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# Interacting with Recommender Systems

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**Abstract**

Automated recommendations have become a common feature of modern online services and mobile apps. In many practical applications, the means provided for users to interact with recommender systems (e.g., to state explicit preferences or to provide feedback on the recommendations) are, however, very limited. In order to improve such systems and consequently user satisfaction, much research work has been done over the years to build richer and more intelligent user interfaces for recommender systems. In this tutorial, we provide a comprehensive overview of existing approaches to user interaction aspects of recommender systems, with a special focus on explanation interfaces. We also provide examples of real-world systems that implement advanced interaction mechanisms and discuss open challenges in the field.

**Author Keywords**

Recommender Systems; Interaction Design

**ACM Classification Keywords**

H.3.3 [Information Search and Retrieval]: Information filtering; H.5.2 [Information Interfaces and Presentation]: User Interfaces

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## Background and Tutorial Goals

Automated recommendations have become a pervasive part of our daily online user experience. Today, the most prominent examples of such systems, e.g., on Amazon.com or on various media streaming sites, predominantly implement a one-shot interaction design. In such a design, the system proactively provides users with a list of presumably relevant recommendations, and the only way for a user to interact with the system is to follow the provided links associated with the recommended items.

Such a design, while being simple to understand, has the drawback that it can limit the applicability and usefulness of a recommendation service for users and, therefore, also for service providers [2, 6]. Users, for example, often have no way of giving feedback to the system about the usefulness of individual recommendations. Such feedback is, however, central for a system to adapt its assumptions about the user's preferences and current context.

Another example of the limitations of current recommender user interfaces is related to their capability of helping users in the decision making process. Richer and adaptive user interfaces would be of more help to users if they, for example, explained their recommendations to the users and guided them to suitable items using persuasive cues. Furthermore, the interaction experience could be improved by providing users with means of exploring the space of alternatives or by allowing them to interactively state and revise their preferences [3, 5].

The goal of the tutorial is to introduce the participants to the various possible ways of building richer and more intelligent (e.g., adaptive) user interfaces for recommender systems. A variety of different proposals have in fact been made in the literature so far, e.g., in the context of conversational

and critiquing approaches or in the context of explanations and user control.

The tutorial provides a comprehensive overview of these approaches from the academic literature and gives examples of advanced user interfaces in real-world systems. The tutorial furthermore covers questions related to the validation and empirical evaluation of such advanced user interfaces. Given the comparably limited amount of research on user interfaces for recommender systems in the academic literature, one further goal of the tutorial is to highlight open research questions and to stimulate more research in the field.

## Topics and Organization

The tutorial is organized in three main parts.

### *(I) Introduction to recommender systems*

The tutorial starts with a brief review of the various application fields of recommender systems, the general idea of the underlying computational approaches of generating recommendations, and typical ways of evaluating and comparing different systems. In this part, examples of typical user interfaces of real-world recommender systems are also reviewed.

### *(II) Interaction mechanisms in recommender systems*

In the second part of the tutorial, we review existing approaches from the academic literature. The framework shown in Figure 1 (from [4]) is used, in which we distinguish between interaction mechanisms for the preference elicitation phase and mechanisms for the result presentation [1] and refinement phase. The topic of explanations [7, 8] is then discussed in more detail, including a presentation of what has been done since explanation mechanisms have first been explored in expert systems until nowadays. A taxonomy of explanation styles, their purposes, and typical

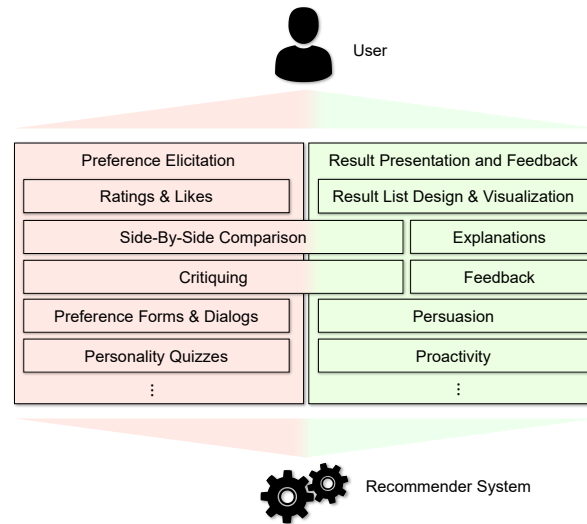


Figure 1: Research Framework

application domains, as well as evaluation methodologies are covered in more depth.

### (III) Examples of Recent Research

In this shorter part of the tutorial, we present selected examples of recent research on intelligent user interfaces for recommender systems. The case studies were selected to emphasize the richness of possible approaches to building more interactive systems and should also serve as examples of how to evaluate such systems in academic and industrial environments.

The tutorial is partially based on our in-depth review of interaction mechanisms for recommender systems [4].

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