Opinions Matter - InfoLab@UD at 2014 Contextual Suggestion Track

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Presented by Kuang Lu

The Roadmap

Candidate Suggestion Crawling

Profile Modeling

Candidate Suggestion Ranking

Description Generation

The Roadmap

Candidate Suggestion Crawling

Opinions matter!

Profile Modeling

Candidate Suggestion Ranking

Delicious
Spicy Sour Fruity
Hot Sweet Tasty
Zesty **Bitter** Juicy
Flavorful Sugary
Salty Savory Yummy
Scrumptious

Description Generation

3

The Roadmap

Compare with last year

- **Linear Interpolation**
  - **last year's top**
- **Learning to Rank** NEW!
  - **worthy to try**

Candidate Suggestion Ranking

Candidate Suggestion Crawling

Profile Modeling

Similar with last year's method

Description Generation

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Description Generation

Candidate Suggestion Crawling

Source :Yelp

16 Categories: ...

Candidate Suggestion Crawling

- Name
- Yelp url
- URL
- overallRating
- total_review_number
- Categories
- pics_count
- Reviews
  - user_id
  - user_friends_count
  - user_reviews_count
  - rating
  - comment
  - useful_count
  - funny_count
  - cool_count

- **Source:Yelp**
- **Total: 60,442**
- **Average:1,208**

JSON

The Roadmap

Candidate Suggestion Crawling

Profile Modeling[1]

Candidate Suggestion Ranking

Description Generation

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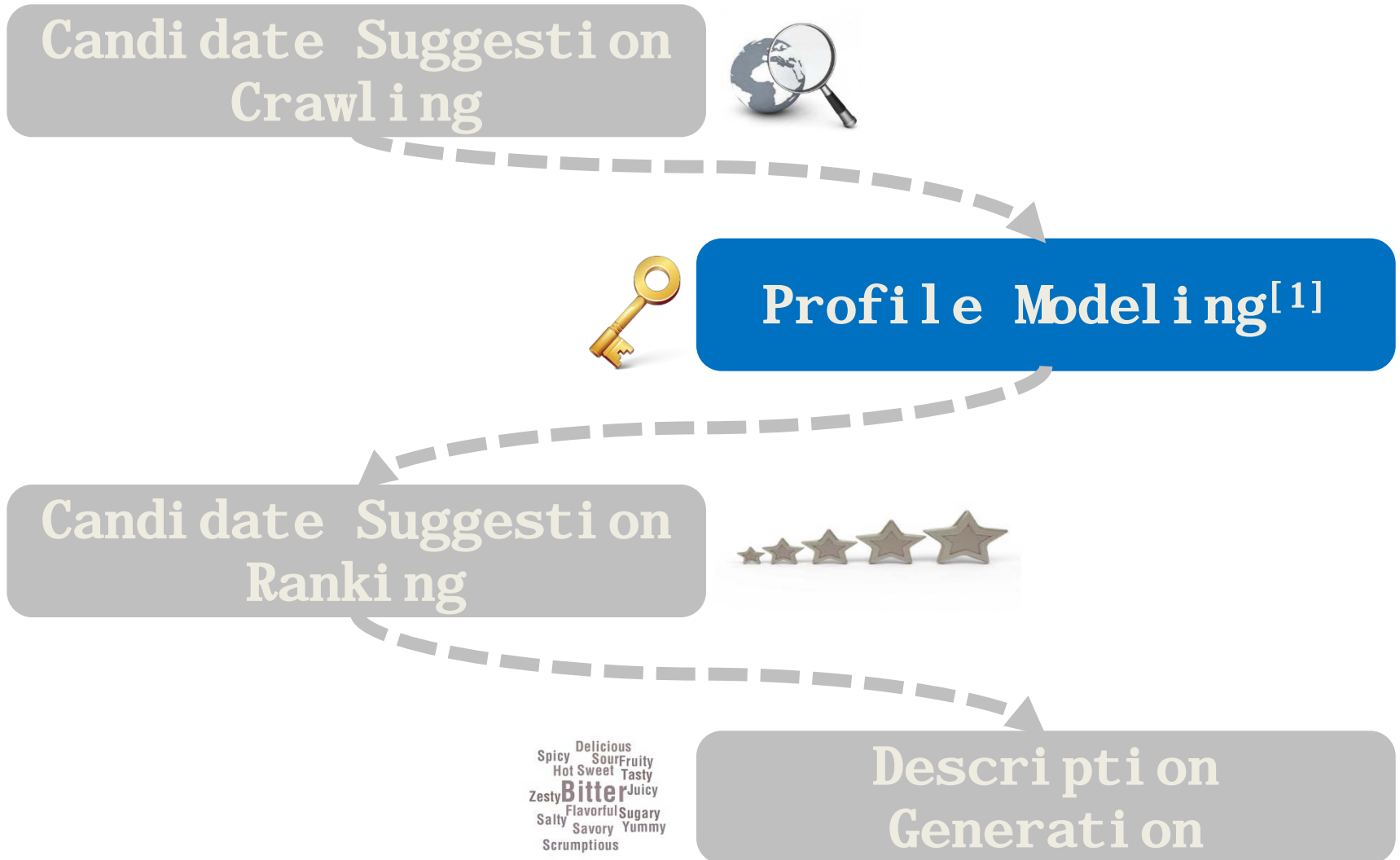
[1] P. Yang and H. Fang. Opinion-based user profile modeling for contextual suggestions. In Proceedings of the 2013 Conference on the Theory of Information Retrieval, ICTIR'13, pages 18:80–18:83, New York, NY, USA, 2013. ACM.

