

Fifth Knowledge-aware and Conversational Recommender Systems Workshop (KaRS 2023)

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Abstract

This is the preface for the Proceedings of the Fifth Knowledge-Aware and Conversational Recommender Systems Workshop (KaRS 2023), co-located with the 17th ACM RecSys 2023 conference.

Keywords

recommender systems, workshop, proceedings

1. Introduction

In this volume, we include the contributions presented at the Fifth Knowledge-aware and Conversational Recommender Systems Workshop (KaRS 2023), co-located with the 17th ACM Conference on Recommender Systems (RecSys 2023) [1], which took place in Singapore on Sept. 18 - 22, 2023. The first edition of KaRS was held in Vancouver (Canada), co-located with RecSys 2018 [2, 3], the second edition was held in Beijing (China) co-located with CIKM 2019 [4, 5], the third joint edition with ComplexRec was held in Amsterdam (Netherlands) co-located with RecSys 2021 [6, 7], and the fourth edition was held in Seattle (USA) co-located with RecSys 2022 [8, 9].

This workshop provides a meeting hub where researchers and companies can showcase their work in Knowledge-aware and Conversational Recommender Systems, as well as discover valuable contacts and meaningful connections with other people.

Indeed, while a few years ago the utilization of external knowledge in literature was sporadic rather than systematic, in recent years, the widespread adoption of Knowledge Graphs (KGs) as repositories of structured information has demonstrated their potential to significantly enhance the performance of recommendation models. Moreover, the advent of ChatGPT has changed the users' perception of Conversational Recommender Systems (CRSs): even people who were not accustomed to using conversational agents are now more inclined to their utilization and perceive conversations with chatbots

as natural. Finally, this edition of KaRS has reflected the emergence of several significant milestones, including neurosymbolic approaches that aim to bridge the gap between machine learning models and semantic machine understanding.

The discussion about the connections between these three pillars has resulted in an outstanding edition of KaRS, marked by an impressive number of contributions. Overall, we accepted 14 papers: 7 long papers, 2 short papers, 3 demo papers, and 2 position papers. Each paper was peer-reviewed by at least 3 program committee (PC) members. This ensured a high quality of the program, further solidifying KaRS an important forum for presenting and discussing ideas related to these emerging technologies and their future interconnections.

2. Background and Goals

Recommender systems have become ubiquitous in daily life. They are used in various applications, ranging from online shopping to music and movie recommendations. However, these systems have limitations when it comes to interacting with human users [10]. While data-driven algorithms have been successful in identifying latent connections among users and items [11], they often miss a fundamental actor in the loop: the end-user. Current research is focusing on new challenges such as privacy [12], and new paradigms such as federated learning [13, 14]. The exploitation of the knowledge about the domain of interest of a catalog via automated reasoning and critiquing approaches is a common behavior of a human user, but it is not well codified in recommendation engine behaviors. One way to overcome these limitations is through knowledge-based ap-

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proaches [15, 16, 17, 18, 19], which are now gaining more attention due to the Linking Open Data¹ initiative and the availability of large knowledge graphs such as DBpedia² and Wikidata³. These approaches provide recommendation to users exploiting the domain-specific knowledge encoded in ontologies or knowledge graphs, used to encode the relationships between items, users, and other relevant entities. The exploitation of such datasets together with their ontologies is at the basis of many approaches to recommendation and challenges proposed in the last years such as Knowledge Graph embeddings [20, 21, 22, 23, 24], hybrid recommendation [18, 25, 26], link prediction [27, 28, 23, 29, 30, 31, 32], interpretable recommendation [33, 34, 18], and user modeling [35]. Successful workshops and conferences in the last few years (ISWC, RecSys, UMAP, AAAI, ECAI, IJCAI, SIGIR) show the growing interest and research potential of these systems. Moreover, a new wave in knowledge-aware recommendation is represented by neural-symbolic systems, which combine data-driven approaches with pure symbolic methods [36]. Leveraging both machine learning systems, which make good use of data, and symbolic systems, which make good use of knowledge, can substantially improve recommendation, e.g., making up for a potential lack of training data [37].

Furthermore, content features become crucial when interaction requires it, such as in Conversational Recommender Systems (CRSs) [38]. These systems are characterized by a multi-turn dialogue between the user and the system [39]. The term “conversational” in this context does not necessarily mean that the system conducts dialogues in natural language, as it may allow more constrained modes of user interaction as well [40]. However, this type of interaction creates new challenges since it blurs the distinction between recommendation and retrieval. A CRS should be able to utilize both short- and long-term preferences and adapt its behavior promptly when user feedback is provided. There are also other peculiarities of CRSs, such as evaluating the systems beyond accuracy metrics [41]. Moreover, the evaluation of CRSs is a sensitive issue also due to the limited availability of datasets [41]. Although research and development into CRSs has been less prominent for some time, recently, the literature on this topic has been growing notably [39].

