Lecture 2.

Probs: Recommendation on which node to follow.

- The Follow Graph
- The consumer-producer graph

\[ S \rightarrow B \]
\[ J \rightarrow K \]
\[ \rightarrow A \]
\[ S \rightarrow B \]
\[ J \leftarrow K \]
\[ \leftarrow A \]

consumers
producers

Use collaborative filter ideas. Get similarity scores for consumers. Then match to most similar node and then make a reco.

Algorithmic: \( \text{sim}(c) = 1 \)

Propagate similarity scores.

“Love”: All sim. score of a consumer \( X \) is transferred to each producer that \( X \) follows. Do the same in the reverse direction. (Captures the top singular vector in SVD)

“Money”: \( X \) follows \( d \) producers, \( \frac{1}{d} \) gets transferred to these prod...
\[ \text{Sim}(x) = (1-\alpha) \sum_{(x,y) \in E} \frac{\text{relevance}(y)}{\text{den}(y)} \text{ if } \alpha \neq C \]

**Personalized PageRank:**
- Teleportation is always to node C w.p. \( \alpha \).
- Otherwise, usual random walk.

\[ \pi = \alpha e_c + \pi P (1-\alpha) \]

**Dark Test:** Predict and see which links are correctly followed.

"Love" < "Cosine" < "Personalized PageRank" < "Money".

- 0.25\%  
- 4.93\%  
- 5.07\%  
- 6.29\%  

8 of top 100 (on follow graph)

**Obs.** "Personalized PR" on consumer-producer graph = "Money"
Cosine similarity:

Consumers

Producers

Simultanea

\( o \)

\( o \times \) Relevances

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

\( o \)

Cosine similarity \((A, B) = \frac{|\text{FOL}(A) \cap \text{FOL}(B)|}{\sqrt{|\text{FOL}(A)||\text{FOL}(B)|}} =: \text{cs}(A, B)\)

\(\text{Rel}_c(z) = \sum_{x: \text{c follows } z} \text{cs}(x, z).\)