Inspiration
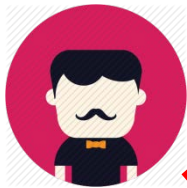
Category

- Landmarks
- Restaurants
- Shopping

Features

- Type (Ancient, Modern) ✓✓
- SuitableFor (Family, Adult)
- …

- Type (American, Mexican) ✓
- Ambience (quiet, hot) ✓
- Price (low, middle, high) ✓
- …

Miscellaneous

- Others like it? ✓
- …

Category	Features	Miscellaneous
↑ Statue of Liberty	→ Statue of Liberty	↑ Uncle Sam Steak
↑ Ipondo Japanese Cuisine	↑ Uncle Sam Steak	↑ Museum of Modern Art
↑ Museum of Modern Art	→ Museum of Modern Art	↓ Statue of Liberty
↑ Uncle Sam Steak	↓ Ipondo Japanese Cuisine	→ Ipondo Japanese Cuisine
↓ Doma Mall	→ Doma Mall	→ Doma Mall

Inspiration
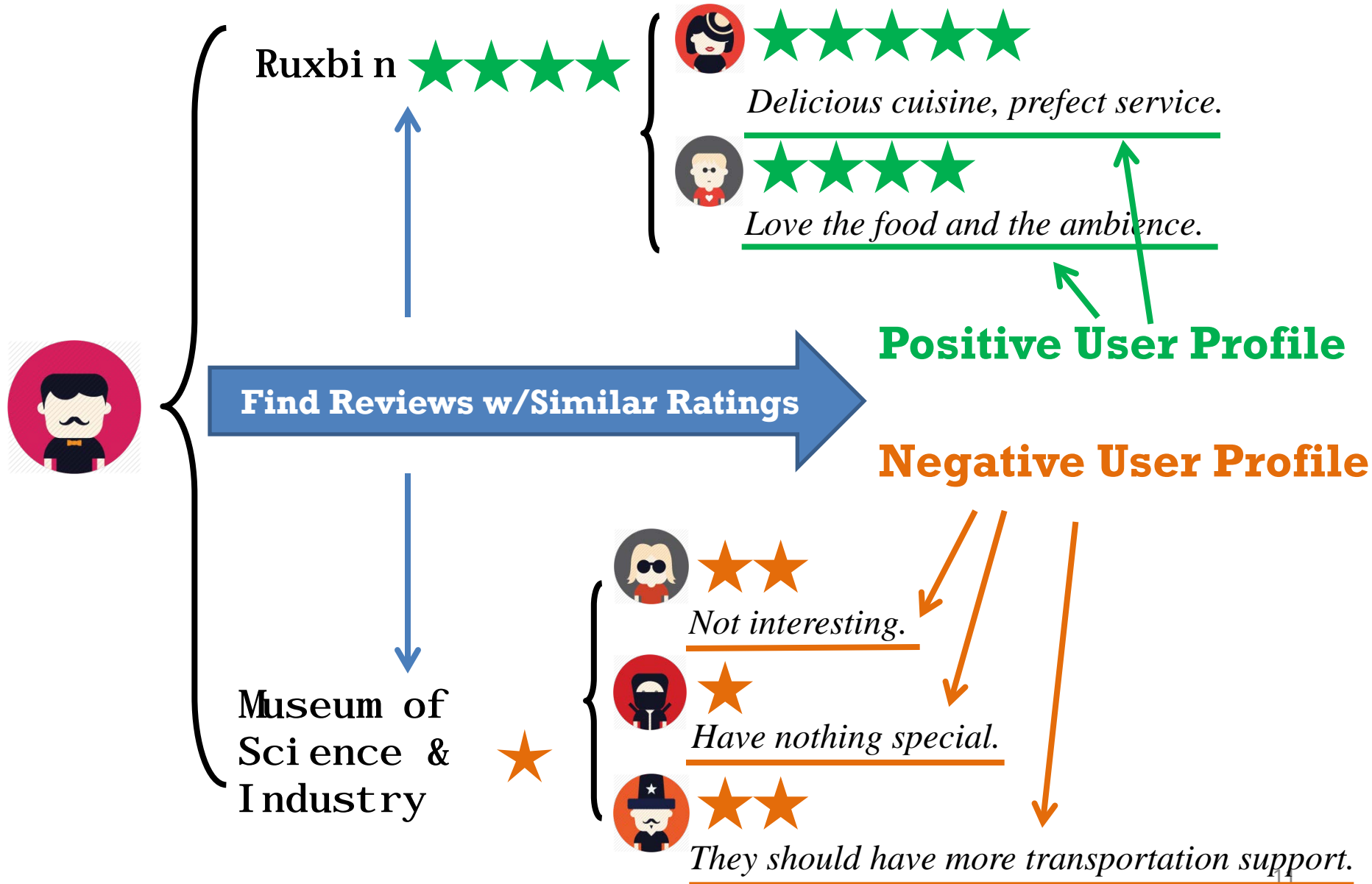
No single factor can capture the real reason…

Enrich!

Explore the opinions

Leverage the wisdom of crowds

Profile Modeling - User

Ruxbin ★★★★

★★★★★
Delicious cuisine, prefect service.

★★★★
Love the food and the ambience.

Positive User Profile

Find Reviews w/Similar Ratings

Negative User Profile

Museum of Science & Industry ★

★★
Not interesting.

★
Have nothing special.

★★
They should have more transportation support.

Profile Modeling - User

Representations of Reviews when building user profile

- Full Reviews (**FR**): use full text in the review.
- Unique terms from Full Reviews (**UFR**): only the unique terms in the review.
- Selective Reviews (**SR**): most frequent terms in the review.
- Unique terms from Selective Reviews (**USR**): only consider the unique terms in SR.
- Nouns in Reviews (**NR**): nouns in the review.
- Review Summaries (**RS**): summary of the review. RS are the terms extracted from the reviews using Opinosis Algorithm[2].

[2] K. Ganesan, C. Zhai, and J. Han. Opinosis: a graph-based approach to abstractive summarization of highly redundant opinions. In Proceedings of the 23rd International Conference on Computational Linguistics, COLING '10, pages 340–348, Stroudsburg, PA, USA, 2010. Association for Computational Linguistics.

