Recommendation Systems for Tourists

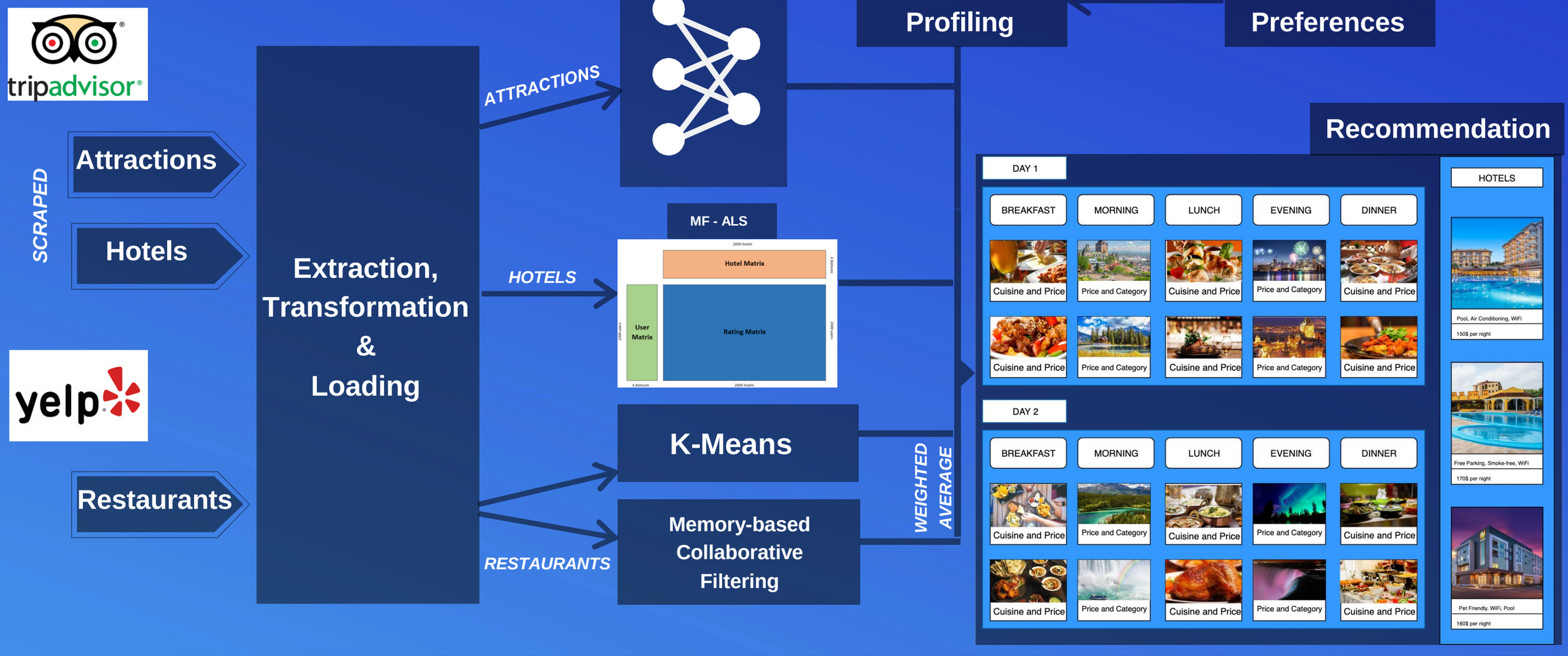
Introduction and Motivation

- Our Project provides **Tailor-made** travel plans for users based on their start and end date of journey, user's preferences and their travel budget.
- 3 different recommendation algorithms were used to provide user recommendations -
- 2 **Collaborative Filtering** techniques and 1 **Hybrid** technique.
- Collaborative Filtering - Restrictive Boltzmann Machine, Matrix Factorization using Alternating Least Squares; Hybrid - K-means and Memory-based Collaborative Filtering.
- User preferences for hotel amenities, attraction categories and restaurant cuisines are obtained from the users and recommendations are provided accordingly.
- Custom Itinerary for each day of trip recommending users where to go and where to eat at which part of the day is provided as end result.

