

A System for Geospatial Question-Answering using LLMs, LangChain, ChromaDB, and a Modern React.Js Frontend

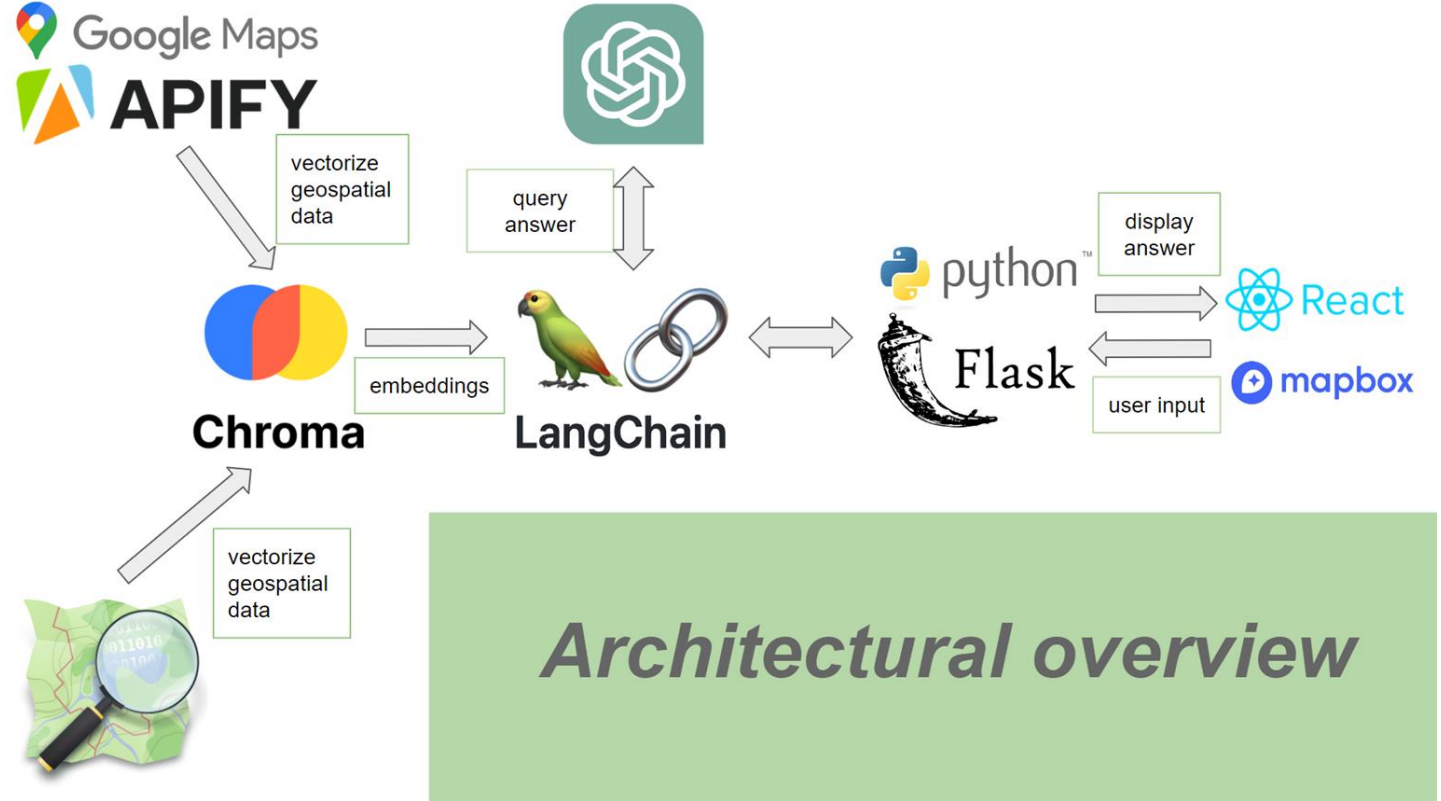
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Motivation

- Seminar work in University course “Information Search and Retrieval”
- Rapid rise in availability of digital cartography
- Demand for efficient interaction with these systems
- LLMs enable efficient processing of user input
- Combine frontend and LLMs to a geospatial question-answer system
- There are already similar systems e.g. ChatGeoPT

