

A Graph-Based Approach to Ranking European Tourist Attraction Preferences

Using the Google Reviews for Tourist Attractions Dataset

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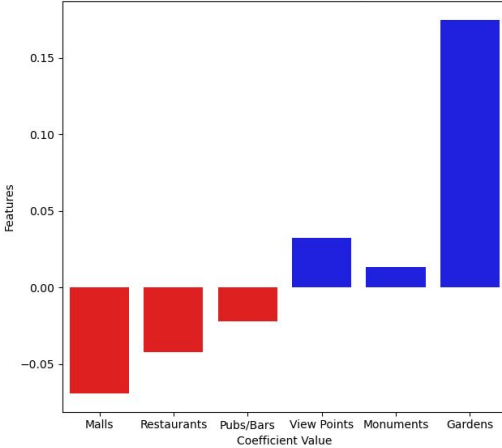
Max Yu

Daniel Henderson

Modeling the Tourist Attraction Types

Lasso regression models were fitted for each attraction type, predicted by all other attraction types.

Feature Coefficients for Predicting Churches



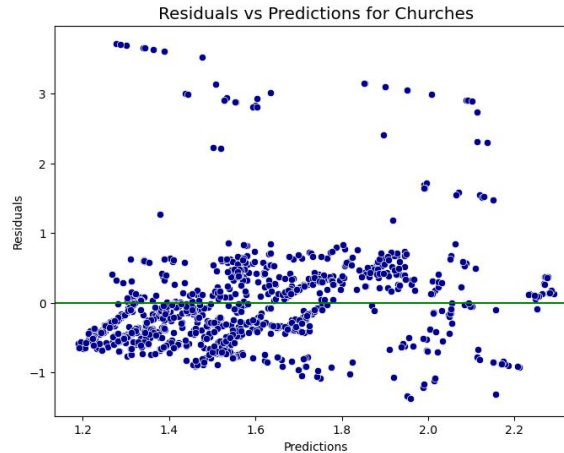
Repeated for Each Tourist Attraction

These models are repeated for every tourist attraction type, however several yielded insignificant results and were removed.

Predicted Churches Rating $\approx 0.18(\text{Gardens Rating}) - 0.07(\text{Malls Rating}) - 0.04(\text{Restaurants Rating}) + 0.03(\text{View Points Rating}) - 0.02(\text{Pubs Rating}) + 0.01(\text{Monuments Rating})$

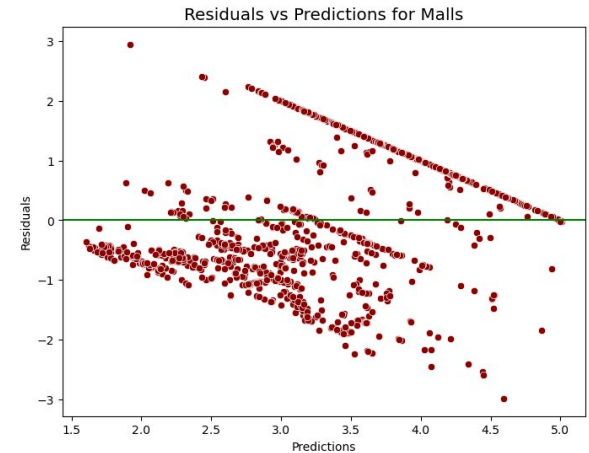


Residual Plot for Acceptable Model



Mean Absolute Error = 0.504

Residual Plot for Unacceptable Model



Mean Absolute Error = 0.874

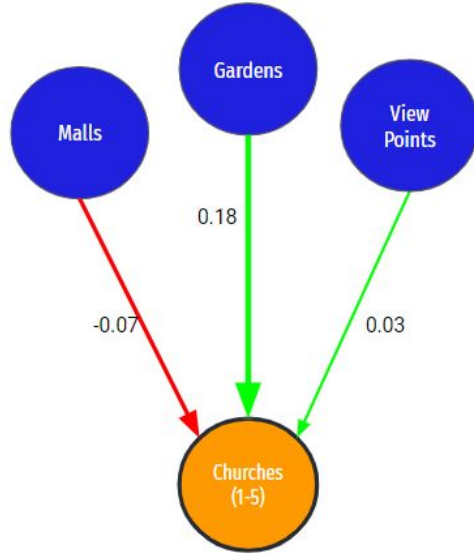
Structure of Predictive Graph Nodes

Predicted Churches Rating $\approx 0.18(\text{Gardens Rating}) - 0.07(\text{Malls Rating}) - 0.04(\text{Restaurants Rating}) + 0.03(\text{View Points Rating}) - 0.02(\text{Pubs Rating}) + 0.01(\text{Monuments Rating})$

Rating Correlations

A higher gardens rating implies a higher churches rating. A higher malls rating implies a lower churches rating, etc.

