

## Guest Editorial

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# Special Issue on Advances in Recommender Systems

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**Abstract.** Recent advances in electronic media and computer networks have allowed the creation of large and distributed repositories of information. However, the immediate availability of extensive resources for use by broad classes of computer users gives rise to new challenges in everyday life. These challenges arise from the fact that users cannot exploit available resources effectively when the amount of information requires prohibitively long user time spent on acquaintance with and comprehension of the information content. Thus, the risk of information overload of users imposes new requirements on the software systems that handle the information. Such systems are called *Recommender Systems* and attempt to provide information in a way that will be most appropriate and valuable to its users and prevent them from being overwhelmed by huge amounts of information that, in the absence of recommender systems, they should browse or examine.

**Keywords:** Recommender systems, machine learning, user modelling, software personalisation, pattern recognition, computational intelligence

## 1. Introduction

In order to achieve original, high quality recommendation services offered to users, a need rises for successfully providing efficient learning algorithms, software applications, and evaluation methodologies. The aim of the special issue on “Advances in Recommender Systems” is to shed light on these needs, to broaden our understanding of past and potential approaches to recommender systems and technologies and to present innovative recommendation services.

We have received a large number of submissions to the special issue. Each submitted paper was reviewed by at least two independent reviewers for novelty and clarity of the research reported in it. Additionally, as guest co-editors, we looked over all the manuscripts. For inclusion in the special issue, we have selected six papers from those submitted.

The first three papers describe novel approaches in developing recommendation methodologies. Specifically, the first paper, authored by Ampazis and Emmanoulidis, is titled: “FALCON: A Matrix Factorization Framework for Recommender Systems Using Constrained Optimization.” The authors introduce a constrained optimization framework for incorporating additional knowledge into the matrix factorization formalism in recommender systems, which can overcome certain drawbacks of the unconstrained minimization approach.

The second paper, authored by Mikeli, Apostolou, and Despotis, is titled: “A New Recommendation Technique for Interval Scaled Multi-criteria Rating Systems Incorporating Intensity.” The authors propose *Interval-Rec*, a recommender system that gives predictions on items that are rated on multiple criteria.

The third paper, authored by Gasmi, Seridi-Bouchelaghem, Hocine and Abdelkarim, is titled “Collaborative Filtering Recommendation based on Dynamic Changes of User Interest.” The authors propose and evaluate a new item-based collaborative filtering

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algorithm to exploit genre information in each item and reflect dynamic changes over time of users' preferences. The proposed algorithm endows each score with a weight function which keeps users' recent, long and periodic interest, and attenuate users' old short interest.

The next three papers present various innovative recommendation services. Specifically, the fourth paper, authored by Bothos, Apostolou and Mentzas, is titled "Recommender Systems for Nudging Commuters towards Eco-friendly Decisions." The authors focus on travel recommendations and aim at providing urban travellers with a system that nudges them to plan routes while considering the environmentally friendliest travel modes.

The fifth paper, authored by Brbić and Žarko, is titled "Tuning Machine Learning Algorithms for Content-Based Movie Recommendation." The authors propose novel approaches for handling multi-valued and continuous attributes, adequate for the naïve Bayes classifier and decision tree classifier, and tune it for content-based movie recommendation.

The final paper, authored by Nair and Mohandas, is titled "An Intelligent Recommender System for Stock

Trading." The authors propose a genetic algorithm-optimized technical indicator decision tree-SVM based intelligent recommender system, which can learn patterns from stock price movements and then recommend appropriate one-day-ahead trading strategies.

The guest co-editors would like to thank Profs.-Drs. Gloria Phillips-Wren, Lakhmi C. Jain, and Junzo Watada, Chief Editors of the *Intelligent Decision Technologies Journal*, for agreeing to the publication of the special issue on "Advances in Recommender Systems." The guest co-editors would also like to thank all the authors for their contributions, the reviewers for their time and effort in reviewing manuscripts, and the journal production team for their support and help in producing the special issue.

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