2.1. Objectives

The *Fifth Knowledge-aware and Conversational Recommender Systems (KaRS) Workshop* is not just another academic event focused on the latest algorithms and approaches for recommendation engines. Instead, it aims to spark a new generation of research that goes beyond

the traditional goal of accuracy [10] and focuses on improving the user experience, engagement, and satisfaction [42]. This requires a diverse set of skills and expertise from fields such as Machine Learning, Human-Computer Interaction, Information Retrieval, and Information Systems, among others.

The KaRS Workshop brings together researchers and practitioners to share their research and techniques, including new design technologies, and identify the next key challenges and emerging topics in the field. The goal is to establish an interdisciplinary community with a focus on the exploitation of (semi-)structured knowledge and conversational approaches for recommender systems, which can lead to exciting collaboration opportunities both for academics and industry practitioners.

In summary, the fifth edition of KaRS [8, 6, 4, 2] is a place for researchers and practitioners to come together to tackle the next generation of challenges in recommender systems to (i) share research and techniques, including new design technologies, (ii) identify next key challenges in the area, (iii) identify emerging topics in the field.

2.2. Topics

Topics of interests include, but are not limited to:

- **Models and Feature Engineering:** Data models based on structured knowledge sources (e.g., Linked Open Data, Wikidata, BabelNet, etc.), Semantics-aware approaches exploiting the analysis of textual sources (e.g., Wikipedia, Social Web, etc.), Knowledge-aware user modeling, Methodological aspects (evaluation protocols, metrics, and datasets), Logic-based modeling of a recommendation process, Knowledge Representation and Automated Reasoning for recommendation engines, Deep learning methods to model semantic features
- **Beyond-Accuracy Recommendation Quality:** Using knowledge bases and knowledge graphs to increase recommendation quality (e.g., in terms of novelty, diversity, serendipity, or explainability), Explainable Recommender Systems, Knowledge-aware explanations (compliant with the General Data Protection Regulation)
- **Online Studies:** Knowledge sources for cross-lingual recommendations, Applications of knowledge-aware recommenders (e.g., music or news recommendation, off-mainstream application areas), User studies (e.g., on the user’s perception of knowledge-based recommendations), field studies
- **Design of a Conversational Agent:** Design and implementation methodologies, Dialogue management

¹<http://linkeddata.org>

²<https://dbpedia.org>

³<https://wikidata.org>

(end-to-end, dialogue-state-tracker models), UX design, Dialogue protocol design

- **User Modeling and Interfaces:** Critiquing and user's feedback exploitation, Short- and Long-term user profiling and modeling, Preference elicitation, Natural language, multimodal, and voice-based interfaces, Next-question problem
- **Methodological and Theoretical aspects:** Evaluation and metrics, Datasets, Theoretical aspects of conversational recommender systems

3. Program

The program of the half-day workshop consisted of:

- a session with the presentation of papers on Conversational Recommender Systems;
- a session with the presentation of papers on Large Language Models for recommendation;
- two sessions with the presentation of papers on Knowledge-aware Recommender Systems.

4. Website & Proceedings

All workshop material including schedule and news will be found on the 2023 workshop website at <https://kars-workshop.github.io/2023/>.

5. Program Committee

We thank the members of the Program Committee of KaRS 2023 for their thorough reviews and their detailed feedback they gave to the authors. The PC comprised people from different countries and spanning various levels of seniority: **Nourah AlRossais** (King Saud University), **Vito Walter Anelli** (Polytechnic University of Bari), **Marco Angelini** (Sapienza University of Rome), **Andrea Bacciu** (Sapienza University of Rome), **Giacomo Balloccu** (University of Cagliari), **Pierpaolo Basile** (University of Bari), **Alejandro Bellogin** (Universidad Autonoma de Madrid), **Giovanni Maria Biancofiore** (Polytechnic University of Bari), **Ludovico Boratto** (University of Cagliari), **Giandomenico Cornacchia** (Polytechnic University of Bari), **Humberto Corona** (Spotify), **Marco de Gemmis** (University of Bari), **Gerard De Melo** (Hasso Plattner Institute and University of Potsdam), **Amra Delić** (University of Sarajevo), **Davide Di Ruscio** (Università degli Studi dell'Aquila), **Francesco Maria Donini** (Università della Tuscia), **Fabrizio Falchi** (ISTI-CNR), **Antonio Ferrara** (Polytechnic University of Bari), **Maurizio Ferrari Dacrema** (Politecnico di

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