Context-Aware Recommender Systems

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Categories and Subject Descriptors
H.1.2 [**Models and Principles**]: User/Machine Systems—*Human information processing*; H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval—*Information filtering, Selection process*.

General Terms
Design, Algorithms, Human Factors.

Keywords
Recommender systems, collaborative filtering, personalization, contextual information, tutorial.

1. SUMMARY OF THE TUTORIAL
Traditionally recommender systems have been focusing on recommending the most relevant items to users or the most appropriate users to items. While the traditional recommendation technologies have performed reasonably well in several applications, in many other applications, such as location- and time-based services, including travel recommendations, it may not be sufficient to consider only users and items – it is also important to incorporate contextual information into the recommendation process. In this tutorial, we will review various ways of providing the contextual information and incorporating it into recommendation algorithms and suggest possible research directions in this area of recommender systems.

We start this tutorial by reviewing the concept of contextual information that is used extensively throughout the computer science and then focus on how the contextual information is used in recommender systems. We first explain what contextual information is in recommender systems and then present different ways to leverage it in order to provide better recommendations.

In addition, we present a framework for classifying various context-based recommendation approaches along the lines of *contextual integration* and *algorithmic deployment*. In particular, contextual information can be:

- tightly integrated into the recommendation process, or
- used independently from the traditional recommendation methods and complement them by being separately applied to improve recommendations.

From the algorithmic perspective, contextual information can be used:

- before the main recommendation methods are launched as a part of the pre-processing step, or
- simultaneously with recommendation methods, or
- after the main recommendation methods are applied, i.e., as a part of the post-processing step.

This framework gives rise to different approaches of introducing contextual information into recommender systems and applying it to improve recommendations. We will review and classify various previously proposed contextual recommendation methods using this framework and will discuss future research directions.

2. ACKNOWLEDGMENTS
The research of Gediminas Adomavicius was supported in part by the US National Science Foundation CAREER grant IIS-0546443.

RecSys'08, October 23–25, 2008, Lausanne, Switzerland.
ACM 978-1-60558-093-7/08/10.