Finding Duplicate News Articles

A New Way of Shingling
Bucketing by Length

Mining of Massive Datasets
Leskovec, Rajaraman, and Ullman
Stanford University

Application: Same News Article

- The Political-Science Dept. at Stanford asked a team from CS to help them with the problem of identifying duplicate, on-line news articles.
- Problem: the same article, say from the Associated Press, appears on the Web site of many newspapers, but looks quite different.

News Articles – (2)

- Each newspaper surrounds the text of the article with:
  - It's own logo and text.
  - Ads.
  - Perhaps links to other articles.
- A newspaper may also "crop" the article (delete parts).

News Articles – (3)

- The team came up with its own solution, that included shingling, but not minhashing or LSH.
  - A special way of shingling that appears quite good for this application.
  - LSH substitute: candidates are articles of similar length.

Enter LSH

- I told them the story of minhashing + LSH.
- They implemented it and found it faster for similarities below 80%.
  - Aside: That's no surprise. When similarity is high, there are better methods, as we shall see.

Enter LSH – (2)

- Their first attempt at minhashing was very inefficient.
- They were unaware of the importance of doing the minhashing row-by-row.
- Since their data was column-by-column, they needed to sort once before minhashing.

Specialized Shingling Technique

- The team observed that news articles have a lot of *stop words*, while ads do not.
  - "Buy Sudzo" vs. "I recommend that you buy Sudzo for your laundry."
- They defined a *shingle* to be a stop word and the next two following words.

Why it Works

- By requiring each shingle to have a stop word, they biased the mapping from documents to shingles so it picked more shingles from the article than from the ads.
- Pages with the same article, but different ads, have higher Jaccard similarity than those with the same ads, different articles.