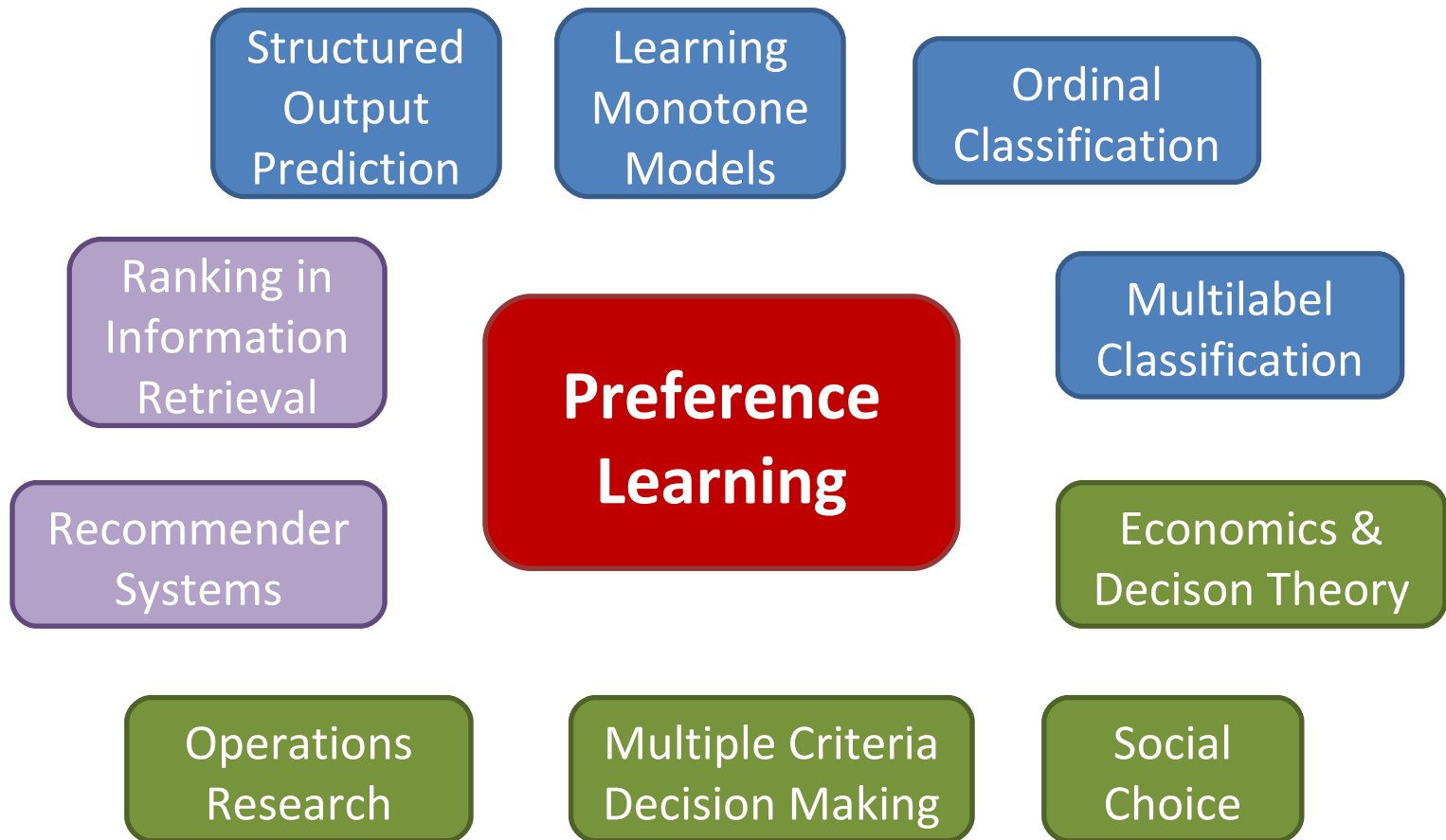

AGENDA

1. Preference Learning Tasks (Eyke)
2. Loss Functions (Johannes)
3. Preference Learning Techniques (Eyke)
4. Complexity of Preference Learning (Johannes)
5. **Conclusions**

Conclusions

- Preference learning is an **emerging subfield** of machine learning, with many **applications** and **theoretical challenges**.
- Prediction of **preference models** instead of scalar outputs (like in classification and regression), hitherto with a focus on **rankings**.
- Many existing machine learning problems can be cast in the framework of preference learning (→ preference learning „in a broad sense“)
- **„Qualitative“ alternative** to conventional numerical approaches
 - pairwise comparison instead of numerical evaluation,
 - order relations instead of individual assessment.
- Still many **open problems** (unified framework, predictions more general than rankings, incorporating numerical information, etc.)
- **Interdisciplinary field**, connections to many other areas.

