

# CSE 291: Trends in Recommender Systems and Human Behavioral Modeling

**Instructor:** [Julian McAuley](mailto:jmcauley@eng.ucsd.edu) (jmcauley@eng.ucsd.edu), CSE 4102

**Autumn 2017, Monday/Wednesday 9:30-10:50, CSE 4140**

CSE 291 is a graduate course devoted to current trends for recommender systems and models of human behavior. This course covers material similar to [CSE 258](#), though is more focused on research papers and student-led presentations. It is suggested (but not required) that you have already taken CSE 258 or are taking it concurrently, though the first 1-2 lectures will be spent on revision.

The course meets twice a week on Monday/Wednesday mornings, starting October 2. Meetings are in CSE 4140. Attendance is expected, as grades are primarily based on participation.

**Office hours:** I'll hold office hours on **Tuesdays 9:00-13:00** in CSE 4102.

| [piazza page](#)

| [assignment spec \(50% of grade\)](#)

| [in-class presentations \(50% of grade\)](#)

| [example discussion questions](#)

## 1 Background

### Monday October 2: Matrix Factorization

- Matrix Factorization Techniques for Recommender Systems (Koren et al., 2009) | [pdf](#)
- The Bellkor 2008 Solution to the Netflix Prize (Bell et al., 2008) | [pdf](#)
- **Application:** Recommending Product Sizes to Customers (Sembium et al., 2016) | [pdf](#)

### Wednesday October 4: Item-to-Item Recommendation

- BPR: Bayesian Personalized Ranking from Implicit Feedback (Rendle et al., 2012) | [pdf](#)
- Learning Visual Clothing Style with Heterogeneous Dyadic Co-occurrences (Veit et al., 2015) | [pdf](#)

- **Application:** Amazon.com Recommendations: Item-to-item Collaborative Filtering (Linden et al., 2003) | [pdf](#)

### Suggested reading:

- Factorization Meets the Neighborhood: A Multifaceted Collaborative Filtering Model (Koren, 2008) | [pdf](#)
- One-Class Collaborative Filtering (Paquet and Koenigstein, 2013) | [pdf](#)
- Factorization Machines (Rendle, 2010) | [pdf](#)
- Factorization Meets the Item Embedding: Regularizing Matrix Factorization with Item Co-occurrence (Liang et al., 2016) | [pdf](#)
- Collaborative Metric Learning (Hsieh et al., 2017) | [pdf](#)

| [course outline slides](#)

## 2 Ranking, Retrieval, & Sequential Recommendation

### Monday October 9: Markov-Chains

- Factorizing Personalized Markov Chains for Next-Basket Recommendation (Rendle et al., 2010) | [pdf](#)
- Personalized Ranking Metric Embedding for Next New POI Recommendation (Feng et al., 2015) | [pdf](#)
- Translation-based Recommendation (He et al., 2017) | [pdf](#)

### Wednesday October 11: More Markov Chains, and Metric Learning

- Learning to Rank with Trust and Distrust in Recommender Systems (Rafailidis and Crestani, 2017) | [pdf](#)
- Modeling User Consumption Sequences (Benson et al., 2016) | [pdf](#)
- **Application:** Playlist Prediction via Metric Embedding (Chen et al., 2012) | [pdf](#)

### Suggested reading:

- Learning Hierarchical Representation Model for Next-Basket Recommendation (Wang et al., 2015) | [pdf](#)
- Fifty Shades of Ratings: How to Benefit from Negative Feedback in Top-N Recommendations Tasks (Frolov and Oseledets, 2016) | [pdf](#)
- Do "Also-Viewed" Products Help User Rating Prediction? (Park et al., 2017) | [pdf](#)
- A Dynamic Recurrent Model for Next Basket Recommendation (Yu et al. 2016) | [pdf](#)
- Neural Ranking Models with Weak Supervision (Dehghani et al. 2017) | [pdf](#)
- Personalizing Session-based Recommendations with Hierarchical Recurrent Neural Networks (Quadrana et al. 2017)
- Bridging Collaborative Filtering and Semi-Supervised Learning: A Neural Approach for POI recommendation (Yang et al. 2017) | [pdf](#)

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## 3

# Temporal Dynamics

## Monday, October 16:

- Time Weight Collaborative Filtering (Ding and Li, 2005) | [pdf](#)
- Collaborative Filtering with Temporal Dynamics (Koren, 2010) | [pdf](#)
- Latent Factor Transition for Dynamic Collaborative Filtering (Zhang et al., 2014) | [pdf](#)
- Who, What, When, and Where: Multi-Dimensional Collaborative Recommendations Using Tensor Factorization on Sparse User-Generated Data (Bhargava et al., 2015) | [pdf](#)
- TribeFlow: Mining & Predicting User Trajectories (Figueiredo et al., 2016) | [pdf](#)

