A DATA MINING PROJECT

YELP US! WE'RE DROWNING

TEAM MEMBERS

- Devin Arnold: Banh Mi
- Matthew Coker: White Widow
- Taylor Gunter: McDouble inside Spicy McChicken, extra pickles
- Keaton Whitehead: Eggs and Ham with a side of Ketchup and Mustard in a tiny cup

PROJECT DESCRIPTION

- The restaurant business is notoriously difficult. Margins are slim, risk is high, and people are picky; but over time many restaurants do find success. We are setting out to determine what makes a restaurant successful. Are there objectively better ways to run a restaurant to increase the chance of success, or is the secret just in the sauce?

OBJECTIVE

- Prove successful restaurants have more in common than just great food
- What do successful restaurants have in common?
- What failed restaurants have in common?
- How does mean and median household income of the area a restaurant is located in affect restaurant success?

PRIOR WORK

- Predicting New Restaurant Success- https://web.stanford.edu/class/cs221/2017/restricted/p-final/wizeng/final.pdf
- Predicting New Restaurant Failure- https://towardsdatascience.com/using-yelp-data-to-predict-restaurant-closure-8aafa4f72ad6
- Review rating prediction- https://cs.uwaterloo.ca/~nasghar/886.pdf
- Yelp Visualization- https://blog.exploratory.io/working-with-json-data-in-very-simple-way-ad7ebcc0bb89

DATASETS

- Yelp Dataset
- Mean and median household income, and population by zip code

DATASET SOURCE

- https://www.kaggle.com/yelp-dataset/yelp-dataset
- https://www.yelp.com/dataset
- https://www.psc.isr.umich.edu/dis/census/Features/tract2zip/

IS THE DATA DOWNLOADED?

- The data is downloaded.
- CSV
- SQL
- JSON

PROPOSED WORK– DATA CLEANING

- Discard sparse tuples
- Discard non-restaurant reviews
- Discard outliers.
  - Restaurants with fewer than 30 reviews

PROPOSED WORK– DATAPREPROCESSING: GARBAGE IN; GARBAGE OUT

- Create consistency rules
  - Cash Only: Yes and Accepts Credit Cards: Yes = False
- Fill in missing values with content of other attributes
- Normalize tables to make joins make sense
- Add additional attributes
  - Price > $50 and Atmosphere: Quiet = Family Friendly: False
- Transform strings to ints or string to bools

PROPOSED WORK– DATA INTEGRATION

- Integrate with household income data
- Join tables

METHODS

- Null Hypothesis testing based on chosen attributes
- Descriptive Modeling
- Pattern Mining
- Correlation Analysis
- Visualization- JSON heat map

TOOLS

- Python
- Numpy
- Scipy
- Pandas
- mySQL
- Tableau

EVALUATION

- Was restaurant failure or success confirmed by our descriptive analyses?
- Model restaurant parameters and map with success or failure.
- What restaurant attributes really matter?
- Compare our results to prior work