**Introduction**

- Metric learning is insufficient for modeling similarity
  - Focus on a subset of features

**Non-metric similarity is common**

- Human perception of face [1]
- “Multiplex” social networks [2]
- Links are formed for different reasons: same school, religion, zip code, hobbies, political views, etc.

- Multiplicative combination of latent components
- Leads to tractable inference
- Yields sparse solutions

**Learning latent similarities**

- Model non-metric and noisy similarity values
- “Localized” metrics focus on the relevant subset of features

**Proposed Approach**

- Latent components
  - Focus on a subset of features
  - Localized similarity values

- Combining latent components
  - Multiplicatively combine with OR gate

- Marginalize out all latent components

**Inference and Learning**

- Tractable posterior over latent variables $S_k$
- EM algorithm
  - Learning each component independently in M step
  - Each component is fit analogously as a softly labeled logistic regression

**Experiments**

- Synthetic data
  - True and recovered metrics ($K = 5$)
  - Similarity prediction accuracies

- Link prediction on a network of NIPS proceedings
  - Compare to discriminative methods (SVM, LMNN[3], ITML[4]) for different features and K.

**Highlights**

- Learning latent similarities
  - Model non-metric and noisy similarity values
  - “Localized” metrics focus on the relevant subset of features
- Multiplicative combination of latent components
  - Leads to tractable inference
  - Yields sparse solutions

**References**