Midterm Progress Report of ChatGIS: GIS-Powered Natural Language Query System

Group Name: ChatDB 70
Course: DSCI 551 - Foundations of Data Science
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Team Members:
- [Yucheng Liu] - [Project Designing, Data Collection, Document Writing]

Team Members Background:

Yucheng Liu is a Master's student in Spatial Data Science at USC with a strong background in computer science, geospatial data science, and deep learning. He specializes in knowledge distillation, cloud-based application development, and geospatial analytics. Proficient in Python, SQL, NoSQL, and GIS, he has experience with AWS, TensorFlow, and ArcGIS Pro. His research focuses on knowledge distillation and multimodal learning in the physiological signals, with publications in ACM MM and IJCAI.

Project Abstract - This proposal presents a **GIS-powered natural language query system** called ChatGIS that integrates **PostGIS** and **LLMs** to allow users to retrieve geospatial data using natural language queries. The system translates user queries into **optimized SQL statements** that efficiently interact with a GIS database, enabling users to ask spatial questions such as *"Where are the nearest electric vehicle charging stations?"* or *"Find all Chinese restaurants within 5 km of my location."*. ChatGIS levels up the accessibility and usability of geospatial data by leveraging **LLM-based query processing, spatial indexing, and GIS visualization tools**.