Applications of NLP in Recommender Systems

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PT Data Analytics Dic 19

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Motivation

Ratings in recommender systems does not reflect correctly the opinion expressed by user about certain restaurant. Using NLP, can capture better the opinion and improve the recommendations from recommender systems.
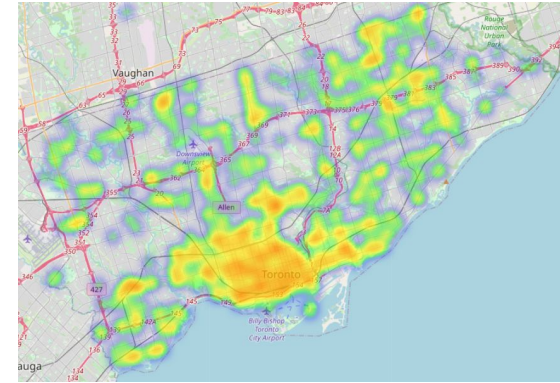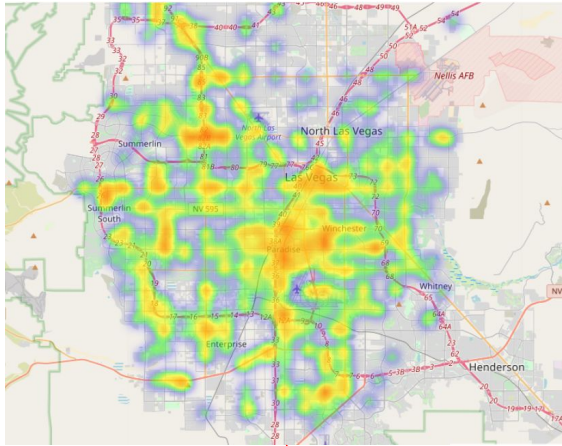
Collaborative Filtering Recommender System

Similar users

Recommendation
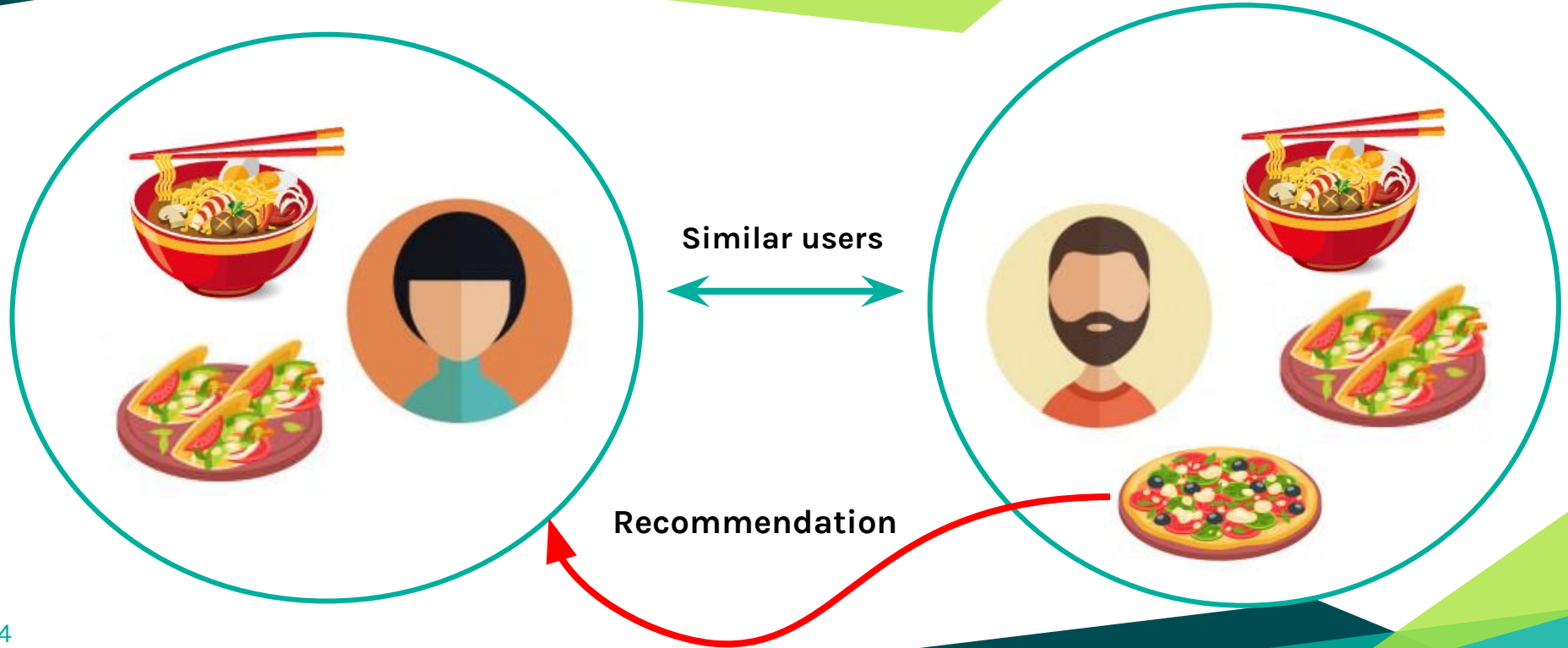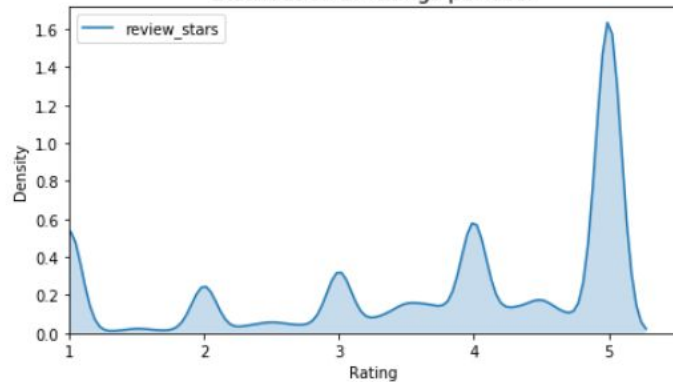
Distribution of restaurants in **Las Vegas**

