

Guided Research/Application Project

Enhancing Sustainable Travel Recommendations Using Retrieval-Augmented Generation

Keywords

Tourism Recommender Systems, Sustainability, Natural Language Processing, Large Language Models

Introduction

In today's digital era, personalized recommendations are crucial in enhancing user experience across various platforms. This project aims to leverage advanced natural language processing techniques to develop a robust recommendation system tailored to the travel domain, explicitly focusing on sustainable travel to European cities. By adopting the Retrieval Augmented Generation (RAG) methodology, we intend to create sustainable and contextually relevant recommendations, catering to diverse user preferences and travel needs while integrating sustainability information.

Objectives

- Adapt RAG to the travel domain: Implement a RAG framework customized for generating recommendations about European cities, incorporating relevant travel-related information, and including sustainability metrics.
- Create a comprehensive knowledge base: Gather and preprocess travel-related data for European cities from reputable sources such as Wikivoyage. Enhance the database with additional attributes such as sustainability information, including eco-friendly accommodations, carbon-neutral transportation options, and environmentally responsible attractions.
- Integration with various LLMs: Feed the enriched knowledge base into different LM models to generate contextually relevant recommendations while considering sustainability factors.
- Performance Evaluation: Evaluate the performance of the recommendation system across different LM models, assessing overall effectiveness and individual model performance in providing sustainable travel recommendations.

Expected Outcomes

- A refined recommendation system capable of providing personalized and sustainable recommendations for European cities, promoting environmentally responsible travel practices.
- Insights into the effectiveness of different LM models in generating contextually relevant recommendations while considering sustainability factors.
- Recommendations for future enhancements and optimizations to improve the recommendation system's performance and usability, focusing on promoting sustainable travel practices.
- Your contribution, either in the form of a new algorithm or a comparison of existing approaches, etc.
- Possibility to publish promising results at a scientific conference

Required Experience

- Strong knowledge and experience in NLP techniques, including text preprocessing, embeddings, and language model architectures
- Machine Learning and data mining expertise.
- Experience in analyzing and evaluating research methodologies and algorithms.
- Strong critical thinking and problem-solving abilities to identify gaps and propose novel ideas in substitution recommendations.
- Programming skills in Python for algorithm implementation and evaluation (if applicable).
- Good understanding of software engineering principles and experience with version control tools like Git.
- Excellent written and verbal communication skills for the potential publication of results at a scientific conference

References

- [RAG System using Gemma for travel-related queries | Medium](#)
- [genai_RAG.md \(github.com\)](#)
- [Gemma Eu Travels - a Hugging Face Space by ashmib](#)

Contact/Supervisors

We would love to hear from you if you're excited about the opportunity!

To apply, kindly submit your transcripts, CV, and a compelling motivation statement (maximum 200 words, crafted by your creativity and not generated by any AI tool 😊) to the following address:

Ashmi Banerjee ([ashmi \[dot\] banerjee \[at\] tum \[dot\] de](mailto:ashmi.dot.banerjee[at]tum[dot]de))