CS260-002: Spatial Data Modeling and Analysis

Course Outline

Instructor: Amr Magdy
Computer Science and Engineering
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Welcome to CS 260

- **Instructor**: Amr Magdy
  Office: Tomas Rivera Library, 159B
  Email: [amr@cs.ucr.edu](mailto:amr@cs.ucr.edu)
  (Include [CS260] in the subject – no spaces)
  Office hours [tentative]: WF: 5:30 - 6:30 PM

- **TA**: None

- **Course Website**: [http://www.cs.ucr.edu/~amr/courses/18SCS260/](http://www.cs.ucr.edu/~amr/courses/18SCS260/)
Course Content

- Introduction to Spatial Computing
- Spatial Relationships and Data Models
- Spatial Data Storage and Indexing
- Spatial Query Processing
- Spatial Networks
- Geo-visualization
- Spatial Data Mining
- Trends and Innovations in Spatial Applications
Course Content

Course Research Elements:

- "Introduction to Research" lecture
- Surveying the literature methodology
- Paper reviews practice
- Presenting research papers
- Writing technical papers (survey and/or final report)
- Project stages (identifying idea, literature survey, tackling the problem, and documenting the results)
- Lecture contents on new trends on spatial-related research
Grading and Policies

Course work
- Project (60%)
- Paper reviews and presentations (15%)
- Hands-on on spatial technologies (10%)
- Final exam (15%) [tentative]

Delivery policies:
- Groups of two required for the project only.
- Delivery instructions and policies announced per assignment.

Cheating is not allowed and will be reported
- If you are using any external source, you must cite it and clarify what exactly got out of it.
- You are expected to understand any source you use.
Project: Grade Breakdown

- Idea Proposal (with potential revision cycles) (5%)
  - extra credit up to 10% for exceptional ideas and above-average quality ideas
- Outline of project deliverables (0%)
- Preliminary literature survey (10%)
- Project deliverables (35%)
- Final report (5%)
- Final presentation (5%)
Project: Categories

- Novel Research
  - Preliminary investigation for a novel research idea
- Literature Survey Paper
  - Surveying the literature of a certain spatial topic
- Literature Experimental Evaluation
  - Experimentally compare major techniques of a certain spatial topic
- SIGSPATIAL Cup
  - Work on SIGSPATIAL cup problem
- Vision Analysis
  - Track the advances in topics of a vision report (e.g., CCC Spatial Computing 2020 Workshop)
- Interdisciplinary project
  - Apply spatial computing technologies to a non-CS field
Project: Deliverables and Assessment

- Novel Research
  - Clearly identifying and presenting the research elements
  - Preliminary solution idea
  - Preliminary evaluation results

- Literature Survey Paper
  - Comprehensive list of papers
  - Literature classification
  - Manuscript quality (writing, figures, organization,... etc)

- Literature Experimental Evaluation
  - Long and short lists of papers
  - Evaluation outline and corresponding implementations from the short list (or a subset)
  - Evaluation results
Project: Deliverables and Assessment

- SIGSPATIAL Cup
  - Same criteria and deliverables of SIGSPATIAL cup winner teams

- Vision Analysis
  - Itemized analysis of the vision report
  - Quality of surveying work on each topic

- Interdisciplinary Project
  - Clear problem definition and importance
  - Survey of related work
  - Quality of the main deliverable, e.g., script, program, etc
Paper Reviews and Presentations

- Two review assignment (10%)
  - Summarization of paper research elements
  - Paper critique
- One presentation per person (5%)
  - Large papers might be assigned to two persons
Hands-on on Spatial Technologies

- Any spatial technology is fine, check instructor approval
- Any reasonable-sized hands-on is fine as well
- Candidate technologies
  - Spatial Databases
    - PostGIS, Oracle Spatial, SpatiaLite, MonetDB/GIS, etc
  - GIS Software
    - ArcGIS, QGIS, etc
  - Maps
    - Google Maps, Bing Maps, ESRI Maps, etc
  - ESRI Story Maps
  - Big Spatial Data Systems
    - Simba, SpatialHadoop, GeoSpark, SpatialSpark, etc
  - GeoSpatial Analysis Tools
    - PySAL, GeoPandas, Fiona, Shapely, GeoDa, SSN & STARS, SP and SF R packages, OGR GDAL
Hands-on on Spatial Technologies

Geospatial Data Analysis Workshop Series

presented by
Dr. Sergio Rey
UCR Center for Geospatial Sciences

If interested, sign up at
https://UCR.MYWCONLINE.COM
Final Exam

Lectures content
Sample Survey Papers


Credits

Prof. Shashi Shekhar course

http://www.spatial.cs.umn.edu/Courses/Spring18/8715/index.php