

Course Syllabus for Spatial Databases

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Instructor

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Course schedules and locations

To be determined ...

Course goals

This course is designed to enable students to first be familiar with the development of the state-of-the-art spatial databases, including both conventional spatial databases based on relational database management system and the key-value based NoSQL databases. Students will learn how spatial databases work and integrate them into developing innovative geospatial applications or analytics tools. In addition, students will also be introduced with the Hadoop File system that is a little bit different from regular spatial database but plays an important role for geospatial analysis in the field of Big Data analytics.

Course information

This course is delivered in two forms: lectures and lab exercises. All the materials, including lecture slides and lab instructions, are hosted in a GitHub repository (https://github.com/yinjunjun/courses/tree/master/Spatial_Database). Students will be able to access this repository anywhere with Internet connections and will be able to comment and create issues related to the subject. In particular, this course will utilize a cloud-based environment hosted by Microsoft Azure.

Evaluation

The final score is based on 4 parts: lab participation (10%), assignments (30%), mid-term exam (20%), and final project (40%). If the mean final percentage for the class is under 75%, I will adjust the final grade such that the mean score is 75%. The curve will be calculated separately for undergraduates and graduates.

Course outline (subject to change)

- Week 1
Introduction to Spatial Databases: The evolution of spatial databases
- Week 2
Relational Database Management System (RDBMS): The contemporary databases
- Week 3
Spatial Databases based on RDBMS: Spatial models and operators
- Week 4
SQL (Structured Query Language) in actions: Talk to spatial databases
- Week 5
Spatial databases for geospatial applications: Choose the right options for desktop, web and mobile applications
- Week 6
NoSQL databases: DBMS for the age of Big Data
- Week 7
Distributed spatial databases: Everything works in a cloud
- Week 8
Develop geospatial applications with NoSQL spatial databases: up and running
- Week 9
The Hadoop distributed file system (HDFS): A new computing paradigm with Map-Reduce
- Week 10
The future direction of spatial databases
- Final project