

DA2PL'2016



*From Multiple Criteria Decision Aid
to Preference Learning*

Final Report of the DA2PL'2016 EURO Mini Conference

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1 General Information

The EURO Mini Conference (EUROmC) “From Multicriteria Decision Aid to Preference Learning” was held at Paderborn University, Germany, on November 7–8, 2016.¹

The conference is a successor of two previous editions of the DA2PL workshop, which took place at the University of Mons in 2012² and Ecole Centrale Paris in 2014.³ In 2016, DA2PL was held in the form of a EURO Mini Conference for the first time.

The conference was attended by 54 participants (of which 9 were PhD students) from 11 different countries: Belgium (2), Czech Republic (1), France (15), Germany (28), Israel (1), Italy (1), Luxembourg (1), Poland (1), Spain (1), UK (2), USA (1).

2 Aims and Scope

The notion of “preferences” has a long tradition in economics and operational research, where it has been formalised in various ways and studied extensively from different points of view. Nowadays, it is a topic of key importance in fields such as game theory, social choice, and the decision sciences, including decision analysis and multicriteria decision aiding. In these fields, much emphasis is put in properly modeling a decision maker’s preferences, and on deriving and (axiomatically) characterizing rational decision rules.

In machine learning, like in artificial intelligence and computer science in general, the interest in the topic of preferences arose much more recently. The emerging field of preference learning is concerned with methods for learning preference models from explicit or implicit preference information, which are typically used for predicting the preferences of an individual or a group of individuals in new decision contexts. While research on preference learning has been specifically triggered by applications such as “learning to rank” for information retrieval (e.g., Internet search engines) and recommender systems, the methods developed in this field are useful in many other domains as well.

Obviously, preference modeling and decision analysis on the one side and preference learning on the other side can ideally complement and mutually benefit from each other (cf. Figure 1). In particular, the suitable specification of an underlying model class is a key prerequisite for successful machine learning, that is to say, successful learning presumes appropriate modeling. Likewise, data-driven approaches for preference modeling and preference elicitation are becoming more and more important in decision analysis nowadays, mainly due to large scale applications, the proliferation of semi-automated computerised interfaces and the increasing availability of preference data.

Against this background, the DA2PL workshop has been launched with the goal of bringing together researchers from both communities, decision analysis and machine learning.

¹<https://homepages.uni-paderborn.de/kiudee/>

²www.lgi.ecp.fr/~mousseau/DA2PL/pmwiki.php/Main/HomePage

³www.lgi.ecp.fr/DA2PL

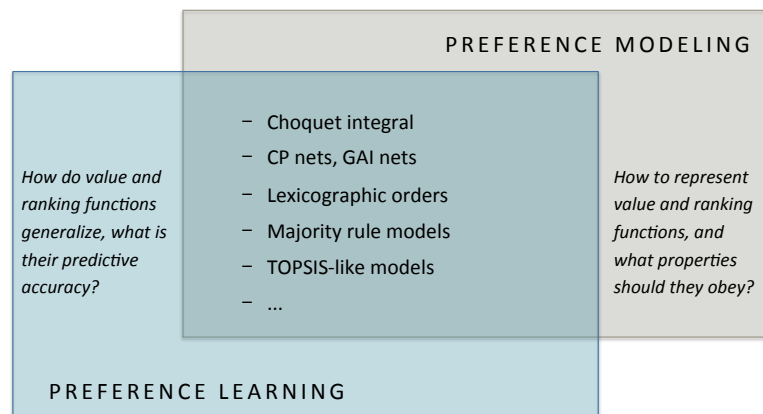


Figure 1: Preference modeling and machine learning complement each other in a natural way, and a number of contributions in the intersection of these research fields have already been made (for example, machine learning methods for the data-driven construction of models typically used in multicriteria decision aiding.)

It aims at providing a forum for discussing recent advances and identifying new research challenges in the intersection of both fields, thereby supporting a cross-fertilisation of these disciplines.

3 Committees

The **organizing committee** of DA2PL 2016 was composed of the general chair Eyke Hüllermeier (Paderborn University), the program chairs Róbert Busa-Fekete (Paderborn University) and Vincent Mousseau (Centrale Paris), and the local chair Karlson Pfannschmidt (Paderborn University).

The following people served as members of the **programme committee**: Jamal Atif, Raymond Bisdorff, Weiwei Cheng, Yann Chevaleyre, Stéphan Cléménçon, Yves De Smet, Krzysztof Dembczynski, Sébastien Destercke, Luis Dias, Raphaël Féraud, Joachim Giesen, Michel Grabisch, Salvatore Greco, Alain Guénoche, Wojciech Kotlowski, Christophe Labreuche, Jérôme Lang, Eneldo Loza Mencía, Thibaut Lust, Lucas Maestro, Thierry Marchant, Brice Mayag, Jérôme Mengin, Patrick Meyer, Wassila Ouerdane, Meltem Ozturk, Patrice Perny, Marc Pirlot, Antoine Rolland, Ammar Shaker, Eric Sibony, Balazs Szorenyi, Bruno Teheux, Mikhail Timonin, Evgeni Tsivtsivadze, Alexis Tsoukias, Tanguy Urvoy, Aida Valls, Paolo Viappiani, Peter Vojtas, Willem Waegeman, Paul Weng, Masrour Zoghi.

The submission and reviewing of papers was handled with the EasyChair conference management system. All submissions were reviewed by at least two PC members.

4 Conference Programme

DA2PL 2016 was organized as a two-day event and started on November 7th, 8h50 AM, with an opening session, in which the general chair, Eyke Hüllermeier, welcomed the participants and provided an overview of the conference.