Profile Modeling – Candidate Suggestions

★★★★★

Absolutely amazing food and the most friendly and inviting atmosphere that I've ever experienced.

★★★★

The food was very reasonably priced. No soggy dough and just the right amount of sweetness.

Positive Candidate Profile

Negative Candidate Profile

★★

Rice ball for a dollar. I guess so? But nothing special.

★

I've done some pretty disgusting things in my life... trust me, but I've always been considerate of other people and their boundaries.

The Roadmap

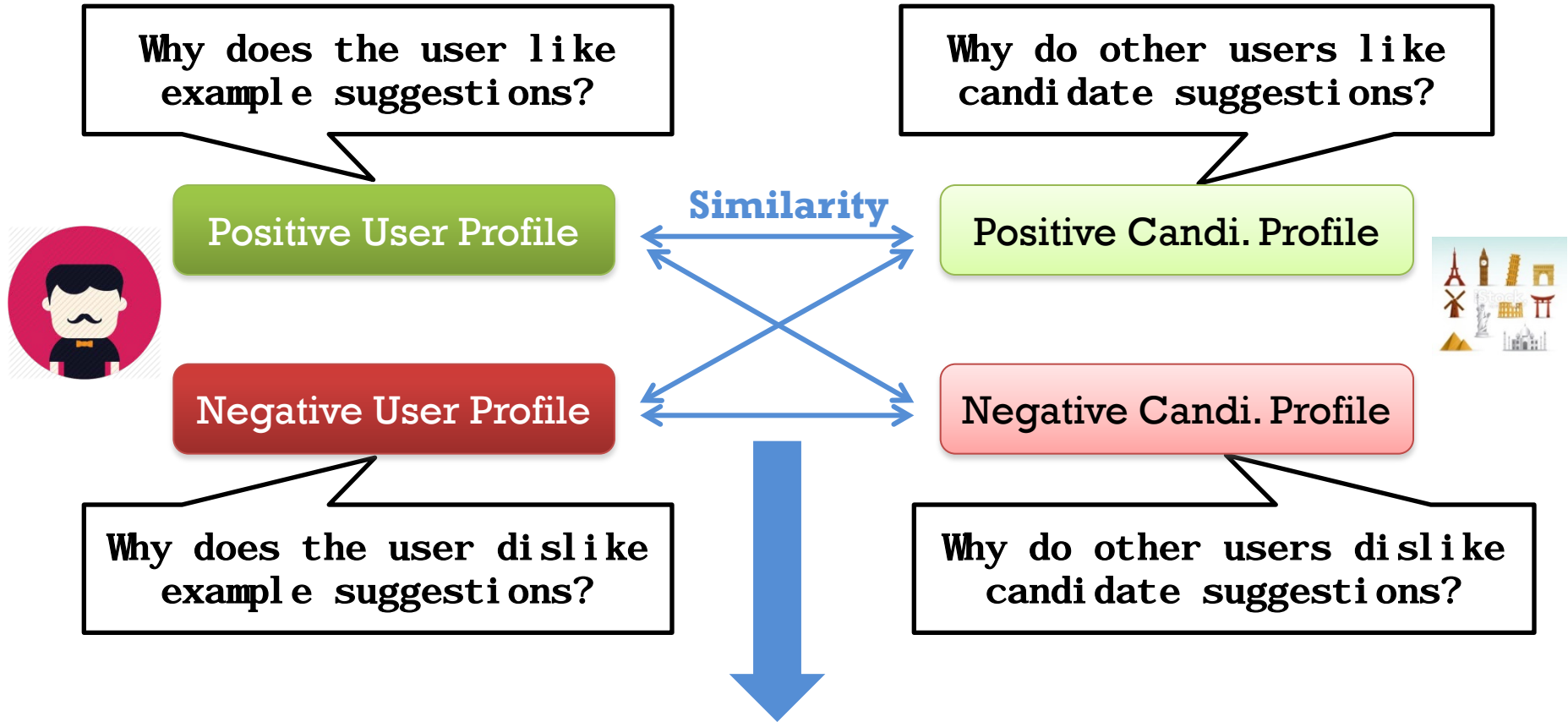Candidate Suggestion Crawling

Profile Modeling

Candidate Suggestion Ranking

Description Generation

Candidate Suggestion Ranking

Why does the user like example suggestions?

