

GGG 760-002 Big Data Remote Sensing

Instructor: Liping Di

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Office Hours: Thursday 2-5 pm

Spring 2016, Thursday 7:20-10:00pm, Exploratory Hall 2310

Course Overview

This is an advanced course designed for students who are interested in concepts, theory, standards, implementation, and application of remote sensing big data. Students registered to this class should have some knowledge of remote sensing, Geographic Information Systems, and Earth observation data.

Prerequisite: GGS 553, GGS 579, or GGS 754, or permission of instructor

Textbook: Big Data Techniques and Technologies in Geoinformatics

Edited by Hassan A. Karimi

Course Work: The work of the semester will consist of readings of selected publications on big data management and analytics in remote sensing. Each student is required to give two presentations of paper reviews, each for about twenty to thirty minutes. There is no mid-term or final exam for this course. However, students have to turn in a paper of their selected topics related to big data remote sensing at the end of the semester. Grades will be determined from classroom discussions, presentations of paper reviews, and the semester paper.

Grading: Presentation and class discussions: 40%

Semester paper: 60%

Syllabus:

Week 1 (January 21): Introduction to the course; General concept of big data; features of big data; big data remote sensing: opportunity and challenges

Week 2 (January 28): Big data remote sensing: data collection challenges and cyberinfrastructure and sensor web solutions

Week 3 (February 4): Computing power to handle big data: distributed and parallel computing

Week 4 (February 11): Big data management: Remote sensing data archiving, cataloging, and dissemination; Big data management services: data discovery (collection and granule level) and access

Week 5 (February 18): Standards for big data management: archiving, metadata, data format, data discovery, data access

Week 6 (February 25): Implementation examples of big data management systems for remote sensing: CWIC and GEOSS GCI

Week 7 (March 3): Big data analytics for remote sensing: concepts, algorithms, platforms, and standards

Week 8 (March 10): Spring Break

Week 9 (March 17): Presentation made by each student on reviewing published work on remote sensing big data management

Week 8 (March 24): Algorithmic design considerations of big data analytics; Machine Learning and data mining on Geospatial Big Data. Examples of remote sensing applications of big data analytics

Week 10 (March 31): Invited talk: Building Open Environments to Meet Big Data Challenges in Earth Sciences (Dr. Meixia Deng)

Week 12 (April 7): Invited talk: Big data activities in ESRI (Dr. Frank Xia)

Week 13(April 14): Presentation and discussion on published papers on big data remote sensing analytics reviewed by each student.

Week 14 (April 21): Open and free tools and services for big data remote sensing, such as Google Earth Engine

Week 15 (April 28): US Federal government big data initiative, NASA Big Earth Data Initiative (BEDI); Challenge and opportunities in the Big Data Remote Sensing (Classroom discussions); Also each student should give a short presentation about the topic of his/her semester paper.

The last day for turning in the semester paper: May 11.