## Wednesday, October 18:

- Temporal Effects on Hashtag Reuse in Twitter: A Cognitive-Inspired Hashtag Recommendation Approach (Kowald et al., 2017) | [pdf](#)
- On the Temporal Dynamics of Opinion Spamming – Case Studies on Yelp (Kc and Mukherjee, 2016) | [pdf](#)
- Personalized Itinerary Recommendation with Queuing Time Awareness (Lim et al., 2017) | [pdf](#)
- Optimizing the Recency-Relevancy Trade-off in Online News Recommendations (Chakraborty et al., 2017) | [pdf](#)
- **Application:** User Session Identification Based on Strong Regularities in Inter-activity Time (Halfaker et al., 2015) | [pdf](#)

## Suggested reading:

- Recurrent Poisson Factorization for Temporal Recommendation (Hosseini et al. 2017)
- A Temporally Heterogeneous Survival Framework with Application to Social Behavior Dynamics (Yu et al. 2017) | [pdf](#)

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## 4 Deep and Content-Aware

## Monday, October 23:

- Recurrent recommender networks (Wu et al., 2017) | [pdf](#)
- Neural Collaborative Filtering (He et al., 2017) | [pdf](#)
- Sequential User-based Recurrent Neural Network Recommendations (Donkers et al., 2017) | [pdf](#)
- Collaborative Variational Autoencoder for Recommender Systems (Li and She, 2017) | [pdf](#)
- TransNets: Learning to Transform for Recommendation (Catherine and Cohen, 2017) | [pdf](#)

## Wednesday, October 25:

- Neural Factorization Machines for Sparse Predictive Analytics (He and Chua, 2017) | [pdf](#)

- What Your Images Reveal: Exploiting Visual Contents for Point-of-Interest Recommendation (Wang et al., 2017) | [pdf](#)
- Deep Neural Networks for YouTube Recommendations (Covington et al., 2016) | [pdf](#)
- 3D Convolutional Networks for Session-based Recommendation with Content Features (Tuan and Phuong, 2017) | [pdf](#)
- Deep Learning based Large Scale Visual Recognition and Search for E-Commerce (Shankar et al., 2017) | [pdf](#)

### Suggested reading:

- On Sampling Strategies for Neural Network-based Collaborative Filtering (Chen et al. 2017) | [pdf](#)
- Attentive Collaborative Filtering: Multimedia Recommendation with Item- and Component-Level Attention (Chen et al. 2017) | [pdf](#)
- Embedding Factorization Models for Jointly Recommending Items and User Generated Lists (Cao et al. 2017) | [pdf](#)
- Collaborative Knowledge Base Embedding for Recommender Systems (Zhang et al. 2017) | [pdf](#)

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## 5 Text and Question-Answering Systems

### Monday, October 30:

- User Review Sites as a Resource for Large-Scale Sociolinguistic Studies (Hovy et al., 2015) | [pdf](#)
- Detecting Evolution of Concepts based on Cause-Effect Relationships in Online Reviews (Zhang et al., 2016) | [pdf](#)
- Neural Rating Regression with Abstractive Tips Generation for Recommendation (Li et al., 2017) | [pdf](#)
- Extracting and Ranking Travel Tips from User-Generated Reviews (Guy et al., 2017) | [pdf](#)
- Exploring Latent Semantic Factors to Find Useful Product Reviews (Mukherjee et al., 2017) | [pdf](#)
- Ask the GRU: Multi-task Learning for Deep Text Recommendations (Bansal et al., 2016) | [pdf](#)

### Wednesday, November 1:

- Novelty based Ranking of Human Answers for Community Questions (Omari et al., 2016) | [pdf](#)
- Understanding How People Use Natural Language to Ask for Recommendations (Kang et al., 2017) | [pdf](#)
- Summarizing Answers in Non-Factoid Community Question-Answering (Song et al., 2017) | [pdf](#)
- Characterizing and Predicting Enterprise Email Reply Behavior (Yang et al., 2017) | [pdf](#)
- **Application:** Smart Reply: Automated Response Suggestion for email (Kannan et al., 2016) | [pdf](#)
- **Application:** Efficient Natural Language Response Suggestion for Smart Reply (Henderson et al., 2017) | [pdf](#)

**Suggested reading:**

- Representativeness-aware Aspect Analysis for Brand Monitoring in Social Media (Liao et al. 2017) | [pdf](#)
- A Semantic-Aware Profile Updating Model for Text Recommendation (Zagheli et al. 2017) | [pdf](#)
- End-to-end Learning for Short Text Expansion (Tang et al. 2017) | [pdf](#)

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## 6 Project Proposals

**Monday Nov. 6/Wednesday Nov. 8**

- Everyone will briefly describe their project proposals in order to discuss them with the class.