Distribution of restaurants in **Toronto**
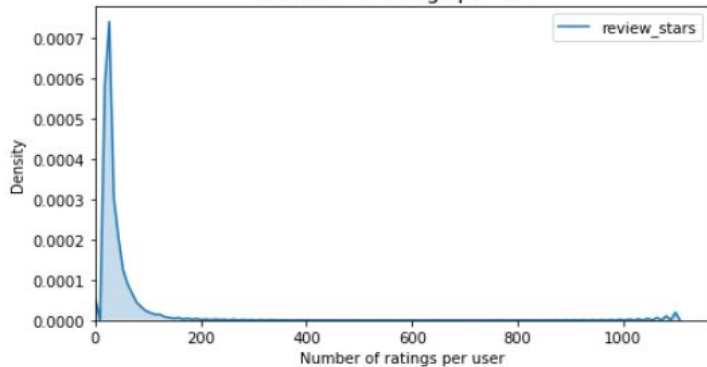

Number of restaurants by city

Distribution of ratings per user
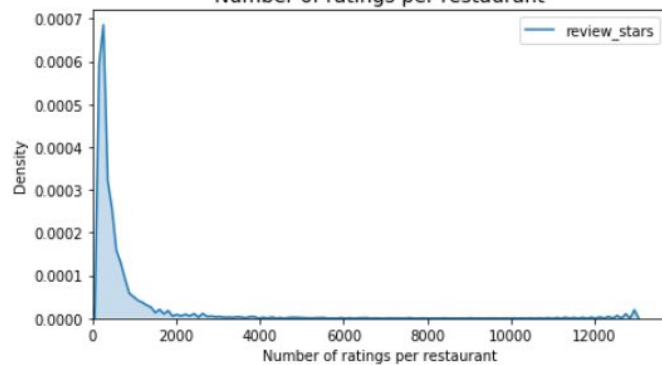
Distribution of ratings per restaurant
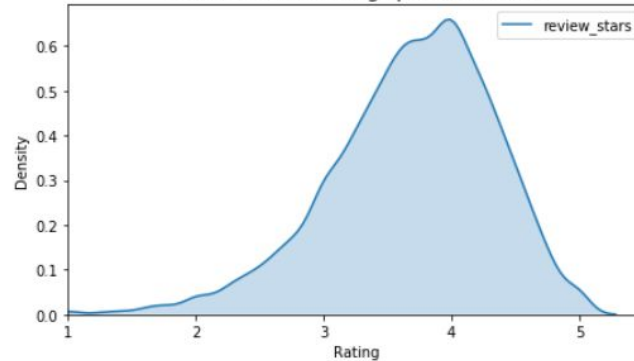
Number of ratings per user

Number of ratings per restaurant

6

Workflow: Preprocessing (NLP)