Why do other users like candidate suggestions?

Positive User Profile

Similarity

Positive Candi. Profile

Negative User Profile

Negative Candi. Profile

Why does the user dislike example suggestions?

Why do other users dislike candidate suggestions?
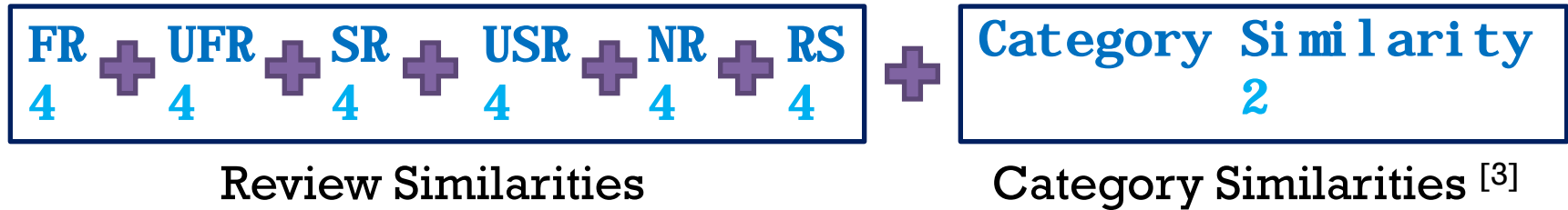
- **Learning to Rank**
- **Linear Interpolation**

Ranking – Learning to Rank

1. Features: Similarities Scores

FR 4 + **UFR 4** + **SR 4** + **USR 4** + **NR 4** + **RS 4**	+	**Category Similarity 2**

Review Similarities   Category Similarities [3]

2. Method:

- ☐ MART
- ☑ LambdaMART
- ☐ SVM
- ☐ ...

[3] P. Yang and H. Fang. An exploration of ranking-based strategy for contextual suggestion. In Proceedings of 21st Text REtrieval Conference (TREC 2012). NIST, November 2012.

Ranking – Linear Interpolation

$$S(\mathcal{U}, \mathcal{CS}) = \alpha \cdot SIM(\mathcal{U}_{pos}, \mathcal{CS}_{pos}) - \beta \cdot SIM(\mathcal{U}_{pos}, \mathcal{CS}_{neg})$$
$$- \gamma \cdot SIM(\mathcal{U}_{neg}, \mathcal{CS}_{pos}) + \eta \cdot SIM(\mathcal{U}_{neg}, \mathcal{CS}_{neg})$$

☐ FR ☐ UFR ☐ SR ☐ USR ☐ NR ☑ RS

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Description Generation

Personalized Description Generation

- Opening Sentence → What kind of this place is?

Finer category

- "Official" Introduction → What is this place? (see below)

- Highlighted Reviews → Why do other people like it?

Sentences containing frequent nouns in positive reviews and more positive adjectives

- Concluding Sentence → Why is this recommended for YOU?

Positive example suggestion with the same finer category

Description Example

The "Olive Room" is a bar. Here at the olive room, you will receive the finest cuisine. "If you are looking for a unique dining experience, with excellent food, service, location, and outstanding ambiance, look no further!" This place is similar to another place you liked: Tria Wine Room.

What kind of this place is?

What is this place?

Why do other people like it?

Why is this recommended for YOU?

Results

Runs	P@5	MRR	TBG
UDInfoCS2014_1	0.4074	0.5482	1.6271
UDInfoCS2014_2	**0.5572**	**0.7439**	**2.7043**
TREC Median	0.3492	0.5350	1.3685

- <u>UDInfoCS2014_1</u>: Learning to Rank.
- <u>UDInfoCS2014_2</u>: Linear Interpolation

Thank you!

Questions?