Popular Items from Yelp Reviews
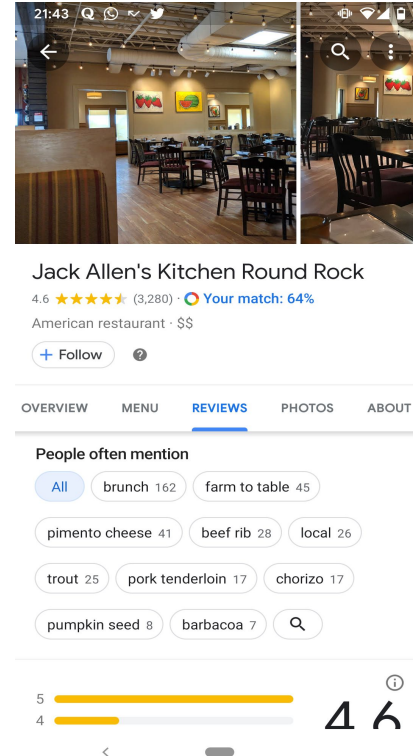
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Project Statement

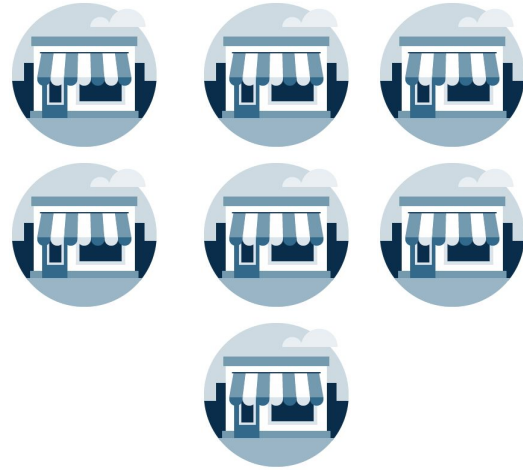Mining Popular items from Yelp restaurant reviews.

Yelp Dataset

Restaurants with sufficient reviews!

- Range: [100, 150]

Yet around 3K Restaurants!

Challenges

- No Test nor Train data
- No Clear Entity Set (restaurant menu)!
- Manually Annotate each review,
  - Food Entity
  - Sentiment

~1000 Reviews

Solution Approach

Phase-1: Extract food Entities

- Variable Sliding Window
- Rule matching phrases to Menu
  - Single word
  - Multiple words
  - Collate entities
- Discard non-food entities
  - WordNet, Food lexname

Eg. Sliding Window
[I had grilled chicken and highly recom]..
              VB   NN

Eg. Collation
I ordered beef pork pizza.
            w1 + w2 + w3

Solution Approach

Phase-2: Computing Popularity

- Score each Entity
- Merge Entities & Aggregate Scores
- Extract Top 10

Eg.
(beef burrito, 12)
(burrito with beef, 8)
=> (beef burrito, 20)

Models

Count Entity Occurrences			Recall	Precision
#1 All reviews			74.28%	65.7%
#2 reviews with rating >= 4			74.28%	65.7%
#3 Differentiated Counting {rating => cnt}	5 4 **3** 2 1	+2 +1 **0** -1 -2	68.5%	58.5%

Models

Sentiment Analysis (polarity >threshold)	Recall	Precision
#5.a Sentence entity is present in (p > 0.0)	64.28%	64.28%
#5.b Current + follow up sentence too (p > 0.3)	65.71%	67.14%

Eg. I ordered grilled chicken wings and lamb chops. They were delicious!

Result: Popular Items at Korean restaurant

Rice
Soup
Side dishes
Soon Tofu
Tofu soup
Bulgogi
Tofu

Purple rice
Tofu Soup
Bulgogi
Tofu
Soon Tofu
Beef
Pork

Model Evaluation

- Precision & Recall
- Entity matching:
    - Remove Stop Words
    - Discard word order

    Eg. chicken salad ⇔ salad with chicken

Future Work

- **Language Translation,** Eg. Sundubu-jjigae ⇔ soft tofu stew
- **Similar Entities,** Eg. bread ⇔ loaf ⇔ bun
- Expand Menu & Multiple cuisines
- More General Rules to Match Entities
- Custom Phrase Sentiment Analysis

Thank you!