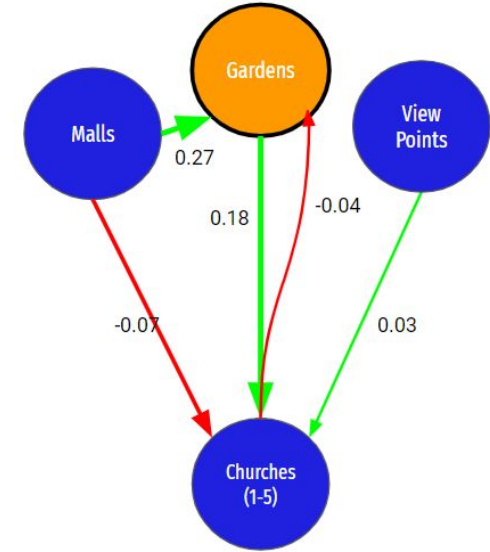
Predictors can be treated as **nodes** which point at the response variable with **weighted edges**.



Additional Connections

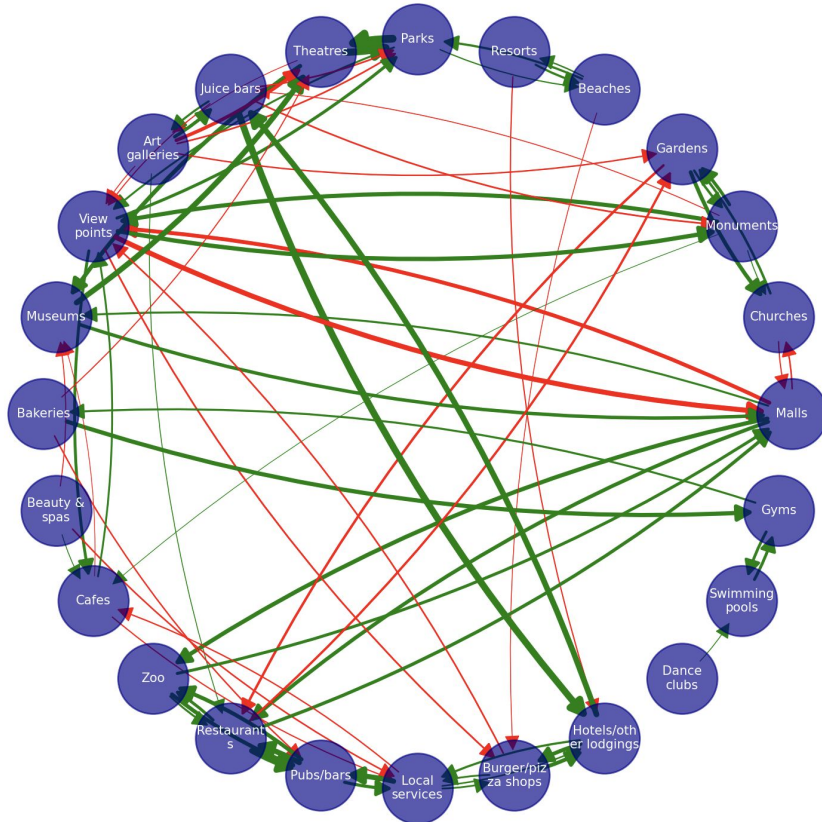
Every node on graph is then treated as a predictor and a response variable in order to generate edges.

Predicted Gardens Rating $\approx 0.27(\text{Church Rating}) - 0.04(\text{Malls Rating}) - 0.14(\text{Restaurants Rating}) - 0.01(\text{Art Galleries}) + 0.18(\text{Monuments})$



