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| ***Are U Query-ous?* A Web-Based Platform for**  **Democratizing Open Geospatial Data Access**  *From Queries to Maps, A New Way to See the World!* | |
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|  | **TFG - Localization Based Systems and Intelligent Spaces**  Bachelor's degree in Techniques for Software Application Development  **Author:**  *Nicolas D’Alessandro Calderon*  **Project supervisor:**  *Joaquín Torres Sospedra*  **Coordinating professor:**  *Antoni Perez-Navarro* |

  
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**Abstract**

This study explores the challenge of making open data more accessible to the general public, addressing the gap between the availability of geospatial information and its practical use. *Are U Query-ous?* is a web-based application designed to enable individuals, regardless of their technical background, to explore and interpret geographic and demographic data intuitively. By integrating interactive maps and user-friendly visualization tools, the platform allows users to analyze regions based on economic activity, population distribution, and local trends.

Through a simplified interface, users can explore and filter publicly available data, identifying patterns relevant to their interests. The application is intended for individuals who are curious about urban development, seeking optimal locations for personal or professional activities, or analyzing demographic trends for research or decision-making. Additionally, the project examines the potential integration of artificial intelligence to facilitate data retrieval through natural language queries, further enhancing accessibility.

The development and results of the analyses in this data scientific report are intended to address all the concepts targeted in the foregoing. The author also expects to depict some fundamental principles underlying web apps development and data science.

**Keywords**

Geospatial Data, Open Data Visualization, Interactive Maps, Urban Analytics, Location Intelligence

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01  
 INTRODUCTION

1.1 Summary of the Proposal

This final project focuses on developing an intuitive **geo-analytics platform** that simplifies the exploration of open data through **interactive maps**. Many open data sources provide valuable insights into **urban planning, demographics, and economic activity**, but non-experts often struggle to extract meaningful information from them.

**Are U Query-ous**? aims to solve this problem by creating a **user-friendly interface** that enables individuals to explore and analyze spatial data without requiring technical expertise.

At the end of the project, the system will provide a **fully functional prototype** that allows users to:

* **Filter** and **visualize** location-based open data.
* Identify **regional patterns and trends** based on economic and demographic factors.
* Utilize **intelligent search capabilities** to access relevant insights more intuitively.

