Abstract

Recommender Systems have been a prevalent area of research since the mid-1990s, beginning with the first papers on collaborative filtering (Adomavicius and Tuzhilin). Since then, recommender systems have been applied to various dimensions, ranging from marketing, education, social media, financial services, and more. At a high-level, recommendation systems are pieces of software that aim to recommend products or information to users, based on certain preferences. This independent study aims to explore the algorithms, theory behind, and design of recommender systems.

This course is meant to extend upon Data Mining for Business Analytics (INFO-UB 57), offered in the Leonard N. Stern School of Business. While recommender systems are discussed in Data Mining, they are studied at more of an intuitive level, rather than understanding the mathematical underpinnings, and inner-workings of the algorithms and technology utilized. The goal of this course is for the student to build and test different recommendation system methods, with an end goal of generating a recommendation system for Massive Open Online Courses (MOOCs). The different recommendation systems plan to be evaluated through an online website, constructed by the student.

This independent study is aimed to provide the student with a deeper understanding of recommender systems, and the ability to map these systems onto other applicable domains in the future. However, the independent study will focus mostly on recommendation systems in the domain of education and MOOCs. The course readings will be technical in nature, coming mostly from textbook chapters and published academic papers on the subject area of interest.

1. Logistics.
   INSTRUCTORS: Alexander Tuzhilin & Panagiotis Adamopoulos
   OFFICE: KMC 8-92 & 8-185
   MEETING TIMES: Every Other Week, Day & Time TBD

2. Syllabus: Each item represents a meeting that will occur every other week of the semester. The topics of discussion are italicized, and the readings for each meeting are given by the number of the work on the reading list found on the next page.
   1. Introduction to Recommendation Systems: (1)
   3. Memory-Based Collaborative Filtering Algorithms: (4), (11), (13)
   4. Model-Based Collaborative Filtering Algorithms and Dimensionality Reduction: (2), (5), (12)
   5. Online Learning and Recommendation Systems: (7), (8), (9)
   6. Advanced Topics in Recommendation Systems: (10)
      • The Cold Start, Context-Aware Recommenders, etc.
   7. Special Topics in Recommendation Systems: (15)
      • TBD from interests developed throughout the semester

3. Text to be Evaluated by the Instructor: The work to be evaluated by the instructor will consist of a research paper, which should be at a minimum of 15 pages. This paper should summarize the work done throughout the semester, which should include the analysis and results of testing different recommender system methods, in relation to MOOCs. The instructor will also evaluate the implementation of the algorithms, in either Python or Java, which may be hosted on the online website, created by the student.
4. Reading List:


(11) B. Sarwar et al., “Item-Based Collaborative Filtering Recommendation Algorithms,” GroupLens Research Group/Army HPC Research Center, Department of Computer Science and Engineering, University of Minnesota, DATE.


