G33 Travel Destination Recommender System

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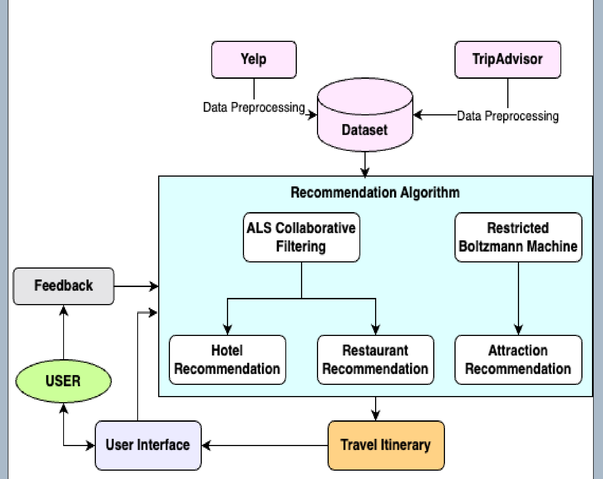
Introduction

Welcome to our innovative travel destination recommender system! We take the stress out of trip planning by using cutting-edge technology to create the perfect itinerary for you.

- No more hours spent scouring websites and guidebooks.
- Personalized recommendations based on your interests, budget, and travel style.
- Discover hidden gems and unique experiences you might have missed.
- Make informed decisions with up-to-date travel data at your fingertips.

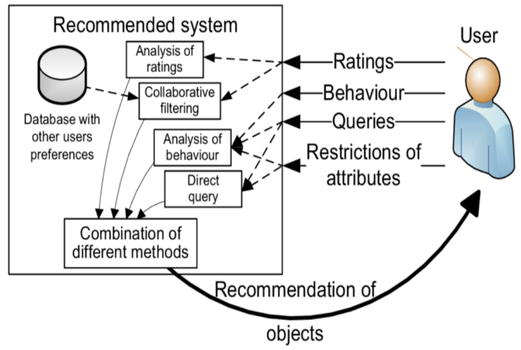
Methodology



- Data Set: Data collected from online travel platforms like Yelp and Trip Advisor.
- Data Preprocessing: Clean and prepare the data for use in the recommendation algorithm.
- Recommendation Algorithm: ALS-Collaborative Filtering used to generate hotel and restaurant recommendations; Restricted Boltzmann Machine algorithm used to generate attraction recommendations.
- User Interface: User-friendly UI designed to receive input from users and show them recommendations.

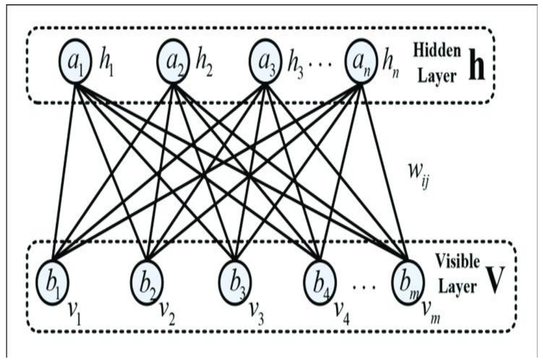
Methodology

Alternating Least Squares - Collaborative filtering



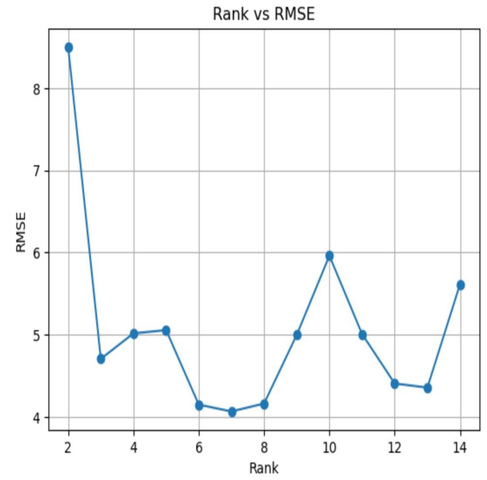
- ALS-Collaborative Filtering analyzes user interactions with accommodations and dining spots to deliver tailored recommendations, enhancing the travel experience with personalized suggestions.
- This method analyzes the attributes of items to recommend similar ones to the user. The user can directly query the system for specific items. The system recommends items to the user based on the combined analysis of user data, object attributes, and other users' preferences.

Restricted Boltzmann Machine Model

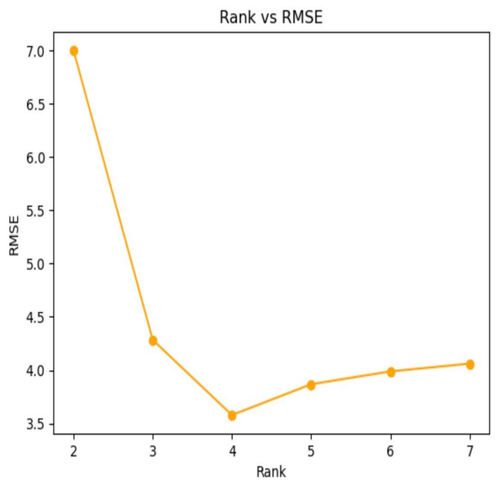


- This bottom layer represents the input data. Each circle denotes a visible unit that corresponds to a single feature in the input data. The top layer in the diagram represents the hidden features learned by the RBM. Each circle denotes a hidden unit that captures higher-level patterns from the input data.
- In our recommender system, these features represent user preferences like preferred location, budget, and activity type. The lines connecting the circles represent connections (weights) between the visible and hidden units.
- The RBM uses these connections and unit activations to learn a probability distribution over the input data. This allows it to perform tasks like dimensionality reduction, feature learni ng, and data reconstruction.

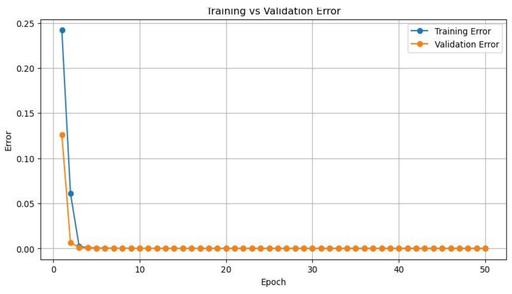
Analysis and Results



- The above graph shows the Rank vs RMSE for hotel recommendation, done using ALS-Collaborative Filtering.
- We can see that for first 7 recommendations, the RMSE was low at 4.0679 and high at first 8.56 for 2 recommendations.



- The above graph shows the Rank vs RMSE for restaurant recommendation, again done using ALS-Collaborative Filtering.
- We can see that for first 4 recommendations, the RMSE was low at 3.579 and high at first 7.014 for 2 recommendations.



- The above is training vs validation error graph for attraction recommendation using Restricted Boltzmann Machine (RBM) .

Summary/Conclusions

- Recommends destinations based on individual preferences, budget, and travel timing, empowering informed decisions and new discoveries.
- Cloud infrastructure, data processing pipelines, and advanced machine learning algorithms ensure efficiency, scalability, and personalization.
- This travel destination recommender system stands as a game-changer, streamlining trip planning and enhancing the overall travel experience globally.

Key References

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[2] U. Gretzel, N. Mitsche, Y. H. Hwang, and D. R. Fesenmaier, "Tell Me Who You Are, and I Will Tell You Where to Go: Use of Travel Personalities in Destination Recommendation Systems," in *Information Technology & Tourism*, vol. 7, no. 1, pp. 3–12, 2004.

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Acknowledgements

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