Workshop on Recommendation in Complex Scenarios (ComplexRec 2017)

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ABSTRACT

Recommendation algorithms for ratings prediction and item ranking have steadily matured during the past decade. However, these state-of-the-art algorithms are typically applied in relatively straightforward scenarios. In reality, recommendation is often a more complex problem: it is usually just a single step in the user's more complex background need. These background needs can often place a variety of constraints on which recommendations are interesting to the user and when they are appropriate. However, relatively little research has been done on these complex recommendation scenarios. The ComplexRec 2017 workshop addressed this by providing an interactive venue for discussing approaches to recommendation in complex scenarios that have no simple one-size-fits-all-solution.

KEYWORDS

Complex recommendation

1 INTRODUCTION

Over the past decade, recommendation algorithms for ratings prediction and item ranking have steadily matured, spurred on in part by the success of data mining competitions such as the Netflix Prize, the 2011 Yahoo! Music KDD Cup, and the RecSys Challenges. Matrix factorization and other latent factor models emerged from these competitions as the state-of-the-art algorithms to apply in both existing and new domains. However, these state-of-the-art algorithms are typically applied in relatively straightforward and static scenarios: given information about a user's past item preferences in isolation, can we predict whether they will like a new item or rank all unseen items based on predicted interests?

In reality, recommendation is often a more complex problem: the evaluation of a list of recommended items never takes place in a

vacuum, and it is often only a single step in the user's more complex background task or need. These background needs can often place a variety of constraints on which recommendations are interesting to the user and when they are appropriate. However, relatively little research has been done on how to elicit rich information about these complex background needs or how to incorporate it into the recommendation process. Furthermore, while state-of-the-art algorithms typically work with user preferences aggregated at the item level, real users may prefer some of an item's features more than others or attach more weight in general to certain features. Finally, providing accurate and appropriate recommendations in such complex scenarios comes with a whole new set of evaluation and validation challenges.

The current generation of recommender systems and algorithms are good at addressing straightforward recommendation scenarios, yet more complex scenarios as described above have been underserved. The **ComplexRec 2017** workshop addressed this by providing an interactive venue for discussing approaches to recommendation in complex scenarios that have no simple one-size-fits-all solution.

While ComplexRec 2017 was the first edition of this workshop, in recent years other workshops have been organized on related topics. Examples include the CARS (Context-aware Recommender Systems) workshop series (2009-2012) organized in conjunction with RecSys [1–4], the CARR (Context-aware Retrieval and Recommendation) workshop series (2011-2015) organized in conjunction with IUI, WSDM, and ECIR [5–8, 11], as well as the SCST (Supporting Complex Search Tasks) workshop series (2015, 2017) organized in conjunction with ECIR and CHIIR [9, 10].

2 FORMAT & TOPICS

ComplexRec was organized as an interactive, half-day workshop. The workshop started with a keynote presentation by Dietmar Jannach about his work on session-aware recommendation, where a recommender system has to adapt its suggestions instantly to the assumed short-term interests of each user, usually based on the user's most recent interactions with the site or app. In his keynote, discussed existing approaches and challenges in this area

based on examples from the domains of e-commerce and music recommendation. The keynote presentation was followed by a single paper session, for which short papers and position papers of 2-4 pages in length were solicited. Accepted submissions received short 10-minute presentations with 5 minutes for discussion. Evaluation criteria for acceptance included novelty, diversity, significance, quality of presentation, and the potential for sparking interesting discussion at the workshop. All submitted papers were reviewed by the Program Committee. The second half of the workshop featured 3-4 breakout groups corresponding to the participant's interests in addition to the topics of the contributed papers. Afterwards, the breakout groups reported back for more discussion on what was learned.

2.1 Topics of interest

Relevant topics for the ComplexRec workshop included:

- **Task-based recommendation** (Approaches that take the user's background tasks and needs into account when generating recommendations)
- **Feature-driven recommendation** (Techniques for eliciting, capturing and integrating rich information about user preferences for specific product features)
- **Constraint-based recommendation** (Approaches that successfully combine state-of-the-art recommendation algorithms with complex knowledge-based or constraint-based optimization)
- **Query-driven recommendation** (Techniques for eliciting and incorporating rich information about the user's recommendation need (e.g., need for accessibility, engagement, socio-cultural values, familiarity, etc.) in addition to the standard user preference information)
- **Context-aware recommendation** (Methods for the extraction and integration of complex contextual signals for recommendation)
- **Complex data sources** (Approaches to dealing with complex data sources and how to infer user preferences from these sources)
- **Evaluation & validation** (Approaches to the evaluation and validation of recommendation in complex scenarios)

3 ACCEPTED PAPERS

A total of 7 papers were submitted to the workshop, which were all reviewed by a program committee of international experts in the field. Five of these papers were accepted for presentation at the workshop, resulting in an acceptance rate of 71.4%.

The accepted papers focused on a variety of complex recommendation problems. Delgado et al. discussed the complexity inherent in personalized voice search for Internet TV, which requires the generation of fresh, domain-specific, relevant and contextual recommendations under a variety of personal and general constraints.

Piazza et al. investigate the usefulness of 3D body scans for fashion product recommendations. They extracted a variety of different body measures from this complex data source and showed that it significantly improved the recommendation performance.

Campos et al. describe the construction and composition of a semi-automatically constructed context taxonomy for extracting context data from user reviews for recommendation. The taxonomy is composed of semantic entities from DBpedia and can be manually adjusted through a proprietarily developed software tool.

Lofi & Tintarev discuss a first step towards analogy-based recommendation by benchmarking the semantics of perceived analogies. Their results show that current word embedding approaches are still not not suitable to sufficiently deal with deeper analogy semantics.

Finally, Wiwobo et al. et al. tackle the complex problem of package recommendation where utility of combinations of items must also be considered, such as travel or fashion. They introduce both a new data set for this domain and propose several extensions to the existing matrix factorization framework.

4 WEBSITE & PROCEEDINGS

The workshop material (list of accepted papers, invited talk, and the workshop schedule) can be found on the ComplexRec workshop website at http://complexrec2017.aau.dk. The proceedings are available as a CEUR Workshop Proceedings volume, a link to which can be found on the workshop website. A summary of the workshop will appear in SIGIR Forum to increase cross-disciplinary awareness of recommender systems research.

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