CAP 6807 Computational Advertising and Real-Time Data Analytics

Credits: 3 credits

Textbook, title, author, and year:

1. Programmatic Advertising: The Successful Transformation to Automated, Data-Driven Marketing in Real-Time, ISBN 978-3-319-25021-2, ISBN-10: 3319250213, Springer, 2016. Oliver Busch (editor)

2. Computational Advertising: Techniques for Targeting Relevant Ads, Kushal Dave (Author), Vasudeva Varma (Author), Now Publishers Inc (October 31, 2014).

Reference materials:
1. Stanford University: Introduction to Computational Advertising
2. Research papers

Specific course information

Catalog description: This course teaches students basic concepts of computational advertising, with a focus on real-time data analytics for displaying advertisement. The class will introduce different key aspects of building platforms for online advertising, the computational requirement, tools, and solutions. The class will cover three major topics including (1) basic statistical machine learning and data analytics skills, (2) Display advertising platforms, tools, and domain knowledge; and (3) Real-time analytics challenges and algorithms. The lectures will include a term project dedicated to the implementation of computational solutions to solve an analytics task, using selected programming language and tools.

Prerequisites: Graduate standing or permission of instructor

Specific goals for the course: The goal of this class is for students to gain hands-on experiences on computational advertising and real-time data analytics. At the end of the class, students should be able to understand the whole process of building a computational advertising platform. We will use real-world data as the testbed and apply the framework for validation. Class will teach theorems, tools, and algorithms for computational advertising data analytics, with a term project for hands-on training.

Brief list of topics to be covered:

Introduction, computational advertising
Computational advertising platforms and marketplace
Displaying advertisement, sponsored search (homework 1)
Demanding site platforms, supply side platforms, Exchange
Native advertisement
Statistical machine learning algorithms: Part I: Theorems (*homework 2*)

Data analytics & machine learning algorithms: Part II: Applications
Statistical machine learning algorithms: Part III: Tools (R programming (*homework 3*) Term project announcement
Real-time analytics algorithms: Click through rate prediction (Mid-term)
Real-time bidding algorithms: Click fraud detection (homework 4)
Real-time bidding algorithms: Bidding curve adjustment
Real-time bidding algorithms: Advertisement recommendation for displaying advertisement (Homework 5)
Real-time bidding algorithms: Customer profiling and retargeting
Student Presentation
Term project report

Project: The goal of the term project is to practice analytical skills learned from the class to solve real-world computational advertising and real-time data analytics challenges.

The instructor will help each student identify a suitable topic (a set of tentative topics, such as click through rate prediction, will be distributed in the class). Students are required to apply knowledge learned from the class to solve the identify task, implement and validate the design, and collect experimental results for reporting.

The final outcomes of the project will be turned into a 6-8-page double column technical report.