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## 7 Novel Tasks & Domains

**Monday, November 13:**

- Domain-Aware Grade Prediction and Top-n Course Recommendation (Elbadrawy and Karypis, 2016) | [pdf](#)
- Gaze prediction for recommender systems (Zhao et al., 2016) | [pdf](#)
- A Novel Recommender System for Helping Marathoners to Achieve a New Personal-Best (Smyth and Cunningham, 2017) | [pdf](#)
- Chemical Reactant Recommendation Using a Network of Organic Chemistry (Savage et al., 2017) | [pdf](#)
- Groove Radio: A Bayesian Hierarchical Model for Personalized Playlist Generation (Lavee et al., 2017) | [pdf](#)

**Wednesday, November 15:**

- Exploiting Food Choice Biases for Healthier Recipe Recommendation (Elsweiler et al., 2017) | [pdf](#)
- Personalized Key Frame Recommendation (Chen et al., 2017) | [pdf](#)
- Meta-Graph Based Recommendation Fusion over Heterogeneous Information Networks (Zhao et al. 2017) | [pdf](#)
- Dynamic Attention Deep Model for Article Recommendation by Learning Human Editors Demonstration (Wang et al. 2017) | [pdf](#)
- Multi-Modality Disease Modeling via Collective Deep Matrix Factorization (Wang et al. 2017) | [pdf](#)

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## 8 Socially & Geographically Aware Models

**Monday, November 20:**

- A Probabilistic Model for Using Social Networks in Personalized Item Recommendation (Chaney et al., 2015) | [pdf](#)
- Online popularity and topical interests through the lens of instagram (Ferrara et al., 2014) | [pdf](#)
- The Effect of Recommendations on Network Structure (Su et al., 2016) | [pdf](#)
- Recommendations in Signed Social Networks (Tang et al., 2016) | [pdf](#)
- STAR: Semiring trust inference for trust-aware social recommenders (Gao et al., 2016) | [pdf](#)
- Fairness-Aware Group Recommendation with Pareto-Efficiency (Xiao et al., 2017) | [pdf](#)

**Wednesday, November 22:**

- Additive Co-Clustering with Social Influence for Recommendation (Du et al., 2017) | [pdf](#)
- A General Model for Out-of-town Region Recommendation (Pham et al., 2017) | [pdf](#)
- Growing Wikipedia Across Languages via Recommendation (Wulczyn et al., 2016) | [pdf](#)
- Social Collaborative Viewpoint Regression with Explainable Recommendations (Ren et al. 2017) | [pdf](#)
- Exploiting Socio-Economic Models for Lodging Recommendation in the Sharing Economy (Vazquez et al. 2017) | [pdf](#)
- A Location-Sentiment-Aware Recommender System for Both Home-Town and Out-of-Town Mobile Users (Wang et al. 2017) | [pdf](#)

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## 9 Human-subject experiments, evaluation, and deployment

**Monday, November 27:**

- When do Recommender Systems Work the Best?: The Moderating Effects of Product Attributes and Consumer Reviews on Recommender Performance (Lee and Hosanagar, 2016) | [pdf](#)
- Leading the Herd Astray: An Experimental Study of Self-fulfilling Prophecies in an Artificial Cultural Market (Salganik and Watts, 2008) | [pdf](#)
- Using Navigation to Improve Recommendations in Real-time (Wu et al., 2013) | [pdf](#)
- An Empirical Analysis of Algorithmic Pricing on Amazon Marketplace (Chen et al., 2016) | [pdf](#)
- Modeling the Assimilation-Contrast Effects in Online Product Rating Systems Debiasing and Recommendations (Zhang et al. 2017) | [pdf](#)

**Wednesday, November 29:**

- Post Processing Recommender Systems for Diversity (Antikacioglu and Ravi, 2017)
- The Role of Social Networks in Information Dissemination (Bakshy et al., 2012)

- Personalized Key Frame Recommendation (Chen et al., 2017)
- Online Popularity and Topical Interests Through the Lens of Instagram (Ferrara et al., 2014)

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## 10 Project Presentations

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