The scientific program included four invited talks:

- From social choice to preference learning, by Jérôme Lang (Université Paris Dauphine, France),
- Preference Learning in Games, by Johannes Fürnkranz (TU Darmstadt, Germany),
- Discovering consensus and structure in preferences, by Marina Meila (University of Washington, USA),
- Incremental Elicitation for Decision Making on Combinatorial Domains, by Patrice Perny (Université Paul et Marie Curie, Paris, France).

Moreover, 25 contributed presentations were given in 8 sessions, separated into short (15 min) and long talks (25 min):

- Simulating new multicriteria data from a given data set, by Antoine Rolland and Jairo Cugliari.
- Optimal Subset Selection With Pairwise Comparisons, by Matthew Groves and Juergen Branke.
- Computing linear rankings from trillions of pairwise outranking situations, by Raymond Bisdorff.
- Metrics and Experiment Organization of Multiuser Preference Learning in Recommender Systems and Decision Aid, by Michal Kopecký, Ladislav Peska, Peter Vojtas and Marta Vomlelová.
- Interpretable Score Learning by Fused Lasso and Integer Linear Programming, by Nataliya Sokolovska, Yann Chevaleyre and Jean-Daniel Zucker.
- Socially Conscious Consumption: Consumers' Willingness-To-Pay for Fair Trade labels, by Friederike Paetz and Daniel Guhl.
- SVIKOR: MCDM with Stochastic Data, Subjective Expert Judgments and Different Risk Attitudes of Decision Makers, by Madjid Tavana, Francisco Javier Santos Arteaga and Debora Di Caprio.
- Dominance based monte carlo algorithm for preference learning in the multi-criteria sorting problem: Theoretical properties, by Tom Denat and Meltem Ozturk.
- Parallel personalized pairwise learning to rank, by Murat Yagci, Tevfik Aytakin, Hurol Turen and Fikret Gurgen.
- On the Identifiability of Models in Multi-Criteria Preference Learning, by Christophe Labreuche, Eyke Hüllermeier and Peter Vojtas.

- Accountable classifications without frontiers, by Khaled Belahcene, Christophe Labreuche, Nicolas Maudet, Vincent Mousseau and Wassila Ouerdane.
- Query-based learning of acyclic conditional preference networks from noisy data, by Fabien Labernia, Florian Yger, Brice Mayag and Jamal Atif.
- A regret-based preference elicitation approach for sorting with multicriteria reference profiles, by Nawal Benabbou, Patrice Perny and Paolo Viappiani.
- Assessing creditworthiness of companies based on lexicographic preference lists, by Michael Bräuning and Tobias Keller.
- Possible and necessary labels in K-nn procedures to query partially labelled data, by Vu-Linh Nguyen, Sébastien Destercke and Marie-Helene Masson.
- Preference-based Reinforcement Learning using Dyad Ranking, by Dirk Schäfer and Eyke Huellermeier.
- Learning MR-Sort rules with coalitional veto, by Olivier Sobrie, Vincent Mousseau and Marc Pirlot.
- Incorporating Auxiliary Data into Recommender Systems, by Thomas Spura, Michael Baumann and Artus Krohn-Grimberghe.
- Semi-Parametric Estimation for Paired Comparisons Using SDP, by Ivo Fagundes David de Oliveira, Nir Ailon and Ori Davidov.
- Predicting diverse rankings in extreme multi-label classification, by Kalina Jasinska and Krzysztof Dembczynski.
- Optimizing the Generalized Gini Index in Multi-objective Bandits, by Robert Busa-Fekete, Paul Weng, Orkun Karabasoglu and Balazs Szorenyi.
- A Preference-Based Bandit Framework for Personalized Recommendation, by Maryam Tavakol and Ulf Brefeld.
- Statistical Inference for Incomplete Ranking Data: A Comparison of two Likelihood-Based Estimators, by Ines Couso, Mohsen Ahmadi and Eyke Huellermeier.
- A Noisy Sorting-based Ranking Model, by Adil Paul and Róbert Busa-Fekete.

The decision about the format was made by the program chairs on the basis of the extensiveness and quality of the submitted paper. Moreover, for each accepted paper, there was an opportunity for an additional poster presentation. Most of the authors took advantage of this opportunity and discussed their work during the coffee and lunch breaks.

The conference ended with a closing session on November 8th, 4h30 PM.

5 Proceedings

Printed conference proceedings were distributed to all participants. The proceedings are roughly 130 pages long and comprise all 24 papers that have been accepted.

6 Social Programme

The social event started in the evening of November 7th with a joint walk from the main conference hotel (Welcome Hotel Paderborn) to the restaurant Kö 13 in the center of Paderborn, where the conference banquet took place (8–11 PM). The social event was attended by more than 40 people, and the conference dinner was very much appreciated.

7 Support

DA2PL 2016 was supported by the following sponsors: the Association of European Operational Research Societies (EURO), the Collaborative Research Centre “On-the-Fly Computing” at Paderborn University, and the GDRI ALGODEC. Thanks to this support, the conference fee could be set to an affordable price, and special support could be provided to PhD students.

8 Next DA2PL

All participants agreed that DA2PL, like its predecessors, has been a highly successful conference, and that the DA2PL series is worth to be continued (on a biannual basis). In the closing session, it was therefore decided to organize the next conference at the Technical University of Poznan, Poland, in 2018. The main responsibility for this event will be taken by Krzysztof Dembczynski.

On behalf of the Organizing Committee

Eyke Hüllermeier, Vincent Mousseau
Paderborn, Paris
January 16th, 2017