The Setting
- Reviews help users form opinion about products.
- Reviews include star ratings and comments section.

The Problem
- 100s of reviews online – how to rank them?
  - Most recent
  - Most helpful
  - Reviewer’s status
- Different users have different priorities in terms of the features (aspects) they value. The user needs to know what a star rating represents and only see reviews relevant to her priorities.

E.g. When searching for restaurants...

The Solution
- Extract opinion scores for different aspects in each review.
- Create user profiles using aspect-based opinion scores.
- Rank reviews based on user similarities.

Personalized Review Rankings
- Rates and reviews
- User profile generation
- Aspect summarization

Aspect Summarization
For each review we extract
- Feature (aspect) words (nouns)
- Opinion words (adverbs & adjectives)

For each feature, we calculate the overall sentiment in the review as the sum of the polarity of all opinion words (including negation/intensifier weights) associated with them.

User Profiles & Review Recommendations
- We follow a neighborhood-based collaborative filtering approach: rank/recommend reviews of users who are the most similar to current user.
- User profile \( U = \{ p_1, \ldots, p_k \} \)
  \[ p_i = \begin{cases} 
  s_{ui} & \text{if } i \in B_u \\
  0 & \text{if } i \notin B_u 
  \end{cases} \]
  \( s_{ui} \) represents the preference score of a user \( u \) for a business \( i \)
- Business-based score: In this implementation \( s_{ui} \) is calculated as the sum of feature opinion scores in \( R_{ui} \)
  \[ s_{ui} = \sum_{w \in R_{ui}} o_{uw} \]

The Prototype
- Yelp Challenge Dataset
  - Python NLTK Brown Review Corpus (POS tagging)
  - Subjectivity Lexicon (words -> numbers)
  - Apache Mahout (Collaborative filtering)
  - Django/Python/MongoDB

[In RSWeb2014 proceedings]

Evaluation
- Empirical evaluation showed very promising results
- Problems when reviews:
  - Include sarcasm/satire, etc.
  - Discuss non-trivial topics
  - Are very short

Extensions
- Incorporate more aspects to capture diverse interests
- Explore alternative preference scores
- Incorporate social network feedback in user profile (current implementation presents friends’ reviews ranked by similarity to user profile)