

CS 69099 Capstone Project - Data Science

Instructor: Xiang Lian

Please select the topics based on the expertise, background, and programming skills of your group members.

Initial Ideas of Project Topics (First-Come-First-Select):

1. Location-based Web system and iOS implementation

Description: In this project, we aim to provide information about the hospitals, communities, student programs, non-government organizations to the user. It will serve as the mediator between faculty and students. Students can visit different intern locations and send their answers to faculty based on their GPS co-ordinates. We use Google maps in the system to dynamically show location based points by using multilevel structure data from database. The database categorizes each application through the location name, question, answer, user, picture, intern students tag.

Requirements: website programming, iOS mobile programming, database design, algorithm design

2. iCampus

Description: In this project, we will implement a spatial crowdsourcing mobile App, which allows people to collect data such as GPS locations (including floor numbers in buildings), different WiFi signal strengths, videos, photos, texts (points of interest or descriptions, entered by mobile users), timestamps, and dates in KSU campus, and transmit them back to a database server or Google drive under WiFi environment. Users should be able to register the account and start to collect campus data. Students are expected to walk through the KSU campus to collect.

Requirements: mobile programming, database design

3. Street View Based GPS Assistance

Description: People at the intersecting point of roads may often be confused about the name of crossing roads. In this project, we will use the sensors (compass) in mobile devices to show the street views and road names of the current direction, which can provide users with clear navigation direction. This project will use Google maps or other map API services, and provide GPS-based mobile assistance for mobile users.

Requirements: mobile programming, database design, algorithm design

4. Path Navigation over Road Networks

Description: In this project, we aim to collect real-time gas prices of gas stations on road networks, and find a best driving path from source to destination on road networks which needs to add gas at some gas station. The selected path passing by the gas station should have the lowest total gas consumption (distance) and price. The path navigation will be displayed by a mobile App.

Requirements: mobile programming, database design, algorithm design

5. Spatial Question/Answer System

Description: In this project, we will implement a mobile platform for task requesters to ask questions (spatial tasks) about spatial landmarks on a map and for mobile users nearby to answer questions (taking photos, or enter text descriptions). Specifically, we maintain a backend database server to track real-time locations of mobile users, and notify people (near landmarks) to do spatial tasks. Other questions in this system include manually comparing whether two photos are taken in the same spatial locations.

Requirements: mobile programming, database design

6. Keyword Search and Visualization of Knowledge Graphs

Description: In this project, we will conduct keyword search in knowledge graphs (e.g., Wikipedia, DBPedia, etc.) and visualize the relationships of Web pages that contain query keywords in a designed GUI interface.

Requirements: visual programming (e.g., C++, C#, Java, Python, etc.), database design, algorithm design

7. Crawling and Querying Social Networks

Description: In this project, we will crawl social network data (e.g., Twitter), store them in a graph database, conduct queries (e.g., spatial-temporal, keyword, sentimental queries) on social networks, and visualize social networks and query results.

Requirements: Internet programming (e.g., C++, C#, Java, Python, etc.), database design, algorithm design

8. Guide of the Course Selection

Description: In this project, we will extract course information (including course prerequisites, credit hours, course descriptions, etc.) from KSU course catalog (<http://catalog.kent.edu/coursesaz/asei/>), construct a course prerequisite graph, and suggest students take new courses for the next semester, based on courses that students have already taken and course prerequisites. A query GUI interface will be designed in this project.

Requirements: programming (e.g., C++, C#, Java, Python, etc.), database design, algorithm design

9. Parsing and Visualizing the Bibliography

Description: In this project, we will automatically parse the bibliography data sets (e.g., DBLP: <http://dblp.uni-trier.de/xml/>), visualize the co-author relationships among authors, and conduct queries over bibliography data sets.

Requirements: programming (e.g., C++, C#, Java, Python, etc.), database design, algorithm design

10. Visualizing and Querying New York Taxi Data

See the descriptions in the lecture slides

Taxi data sets: <https://opendata.cityofnewyork.us/data/>

http://www.cs.kent.edu/~xlian/2023Spring_CS69099/NYC_taxi_description.pdf

Requirements: visual programming (e.g., C++, C#, Java, Python, etc.), database design

11. Any topics that you are interested in (please consult with the instructor)