Review

NLP Processing

1.- Cleaning text from non words
2.- Lemmatization
3.- Vectorization

Sentiment Analysis

Reducción de la dimensionalidad (Word2Vec)
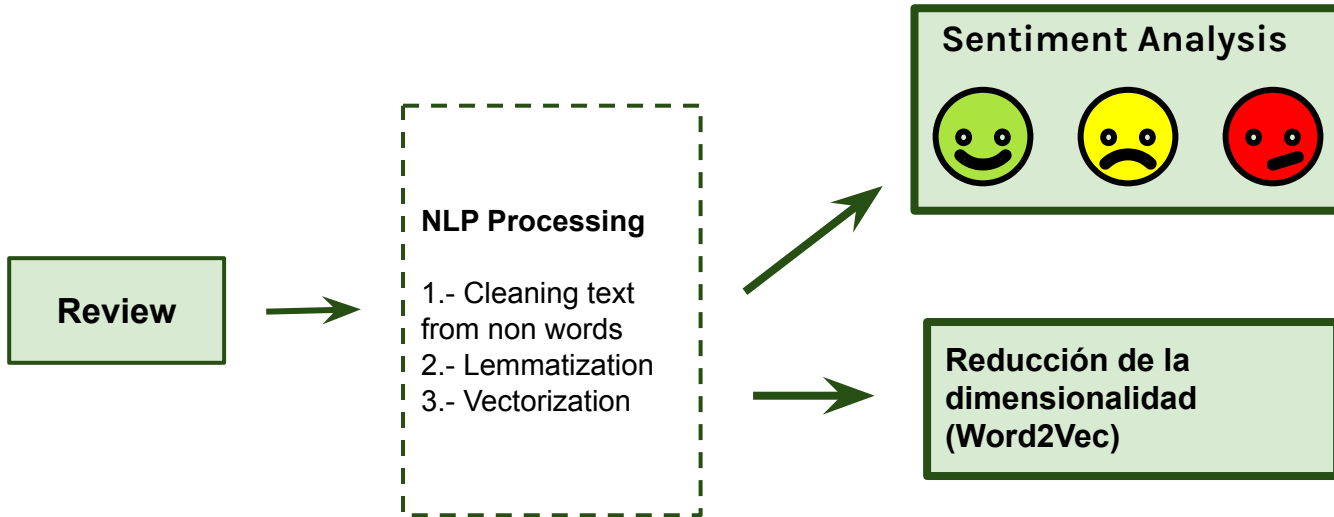
Workflow: Recommender Systems

Ratings

⭐⭐⭐⭐⭐

Sentiment Analysis

😊 😟 😠

Word2Vec

Utility Matrix

	🍜	🍤	🍕
👤	5	4	?
👤	5	4	4

Testing Models

Distance based (kNN)

Matrix Factorization (SVD, NMF)

Model Selection (based on RMSE, MAE and MSE)

SVD: ⭐⭐⭐⭐⭐

kNN: 😊 😟 😠

Hyperparameter tuning

Model Selected

kNN (cosine distance between comments)
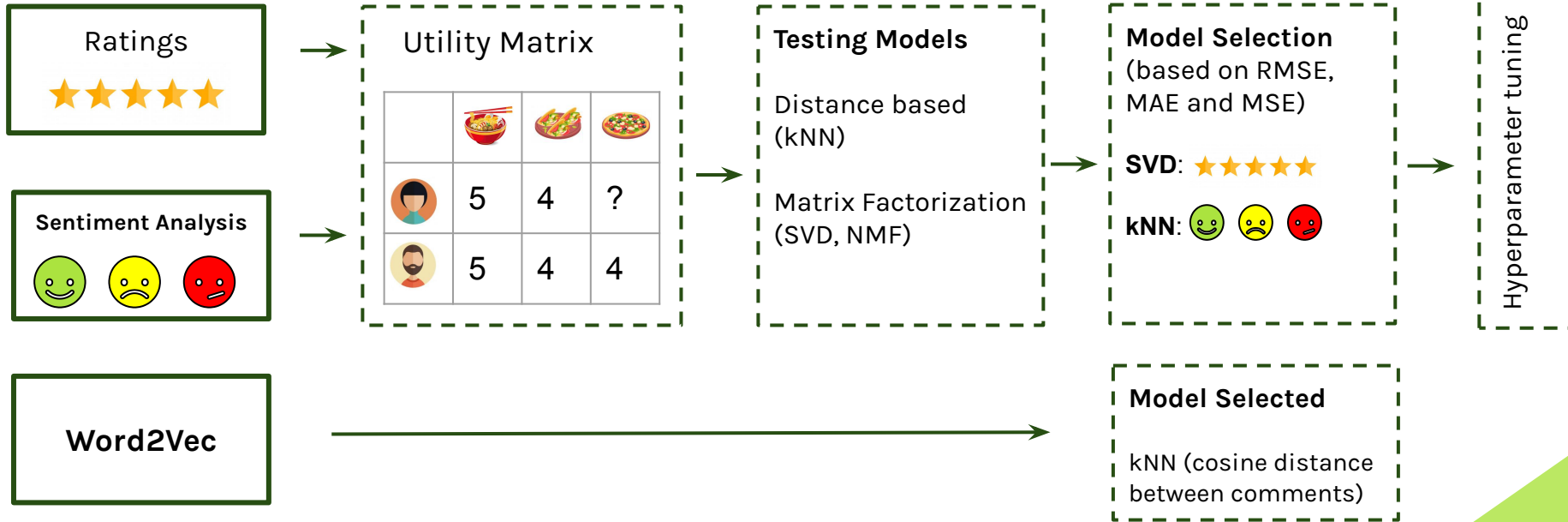
Workflow: RS Evaluation

	RMSE	MAE	MAP@10	MAR@10
★★★★★	0.973	0.758	**0.534**	0.674
😊😞😠	**0.326**	**0.234**	0.531	**0.679**
Word2Vec	-	-	0.482	0.643

Next Steps

◆ Incorporate additional information such as user profile or information about the restaurants in order to improve the recommender systems.

◆ Test with other models for word embedding / sentiment analysis and compare it with the results obtained.

Thanks!