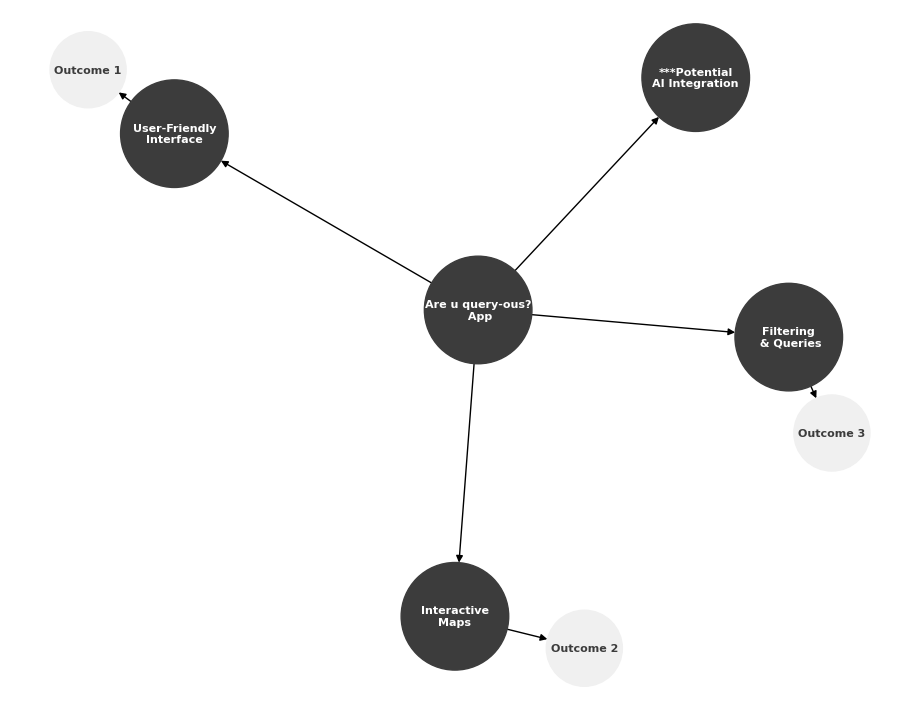


Figure 1 1: Conceptual Representation of Project Summary

1.2 Justification

Access to open data has grown exponentially, yet many users struggle to transform this data into actionable insights. While businesses and government entities benefit from sophisticated **geo-analytics tools**, individuals and small organizations often lack the resources or expertise to use these datasets effectively. This project is relevant because it seeks to **bridge this gap**, making open data truly accessible and usable for the **general public, students, researchers, and small businesses**.

Moreover, the relevance of geospatial analysis has expanded in fields such as **smart cities, sustainable urban development, and socio-economic research**. By providing an easy-to-use tool, this project supports the broader goal of promoting **data-driven decision-making at all levels of society**.

1.3 Motivation

In the past eight years I have been working and developing my professional career in the field of **data analysis**, so this project aligns with both academic and professional aspirations. The motivation for this project is coming from:

* A personal interest in **making complex data more understandable** for non-experts.
* A desire to provide **access to urban and economic and geomarketing insights** through intuitive visualization for the general public, students, researchers, and small businesses.
* The opportunity **to apply geospatial analytics in a real-world application**.

Additionally, the skills developed through this project, including data processing, backend development, frontend visualization, and user interface design, will be valuable in both academic research and professional settings.

A diagram of a business

AI-generated content may be incorrect.

Figure 1 2: Key Motivations for the Project

1.4 Objectives

1.4.1 Main Objective

* To **develop a web-based app that enables users to intuitively explore, filter, and analyze open geospatial data**, making location-based intelligence more accessible to a non-technical audience.

1.4.2 Sub-Objectives

* **Develop an interactive mapping system** that allows users to visualize open data in an intuitive and engaging way.
* **Implement filtering and querying functionalities** to help users refine their search and extract relevant insights.
* **Ensure usability and accessibility** by designing a simple and intuitive user interface.
* **Explore AI-powered search capabilities** to allow natural language queries for easier data retrieval *(optional feature).*
* **Validate the effectiveness of the platform** through user feedback and iterative improvements.

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Figure 1 3: Objectives Breakdown

1.5 Hypothesis

Making **geospatial data accessible through an interactive and user-friendly platform** will enable a broader audience to **extract meaningful insights from open data** helping to make **better decision-making and increased public engagement** with geospatial information.

1.6 Sustainability, diversity, and ethical/social challenges

1.6.1 Sustainability

This project promotes sustainability by supporting the efficient **use of open data to improve urban and social planning**. By making geospatial information more accessible, individuals and organizations can make informed decisions about resource allocation, mobility, and land use, reducing unnecessary waste and inefficiencies. Additionally, the project aligns with the United Nations Sustainable Development Goals (SDGs), particularly [Goal 11 (Sustainable Cities and Communities),](https://sdgs.un.org/goals/goal11) by providing insights that encourage responsible urban development. The project has a minimal ecological footprint as it relies on existing digital infrastructure, avoiding additional resource consumption.

1.6.2 Ethical behaviour and social responsibility

The project considers ethical principles by **ensuring data privacy and security**. Since the system processes **publicly available open data**, it does not involve personal or sensitive information. However, the potential risks of misinterpreting data or using insights unethically are acknowledged. To mitigate this, the platform will provide **transparent data sources and disclaimers to ensure users understand the limitations of the information**.

1.6.3 Diversity, gender and human rights

The project is designed to be inclusive and accessible, allowing all individuals, regardless of background, gender, or technical expertise, to explore geospatial data. By offering a simple and user-friendly interface, it ensures that users with limited data experience can engage with geographic insights. Furthermore, **accessibility features will be considered**. The project aligns with the principle of equal access to information, promoting diversity and reducing barriers to data-driven knowledge.

