Pareto Frontier-based Methods for Multi-Objective Recommender Systems

ACM Transactions on Intelligent Systems and Technology (ACM TIST)

Special Issue on

Diversity and Discovery in Recommender Systems and Exploratory Search
• Re-implement CIKM efficiently and easily testable (Now implementing AL)

• Evaluation changes in CIKM paper

  • Dataset: Last.fm (implicit dataset)

  • Methodology: commonly used in RecSys community for top-N recommendation task

  • Metrics: Use the same as RecSys paper

• Run constituents algs (PureSVD, WRMF, ...) over training-set D (selected examples)

• Implement a multi-objective method for recommender systems
Methodology

• We must use the same evaluation methodology

• Base of RecSys paper (“Performance of Recommender Algorithms on top-N recommendation tasks”)

• We must use the same set of metrics to evaluate acc, nov, and div

• Base of RecSys paper (“Rank and Relevance in Novelty and Diversity Metrics for Recommender Systems”)
Related Work

- In progress
- Optimizing Multiple Objectives in Collaborative Filtering
- Using Control Theory for Stable and Efficient Recommender Systems
- Click Shapping to Optimize Multiple Objectives
- Towards More Diverse Recommendations: Item Re-ranking Methods for Recommender Systems
- Improving Recommendation Lists Through Topic Diversification
- Solving the Apparent Diversity-Accuracy Dilemma of Recommender Systems
- Auralist: Introducing Serendipity into Music Recommendation
- I’m looking for others...
Exploiting “educated guess” to achieve optimal multi-objective instances

Implementation of state of the art in top-N recommendation task
paper: “An analysis of probabilistic methods for top-N recommendation
in collaborative filtering”

Report results of methods that claim to be more diverse and novel

Analysis of results

Writing!
Novelty and Diversity are relative to users, systems, time, viewpoint (e.g. user vs. business), tasks, session state, and other contextual variables.

Particular attention in the discussion was the elucidation of when, to what extent, and in which scenarios, novelty and diversity are really appropriate in practice.

From the understanding that their use should not be indiscriminative.

Two points of view were distinguished: (i) users and (businesses).

Businesses: monetization was pointed out as a main effectiveness metric for commercial applications of recommendation technologies.

- Assessing the business value of novelty and diversity should require distinction between short vs. longer-term - and direct vs. indirect - benefits.

There was general agreement that business studies in this area would be highly useful in shedding further light on these issues.
Workshop DiveRS 2011

• 7 papers from 13 submissions (54%)
  • Maximizing Aggregate Recommendation Diversity: A Graph-Theoretic Approach
  • On Unexpectedness in Recommender Systems: Or How to Expect the Unexpected
  • Fusion-based Recommender System for Improving Serendipity
  • The Oblivion Problem: Exploiting Forgotten Items to Improve Recommendation Diversity
  • A Framework for Recommending Collections
  • Helping Users Perceive Recommendation Diversity
  • An Evaluation of Novelty and Diversity Based on Fuzzy Logic

“Extended versions of selected papers will be published in a special issue of the ACM Transactions on Intelligent Systems and Technology”
DiveRS 2011 and DiveRS 2012

- Same editors
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