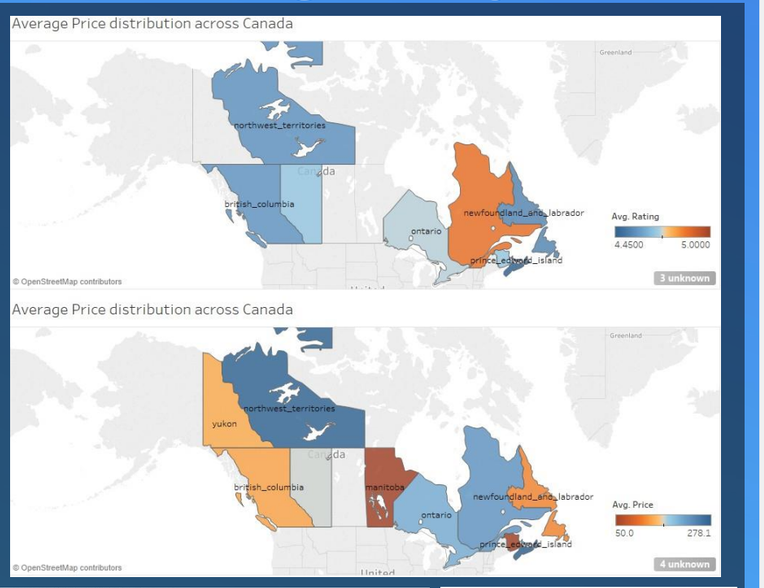
Models Used

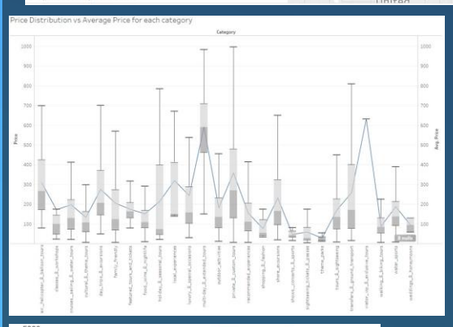
- **RBM** - CF technique that uses Boltzmann machines with no connections within visible and hidden layers.
- **ALS** - Matrix Factorization in Parallel Fashion. Apache Spark ML implementation for large scale CF problems.
- **HYBRID** - Weighted recommendation from K-means clustering & Memory based Collaborative filtering technique.

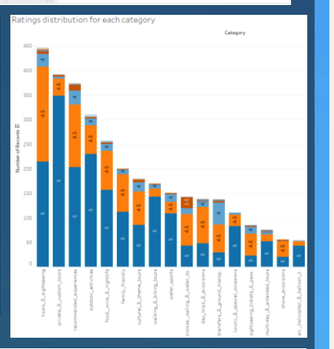
Pipeline

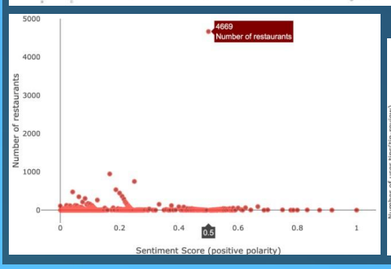


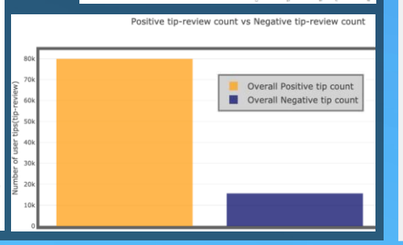
Interesting Analysis



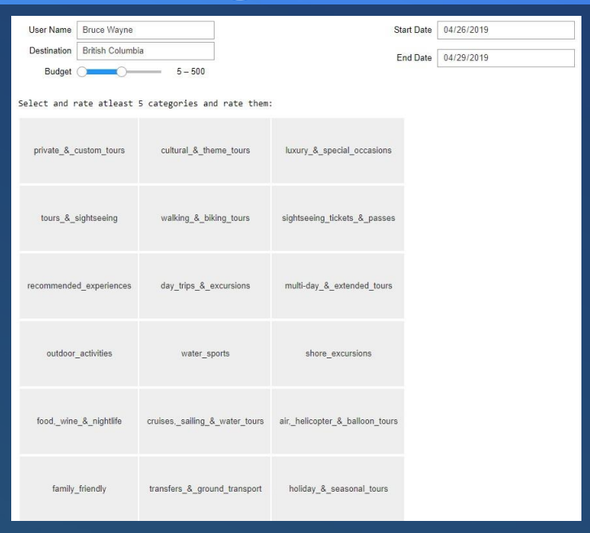


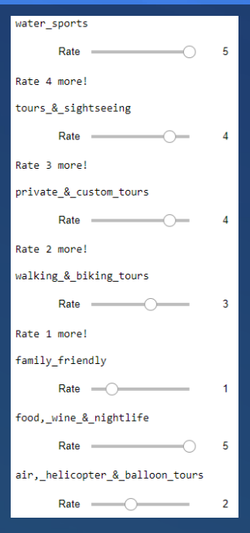






Challenges





- Recommendation for each category had to be handled in a unique manner.
- User's amenity requirements were used to simulate hotel ratings and hotels with most user-favorite amenities were recommended
- User was asked to rate at least 5 categories of attraction and was matched with user having similar preferences to provide recommendation
- User profiling for restaurants was done based on the result from content-based recommendation .
- Hybrid model relies a lot on feature engineering. After careful **EDA,** optimal feature selection (**PCA**) was done for the hybrid recommender.

Technologies Used

Apache Spark · TensorFlow · Python · jupyter · gensim · scikit learn · pandas · spaCy · Natural Language Tool Kit (NLTK) · tableau

Learnings G Future Work

- Gained experience in concepts and implementation of 3 different recommendation algorithms.
- Exploratory Data Analysis was performed on all data sets to understand the data better.
- Explored Jupyter notebook widgets to create an interactive notebook.
- Creating a web application and collecting interactions of users to improve user experience and provide implicit recommendations.
- Using Deep Belief Network instead of RBM to improve recommendations.