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Content Based Hotel Recommendation System

Metis Bootcamp - NLP/ Unsupervised Learning Module
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Introduction

- Problem:
 - Spending time researching for another hotel if the hotel of interest is completely booked
- Goal:
 - A hotel recommendation system that provides top five hotels similar in star rating and attractions around the hotel of interest



Methodology

995 hotel
star ratings /
area
descriptions



Beautiful Soup
Selenium

Chicago
San Francisco
New York City
Seattle
Los Angeles

Pandas
NLTK
Regex

TfidfVectorizer

SVD
NMF

Cosine similarity

Results are evaluated subjectively by comparing star ratings & area descriptions

Topics with truncated SVD

| <i>Topic 1</i> | <i>Topic 2</i> | <i>Topic 3</i> | <i>Topic 4</i> | <i>Topic 5</i> |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| new_york | san_francisco | chicago | seattle | los_angeles |
| st | oracle_park | pavilion | lumen_field | staples |
| san_francisco | historical | uic | lake | museum |
| mid | pier | wrigley | union | santa_monica_pier |
| square | ferry | solder_field | climate_pledge_arena | venice |
| times | muir | seattle | el_corazon | la |
| madison_square_garden | monument | field | pike_place_market | pantage_theatre |
| st_james_theatre | woods | navy_pier | tmobile_park | belasco |
| park | exploratorium | tower | wheel | wax |
| ing | chase | the_loop | westlake | paramount_studios |

Recommendation



Oakwood at Via 6

3 stars

Hyatt Place Seattle
Downtown

3 stars

Quality Inn & Suites Seattle
Center Downtown

3 stars

Staypineapple, Hotel
Downtown Seattle

3 stars

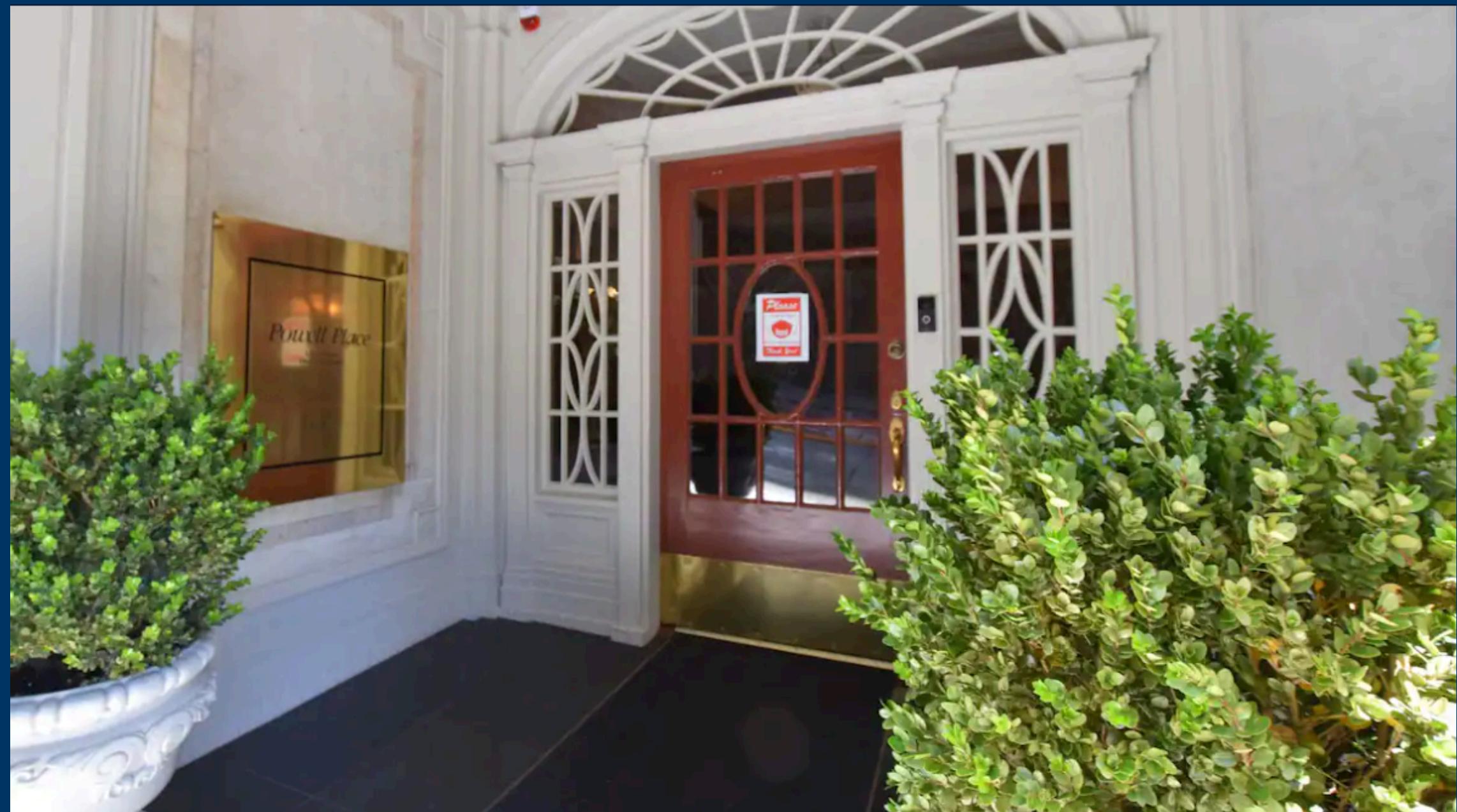
Hilton Seattle

3 stars

Holiday Inn Seattle
Downtown

3 stars

Recommendation



Powell Place

2 stars

Inn at Union Square

3 stars

The Ritz-Carlton, San Francisco

5 stars

Courtyard by Marriott San Francisco Union Square

3 stars

Union Square Plaza Hotel

2 stars

Le Meridien San Francisco

4 stars



System with truncated SVD provides extreme results - either all five excellent recommendations or all are completely wrong

Topics with NMF

| Topic 1 | Topic 2 | Topic 3 | Topic 4 | Topic5 |
|----------------|----------------|----------------|----------------|---------------|
| st | san | chicago | los | seattle |
| square | francisco | field | angeles | waterfront |
| new | national | beach | hollywood | lumen |
| york | downtown | north | studios | center |
| station | oracle | water | center | lake |
| midtown | park | near | museum | union |
| minutes | historical | michigan | monica | climate |
| madison | maritime | loop | santa | pledge |
| central | great | pavilion | staples | place |
| park | ferry | soldier | beach | looking |

Recommendation



Pendry Chicago

4 stars

Omni Chicago Suites -
Magnificent Mile



4 stars

Swissotel - Chicago



4 stars

Virgin Hotels Chicago



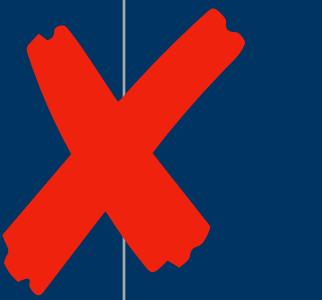
4 stars

Hyatt Centric Chicago
Magnificent Mile



4 stars

The Peninsula Chicago



5 stars

System with NMF provides mixed results - some recommendations are great, some are ok, and some are completely wrong

Conclusion / Future Work

- Recommendation system with NMF provides better results than that of truncated SVD
- Build a collaborative recommendation system

Thank you