The Completed Ranking Graph Model

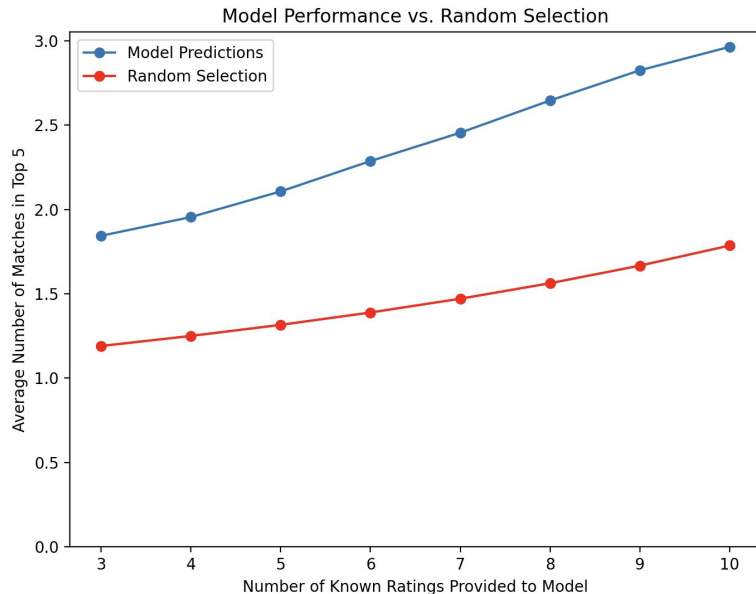
Weighted Directed Graph for Lasso Regression Results After Fitting



Ranking/Scoring off of Known Data

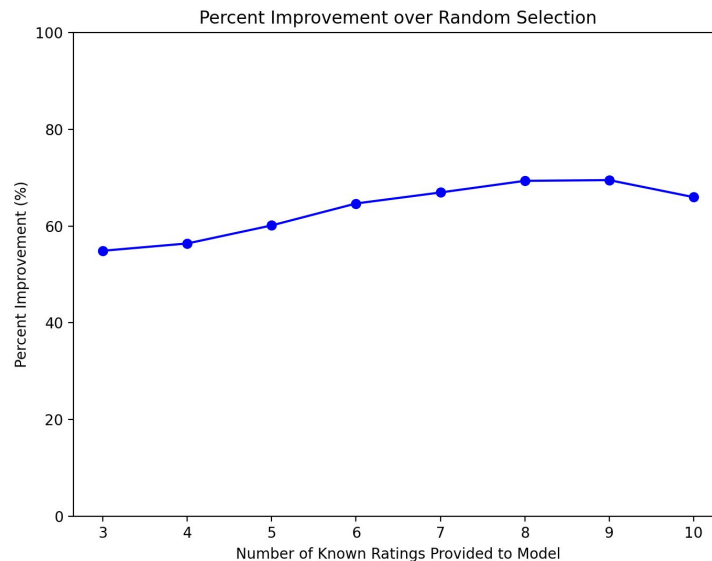
Known user ratings can be provided to the model, values are placed into respective nodes which emit arrows/edges pointing at other nodes increasing/decreasing other nodes' various scores by certain weights. These scores are ranked to determine a user's most preferred tourist attractions.

Evaluating Model Performance



Performance Improvement

We consistently achieve ~65% improvement over randomly selecting preferred attraction types.



Percent Improvement

Real World Deployment for Targeted Advertising

Personalized Suggestions for Users, Improved Revenue for Businesses

Tourist planning and booking services (Viator, TripAdvisor, Expedia) can gauge customer experience on recently completed tourist excursions.

Subsequently, these websites can reliably provide suggested trips and bookings, improving user experience and advertising power.

viator®



Tripadvisor

Thank you for choosing Amtrak!

We're interested in learning more about your recent trip. Please take a moment to provide feedback on your travel experience in a brief survey. Your responses will ensure we are meeting the needs of travelers like you.

The survey will be available until October 03, 2024.

How likely are you to recommend us to a friend or family member?

Not Likely										Extremely Likely	
0	1	2	3	4	5	6	7	8	9	10	

Popular with Viator travelers

Trending Now

Art & Culture

Outdoor Activities

Food & Drink

Nature & Wildlife

Day Trips

Tickets & Passes



Rome, Italy

Rome: Colosseum, Roman Forum, and Palatine Hill Guided Tour

★★★★★ 5,848

from \$44.36



Honolulu, USA

Mauka Warriors Luau Honoring Polynesia's Forgotten History

★★★★★ 1,205

from \$139.00



Mexico City, Mexico

Hot Air Balloon Flight over Teotihuacan, from Mexico City

★★★★★ 1,964

from \$140.98



Rome, Italy

Pompeii, Amalfi Coast and Positano Day Trip from Rome

★★★★★ 3,665

from \$135.34