02  
 PLANNING

2.1 Project Planning TBD

A detailed **schedule with milestones** will be defined in the next iteration, ensuring that the development process is structured, manageable, and aligned with the semester timeline.

TODO: Project plan detailed Gant

2.2 Expected Outcome

By the end of the semester, the project will deliver:

* A functional web application where users can **explore and visualize geospatial data** interactively.
* An intuitive filtering system allowing users **to refine results based on key indicators**.
* A structured API serving **open datasets** with a focus on usability and efficiency.
* A research report detailing **the impact of accessible open data visualization**.

This project contributes to the broader goal of **making open data actionable and meaningful** for a **diverse audience**, reinforcing the importance of **geospatial intelligence in everyday decision-making**.

A diagram of a computer

AI-generated content may be incorrect.

03  
 METHODS AND RESOURCES

3.1 Approach and Methodology

This project follows a structured development process based on agile principles, allowing for iterative testing and feedback throughout the semester. The key steps include:

3.1.1 Data Collection and Processing

* **Identify and integrate open datasets** (demographic, economic, urban mobility, etc.).
* **Clean and preprocess data** to ensure usability in the application.

3.1.2 Backend Development

* Build a **RESTful API** to serve geospatial data.
* **Store data in a database** optimized for efficient queries.

3.1.3 Frontend Development

* **Design a responsive user interface** with map-based interaction.
* **Implement data visualization tools** for filtering and exploration.

3.1.4 Testing and Refinement

* **Gather feedback** to enhance usability and features.

TODO: Figure 3.1

3.2 Technology

The project will leverage a modern web technology stack to ensure efficiency, scalability, and a seamless user experience. The core technologies include:

3.2.1 Frontend:

* **React.js** for building a dynamic and interactive user interface.
* **Leaflet.js** for mapping and geospatial visualization.

3.2.2 Backend:

* **FastAPI** to handle API requests and serve processed geospatial data.
* **PostgreSQL/PostGIS** for storing and querying spatial data efficiently.

3.2.3 Data Processing & Integration:

* **Python** and **Pandas** for data preprocessing and transformation.
* **GeoJSON** format to represent geospatial data and serve it dynamically.

3.2.4 Deployment & Hosting:

* **Docker** for containerized development and deployment.
* **GitHub Codespaces** for cloud-based development and collaboration.
* **Vercel**  for frontend deployment and **Fly.io** or **Heroku** for backend deployment.

3.2.5 Potential AI Integration (Optional):

* **NLP Natural Language Processing** for AI-driven queries (future implementation).

These technologies will enable the development of a robust and scalable application that can effectively serve users with varying levels of expertise in data analysis and geospatial exploration.

TODO: Figure 3.2

04   
RESULTS

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05   
CONCLUSIONS AND FUTURE WORK

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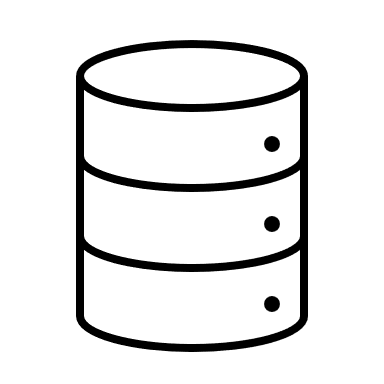
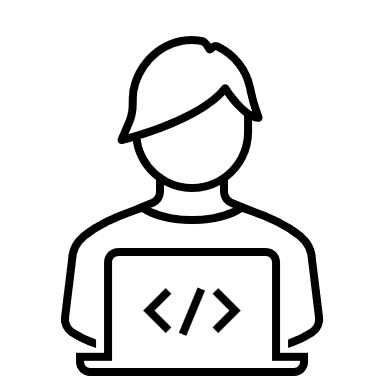
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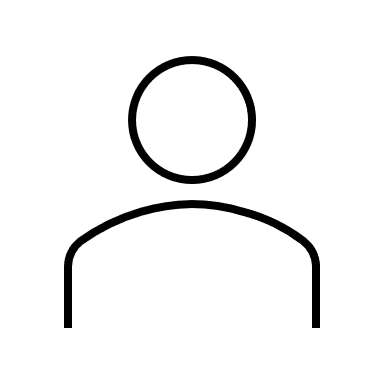
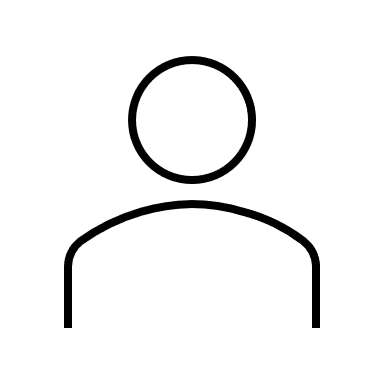
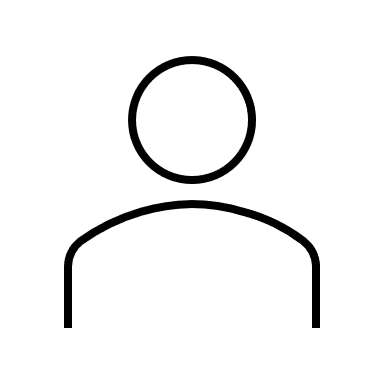
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08  
 APPENDICES