Architecture



Architectural overview

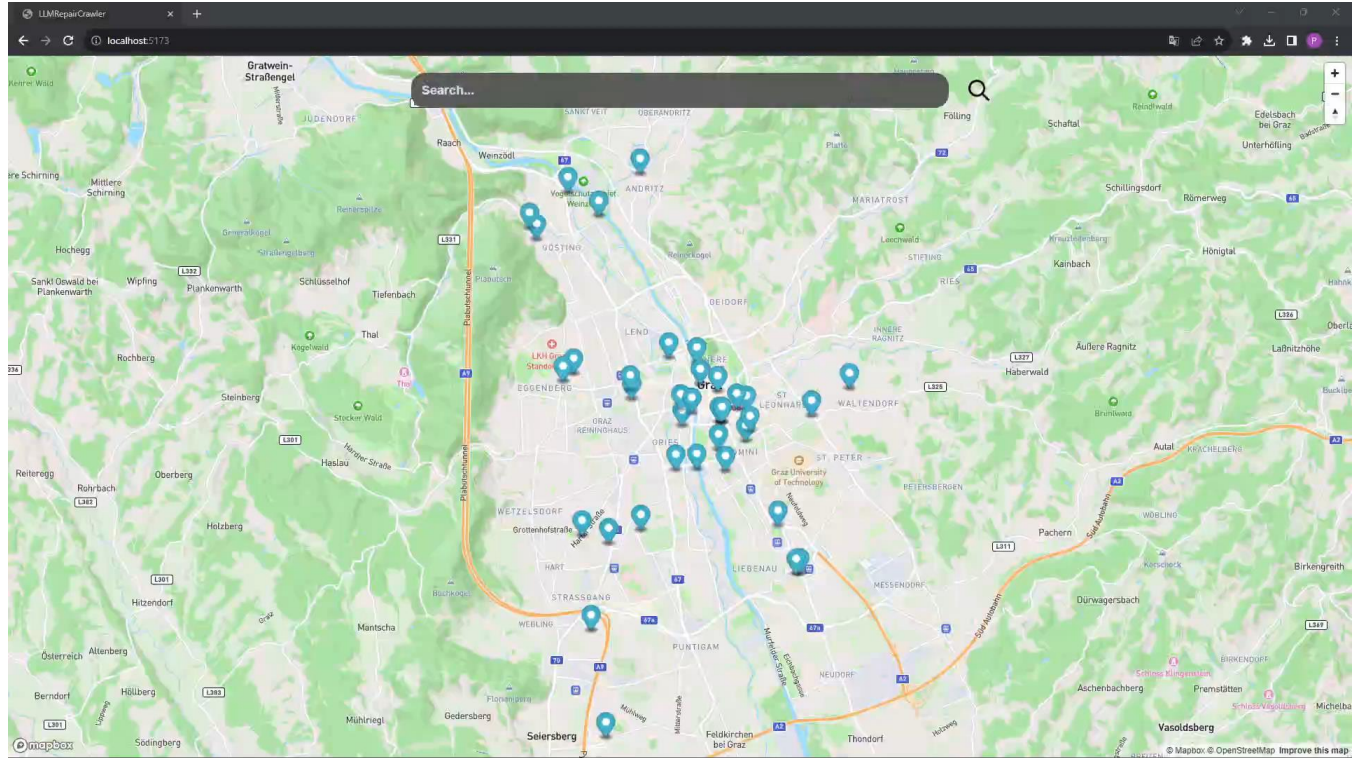
Backend

- Data retrieval
 - Retrieve data from geospatial data providers
 - Annotate additional data
- LLM API
 - Vectorize input and store in ChromaDB
 - Query user input with LangChain

Frontend

- Data representation on a digital map
- Represents locations for data entities
- Search for entities across Styria
- Display history of already searched entities

Demo



Limitations

- Efficiency is still influenced by the precision of user commands
- Dataset is relatively small
- Proprietary models
- Data sometimes not homogenous enough

Conclusion & Future Work

- LLMs can be efficiently leveraged for geospatial data
- Optimize data processing
- Train LLMs on dedicated dataset to improve accuracy and efficiency
- UI and UX improvements