Pattern Discovery in Data Mining: Course Overview

Courses in Data Mining Specialization

- Data Visualization
- Text Retrieval and Search Engines
- Text Mining and Analytics
- Pattern Discovery in Data Mining
- Cluster Analysis in Data Mining
- Data Mining Capstone

What Is Pattern Discovery?

- Considering massive shopping transaction data, pattern discovery may help answer the following questions:
  - What groups of items are frequently bought together?
  - If a person buys diapers at night, what is the probability of this person buying beer as well?
  - If a customer buys an iPhone 5 or iPhone 7, what other electronic products will the customer be most likely to buy in the next 3 months?

The Value of Pattern Discovery

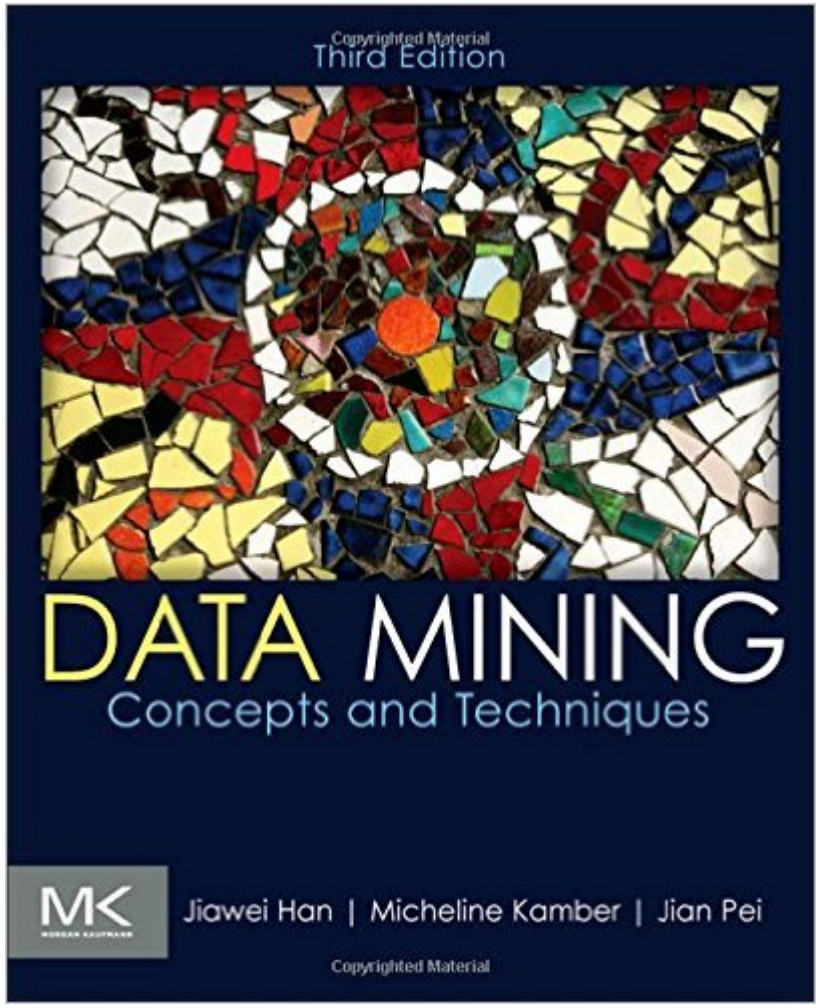
- What is the value of pattern discovery?
  - Pattern discovery helps you find hidden and inherent data patterns in massive data
  - Pattern mining will play a unique and critical role in mining massive data!
- What roles does pattern discovery play in the Data Mining Specialization?
  - You will learn scalable methods to find patterns (e.g., the set of data items strongly correlated to each other) from massive data
  - You will learn how to mine a large variety of patterns
  - You will also learn how to evaluate the value of patterns
  - Pattern discovery will help classification, clustering and other data mining tasks

Broad Applications of Pattern Discovery

- Predicting shopping transaction data:
  - For a customer who buys products A and B, what is the likelihood of the customer buying product C?
- Predicting webpage click streams:
  - Now, which webpage is most likely to be clicked next?
- Mining software bugs: Where is the likely bug in this program?
- Identifying objects or sub-structures in images, videos, and social media
- Finding quality phrases, entities, and attributes in massive text
- Finding repeating DNA and protein sequences in genomes
- Finding “hidden” communities in a massive social network

Major Reference Readings for the Course

- **Textbook**
  - Han, J., Kamber, M., & Pei, J. (2011). *Data Mining: Concepts and Techniques (3rd ed)*. Morgan Kaufmann
  - **Chapters most related to the course**
    - Chapter 1: Introduction
    - Chapter 6: Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods
    - Chapter 7: Advanced Pattern Mining



- Other references will be listed at the end of each lecture video

Course Structure

- Lesson 1: Pattern Discovery: Basic Concepts
- Lesson 2: Efficient Pattern Mining Methods

Module 1

- Lesson 3: Pattern Evaluation
- Lesson 4: Mining Diverse Frequent Patterns

Module 2

- Lesson 5: Sequential Pattern Mining
- Lesson 6: Pattern Mining Applications: Mining Spatiotemporal and Trajectory Patterns

Module 3

- Lesson 7: Pattern Mining Applications: Mining Quality Phrases from Text Data
- Lesson 8: Advanced Topics on Pattern Discovery

Module 4

Course General Information

- Instructor:

  Jiawei Han, Abel Bliss Professor

  Department of Computer Science

  University of Illinois at Urbana-Champaign
- Teaching assistants
- Course prerequisite:

  Familiar with basic data structures and algorithms
- Course assessment
  - In-video questions
  - Lesson quizzes
  - Programming assignments