B9619: Mathematical Models in Marketing

Fall 2019

Thursdays, 2:15 pm – 5:30 pm

Instructor: Rajeev Kohli

Overview

The purpose of the course is to provide an introduction to mathematical models in marketing. The topics it covers include social networks, segmentation and clustering, recommendation systems, deep learning, elements of big data, mechanism design, field experiments and conjoint analysis/non-compensatory choice models. The emphasis of the course is on developing foundational skills for understanding and conducting mathematical research in marketing, with special attention to new and emerging research areas and methods.

Class sessions will combine lectures and discussions of assigned articles. You are expected to actively contribute to class discussions and think critically about the concepts and issues discussed in the course. Reading and analyzing the required papers for each class is the best way to prepare for class participation. You are expected to prepare a short critique (2-3 pages) and lead the class discussion for selected papers. Both your critique and class discussion should focus on providing:

1. A succinct summary of the objective and contribution of the research.
2. A careful critique of the research, including a discussion of the paper’s major strengths and weaknesses (spend most of the time here).
3. Future research issues in the problem area.

Grading

25% homeworks; 25% research proposal (PhD students)/project (MS students); 25% final exam; 25% class preparation and presentations.

PhD students are encouraged to identify a topic for the research proposal by the third week of class, so that you have sufficient time to acquire the relevant background and develop
your analysis. You should describe the problem, briefly review the relevant literature, explicitly state the proposed contribution, develop a model, describe the required data, and outline the analysis and expected results. But the entire paper need not be completed. For example, you do not have to collect data, or write it as a paper ready for submission to a journal. High quality work is expected. Using canned computer programs to analyze a data set is not an appropriate project for the course.

MS students have the option of working on a research proposal (if they wish to subsequently pursue PhD studies) or an applied project or case study.

All students should schedule a meeting with the instructor to discuss the proposals/projects in the first six weeks of the course.

Readings

Readings for the sessions are given below. All the major journals in marketing are available online through Columbia University libraries. A pdf copy of the Easley and Kleinberg book *Networks, Crowds, and Markets: Reasoning About a Highly Connected World* is available on Canvas and from Jon Kleinberg’s website.


   (3) Easley, D. and J. Kleinberg, “Strong and Weak Ties,” Ch. 3 in *Networks, Crowds, and Markets: Reasoning About a Highly Connected World*. 


(5) Multi-armed bandits.

Guest: Prof. Omar Besbes, Columbia University.

7. Oct 24. (Uris 327) Field experiments.


(1) Cluster Analysis: Basic Concepts and Algorithms.


Guest: Prof. Srikanth Jagabathula, NYU.


Guest: Malek Ben Sliman and Yegor Tkachenko, Columbia University.

12. Dec 5. (Uris 208) Presentations

Pick up your take home exam. Submit your answers on Canvas by midnight next week on Thursday.