**Vercel + Fly.io or Heroku**

**Docker + GitHub Codespaces**



Production

Environment

**Development Environment**

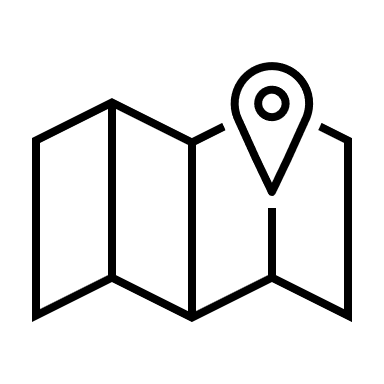
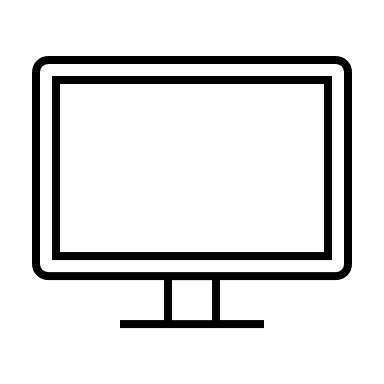
**Frontend**

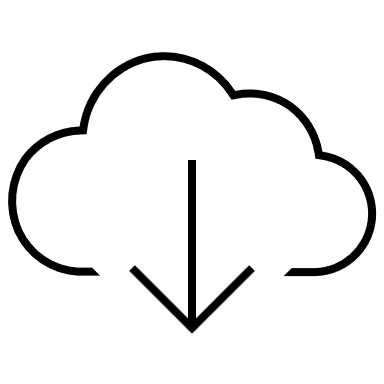
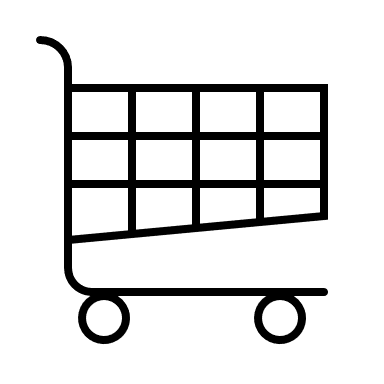
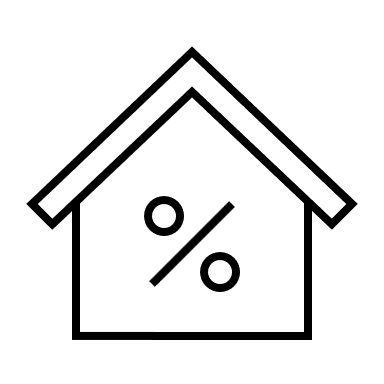
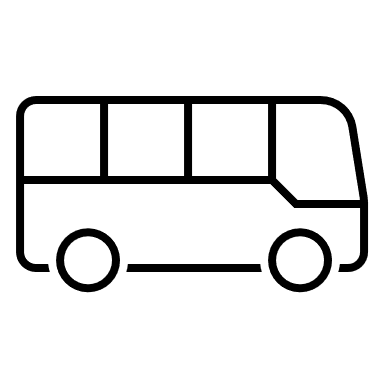
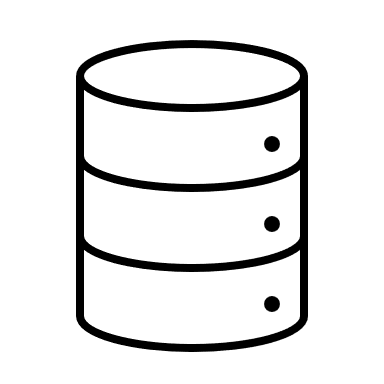