Connections to Other Fields



Forthcoming Book on Preference Learning

Preference Learning: An Introduction

A Preference Optimization based Unifying Framework for Supervised Learning Problems

Part I – Label Ranking

Label Ranking Algorithms: A Survey

Preference Learning and Ranking by Pairwise Comparison

Decision Tree Modeling for Ranking Data

Co-regularized Least-Squares for Label Ranking

Part II – Instance Ranking

A Survey on ROC-Based Ordinal Regression

Ranking Cases with Classification Rules

Part III – Object Ranking

A Survey and Empirical Comparison of Object Ranking Methods

Dimension Reduction for Object Ranking

Learning of Rule Ensembles for Multiple Attribute Ranking Problems

Part IV – Preferences in Multiattribute Domains

Learning Lexicographic Preference Models

Learning Ordinal Preferences on Multiattribute Domains: the Case of CP-nets

Choice-Based Conjoint Analysis: Classification vs. Discrete Choice Models

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Part V – Preferences in Information Retrieval

Evaluating Search Engine Relevance with Click-Based Metrics

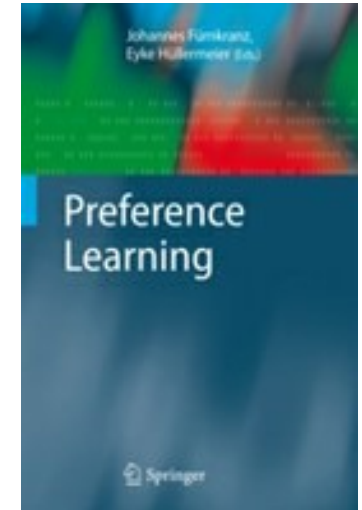
Learning SVM Ranking Function from User Feedback Using Document Metadata and Active Learning in the Biomedical Domain

Part VI – Preferences in Recommender Systems

Learning Preference Models in Recommender Systems

Collaborative Preference Learning

Discerning Relevant Model Features in a Content-Based Collaborative Recommender System



J. Fürnkranz &
E. Hüllermeier (eds.)
Preference Learning
Springer-Verlag 2010

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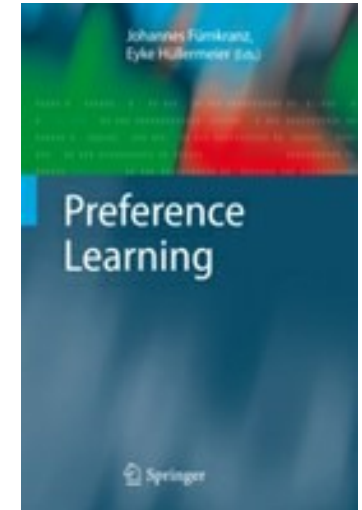
Part VI – Preferences in Recommender Systems

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includes several introductions
and survey articles



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Schedule for Today

- **12.15-13.45: Preference Learning Algorithms**

 - J. Zabkar, M. Mozina, T. Janez, I. Bratko, J. Demsar. Preference Learning from Qualitative Partial Derivatives

 - J. Giesen, S. Laue, K. Nimczick. Measuring a Lexicographic Bias in Linear Conjoint Analysis Models

 - A. Airola, T. Pahikkala, T. Salakoski. Large scale training methods for linear RankRLS

 - D. Devlaminck, W. Waegeman, B. Bauwens, B. Wyns, P. Santens, and G. Otte, From circular ordinal regression to multilabel classification

- **15.00-16.30: Preference Learning in Recommender Systems**

 - M. Ceci, A. Appice, D. Malerba. Semantic-Based Destination Suggestion in Intelligent Tourism Information Systems

 - A. Brun, A. Hamad, O. Buffet, A. Boyer. Towards Preference Relations in Recommender Systems

 - K. Christidis, D. Apostolou and G. Mentzas. Exploring Customer Preferences with Probabilistic Topics Models

 - L. Pizzato, T. Chung, T. Rej, I. Koprinska, K. Yacef, J. Kay. Learning User Preferences in Online Dating

- **17.00-18.10: Rule-Based Preference Learning**

 - B. Pieters, A. Knobbe, S. Dzeroski. Subgroup Discovery in Ranked Data, with an Application to Gene Set Enrichment

 - C. Sa, C. Soares, A. M. Jorge, P. Azevedo, J. Costa Mining Association Rules for Label Ranking

 - M. Ceci, A. Appice, C. Loglisci, D. Malerba. Preference Learning for Document Image Analysis

- **18.10-18.30: Final Discussion**

- **19.30: Follow-up meeting (?)**