CMPT 843 - G100 Database and Knowledge-base Systems

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Calendar Objective/Description:
An advanced course on database systems which focuses on data mining and data warehousing, including their principles, designs, implementations, and applications. It may cover some additional topics on advanced database system concepts, including deductive and object-oriented database systems, spatial and multimedia databases, and database-oriented Web technology.

Instructor’s Objectives:
The Big Data movement is attracting an increasing number of new researchers to work on data processing related research. On the other hand, the database community has been thinking about how to address data-processing challenges for over 40 years. Numerous elegant ideas were proposed in the past and many of them are being widely applied in industry. Therefore, there is a high need to educate the new researchers to learn classical database knowledge and make sure they can stand on the shoulders of giants rather than reinvent the wheel.

Because of this purpose, the course will be divided into two parts. The first part will guide students to read classical database papers that were published before 2000 on the topics including relational model, parallel database systems, transaction processing, query optimization, and materialized views. The second part will mostly about the papers published in the recent ten years on the topics including MapReduce, Spark, Columnar Store, and Key-Value Store. Through this traditional vs. modern view of data processing, the students should have a much deeper understanding of the Big Data movement and form their own opinion on what’s novel about Big Data systems.

Prerequisites:
None

Topics:
- Data Model
- Parallel Database Systems
- Transaction
- Query Optimization
- MapReduce and Spark
- NoSQL
- NewSQL
- Columnar Store
- Key-Value Store

Grading:
Paper Presentation: 25% Questions: 10% Paper Review: 20% Blog Post: 10% Final Project: 35%

Recommended Books:
Academic Honesty Statement:
Academic honesty plays a key role in our efforts to maintain a high standard of academic excellence and integrity. Students are advised that ALL acts of intellectual dishonesty will be handled in accordance with the SFU Academic Honesty and Student Conduct Policies (http://www.sfu.ca/policies/gazette/student.html).