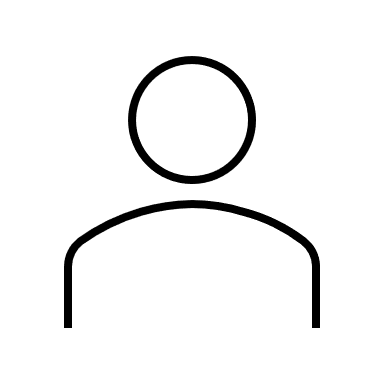
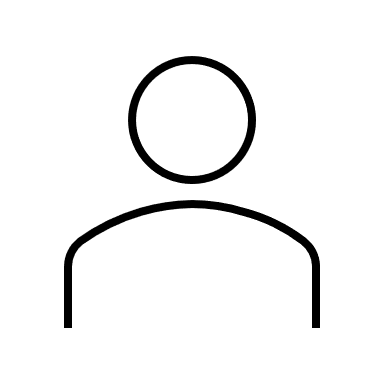
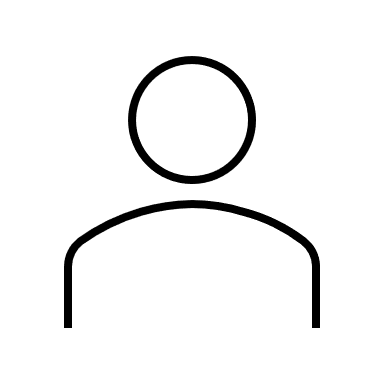
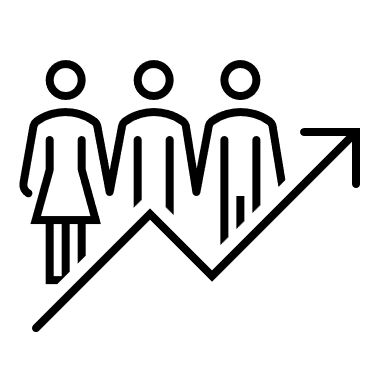
**Backend**

**React.js + Leaflet.js**

**PostgreSQL/PostGIS**

**FastAPI**





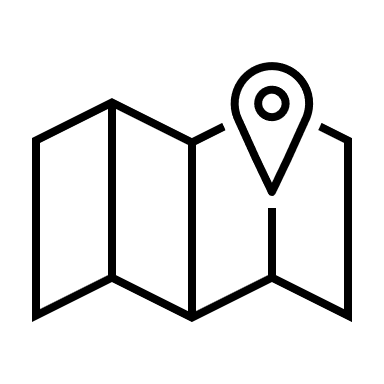
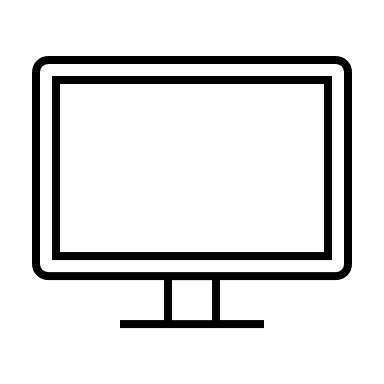
**ETL**

**Internet Open Data**

**End User**

**DB**

**Are u query-ous? Web App**



**API**

**Backend**

**Frontend**