



Facilitating Knowledge Sharing and Discovery: Search Functionality and API Design for the I-GUIDE

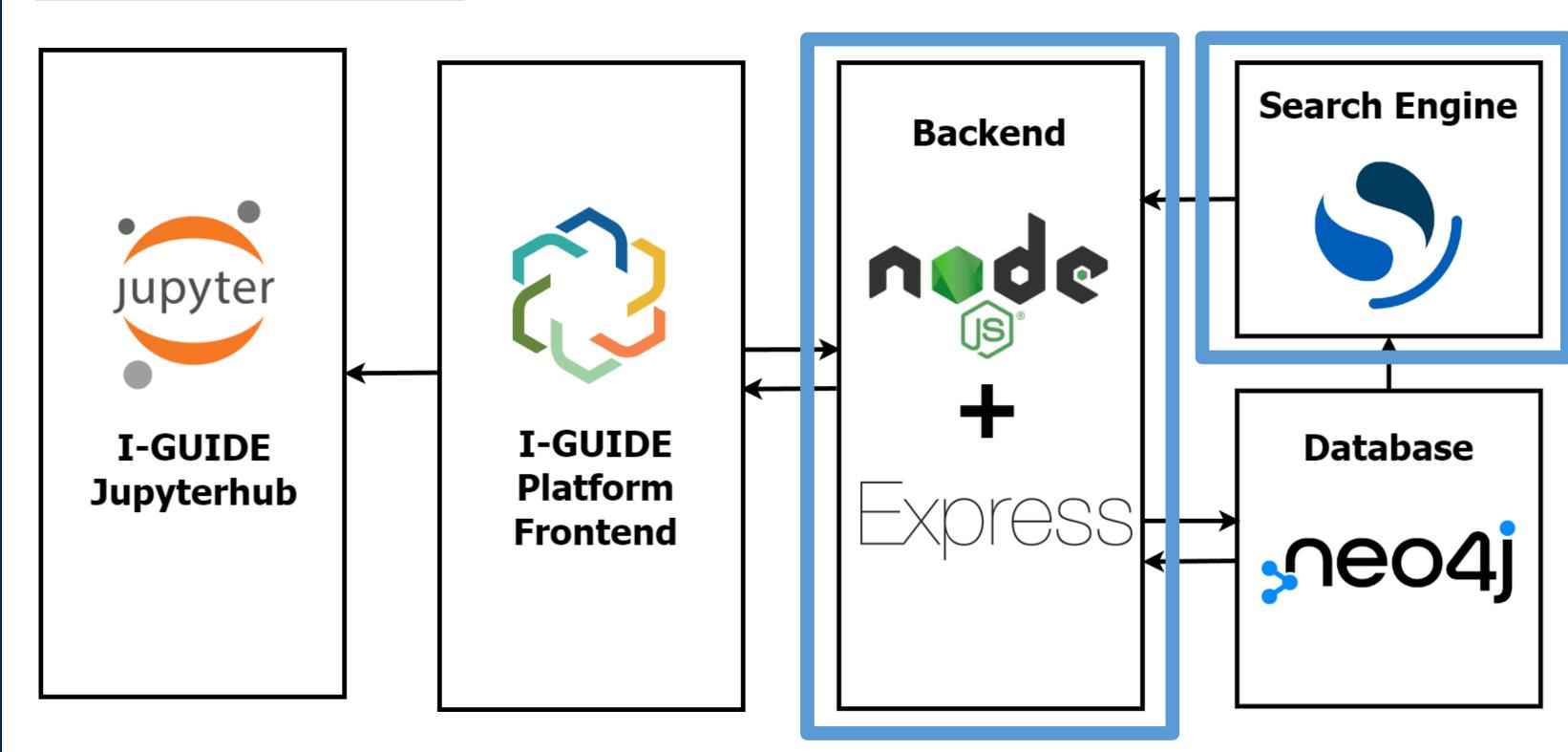


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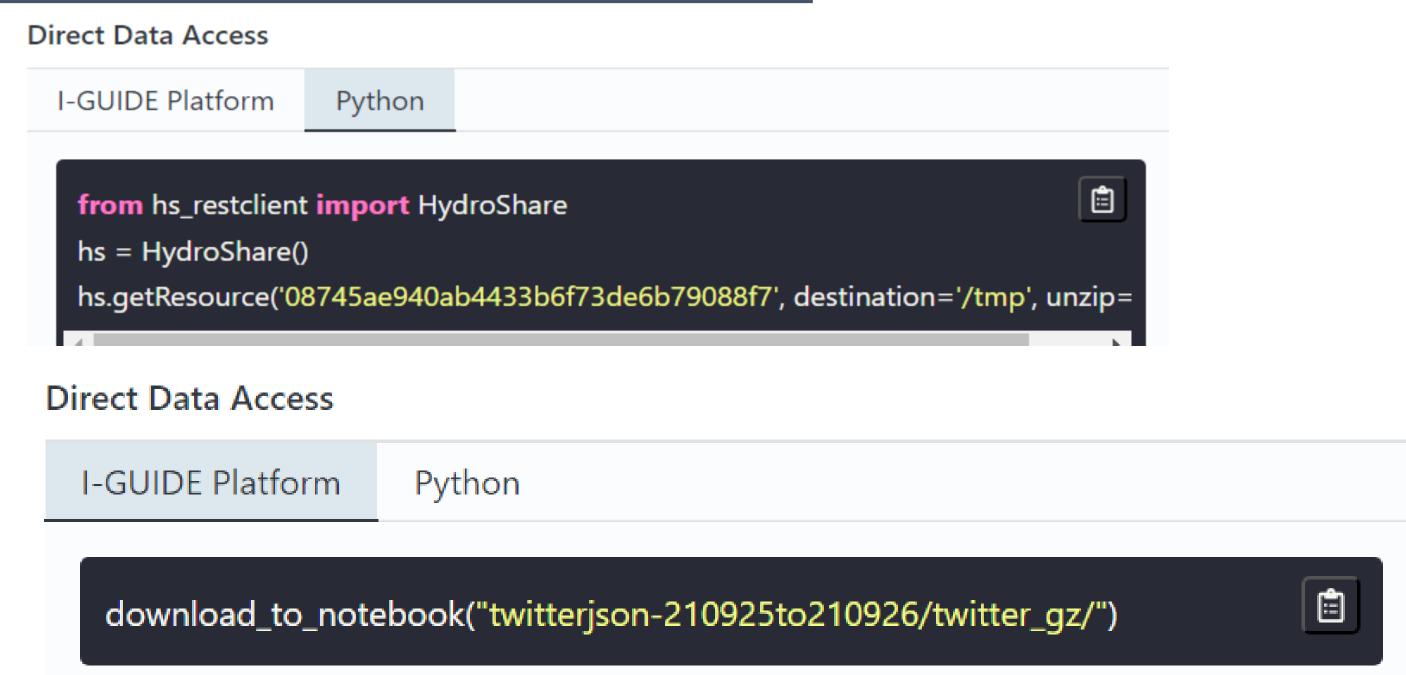
Abstract

The I-GUIDE platform is designed to facilitate convergence research by providing a scalable and its user environment provides an easy to use interface for knowledge sharing and discovery. This poster presents the platform's technical architecture, focusing on its capabilities and backend APIs that underpin this user environment. OpenSearch powers the full-text and spatio-temporal search capabilities, addressing the challenges of scalability, performance, and ensuring relevance and precision in search results. Express.js and Node.js drive the backend API endpoints, providing efficient query handling, scalability for high traffic loads, and flexibility to adapt to evolving research needs. JWT (JSON Web Tokens) secures and authorizes access to the platform's endpoints, addressing the challenges of robust data security, scalable authorization processes, and seamless integration for role-based permission control. These technical solutions collectively ensure that the I-GUIDE platform's user environment remains a powerful and adaptable tool for supporting extensive, multi-disciplinary research initiatives.

