metric MDS has a stress of ~0.05
  - Non-metric MDS has a stress of ~0.03

Future Work
- Fix various short-comings of current implementation
- Consider other MoCap similarity metrics
- Dealing with data that has an intrinsic dimensionality > 2

Visual encodings
- Dimensionality Metric
- Scatterplot View
- Details on Demand Views