CS 43018/53018 Graph and Social Network Analysis  3 credit hours

Instructor’s Name: Dr. Xiang Lian

Course Materials:
TBD

Course Content:
This course covers a number of important and useful problems in graph databases, especially social networks, such as the data model for certain/uncertain graphs (social networks), indexing over graphs, and query processing algorithms for graph databases (e.g., single-source path queries, path queries, reachability queries, keyword search queries, subgraph matching, etc.). Moreover, we will discuss the influence maximization problems over social networks in real applications. We will also study various queries over the distributed graph database.

Prerequisites or co-requisites: CS 33007 – Introduction to Database System Design (3 credits) (or CS 63005 – Advanced Database Systems Design (3 credits)), CS 49995 & CS 63017 - Big Data Management (3 credits), or consent of the instructor

Required, elective, or selected elective

Goals:
1. Become familiar with the graph database and their applications
2. Understand the real applications of social networks
3. Learn the data model for graph databases and social networks
4. Learn important queries over graphs/social networks
5. Learn the query processing algorithms over graphs
6. Gain the knowledge of queries over distributed graph databases

Outcomes:
1. Understanding of background of graph databases
2. Get familiar with the real applications of general graph databases and social networks
3. Proficiency with the data model of certain/uncertain graphs
4. Proficiency with various queries over graph databases (including social networks)
5. Proficiency with the implementation of algorithms to tackle graph or social network problems
6. Understanding of queries over distributed graph databases
7. Proficiency with the answering of queries in distributed graph databases

Topics to be Covered:
1. Introduction to graph databases
2. Real applications of graph databases
3. Social network analysis
4. Data models for certain/uncertain graphs
5. Queries over general graph databases
6. Influence maximization problems in social networks
7. Distributed graph processing
Abet Learning Outcomes:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.
- Apply computer science theory and software development fundamentals to produce computing-based solutions.
- Communicate effectively in a variety of professional contexts.
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.