System Overview



Code generation for data accessing



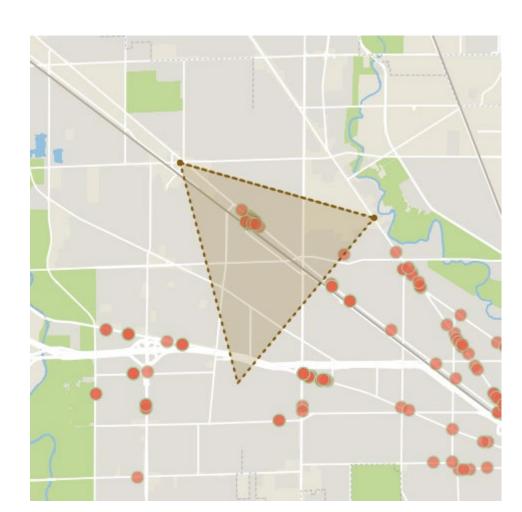
Scalable knowledge sharing and discovery - Search Functionality

•Full-text search with filtering, ranking, and sorting

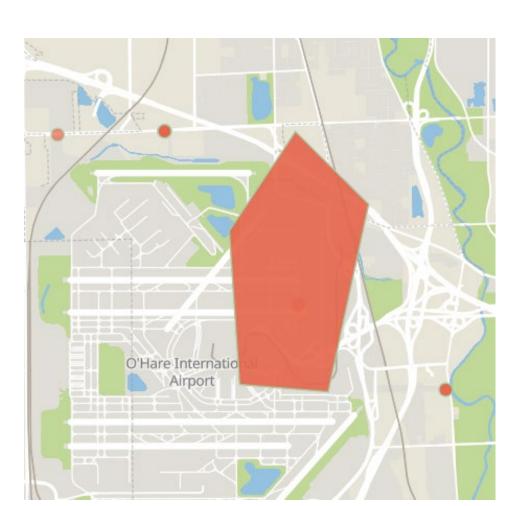
Spatial search

- Search with (x, y)
- Search with a bonding box
- Search with (x, y) and a distance
- Search with a geopolygon
- Search with a geoshape

Conversational Neural Search



Search the knowledge elements within the polygon



Search the knowledge elements that intersects with the map that I am interested in.

Is there any knowledge element that studies Chicago on this platform?

Ingestion Pipeline Knowledge Element Knowledge Element Text embedding field: value, field: value, processor field_embedding:[,,...] Spatial embedding processor Search Pipeline Question Query Query embedding processor Query embedding:[Reranking LLM Generated RAG

Security and API access

- •Oauth 2.0
- Json Web Token and role-based authorization
- Open API Standard 3.0
- ☐ Getting metadata of knowledge elements by id, type, keyword, tag...
- Downloading dataset and notebooks
- Exploring related knowledge elements

Yes, there are several documents and resources related to the study of Chicago on this platform. Here are some examples:

- **Datasets:**
- **Census tract level Chicago Boundary Shapefile** (SEARCH RESULT 12): A geospatial dataset that includes boundary shapefiles for the Chicago, US region at the census tract level.
- **Chicago Communities** (SEARCH RESULT 18): A geospatial dataset of communities within the city of Chicago.
- **Chicago Major Streets** (SEARCH RESULT 24): A geospatial dataset of major streets within the city of Chicago.
- 2. **Notebooks:**
- **IntroToCyberGIS-Compute.ipynb** (SEARCH RESULT 2): A notebook that includes an example analysis using data from the pysal/access package and a model covering the state of Illinois, including Chicago.
- **ChicagoAccess.ipynb** (SEARCH RESULT 2): A Jupyter notebook that allows users to run a Chicago analysis in CyberGISX without using CyberGIS-Compute.
- **Social Media (Twitter) Data Visualization** (SEARCH RESULT 30): A notebook that provides examples of visualization of social media data, including location-based Twitter data posted in the City of Chicago.

These resources provide various types of data and analyses related to Chicago, useful for research and study purposes.

Conclusion

 Implemented CyberGIS-Cloud; a web-based middleware framework which abstracts away the details of accessing, utilizing and managing multiple cloud backends.

•Future work:

- Library for data accessing
- LLM Search

