



Binary Classification, Multi-label Classification and Ranking: A Decision-theoretic Approach

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- **Wojciech Kotłowski:**

- ▶ Main interest: **machine learning** (online-learning, matrix learning, preference learning, learning theory)
- ▶ Past interest: multi-criteria decision aiding, decision rule models
- ▶ Education: MSc (2004 in Computer Science, 2006 in Physics), PhD (2009).
- ▶ Postdoc: Centrum Wiskunde & Informatica (2009-2012).



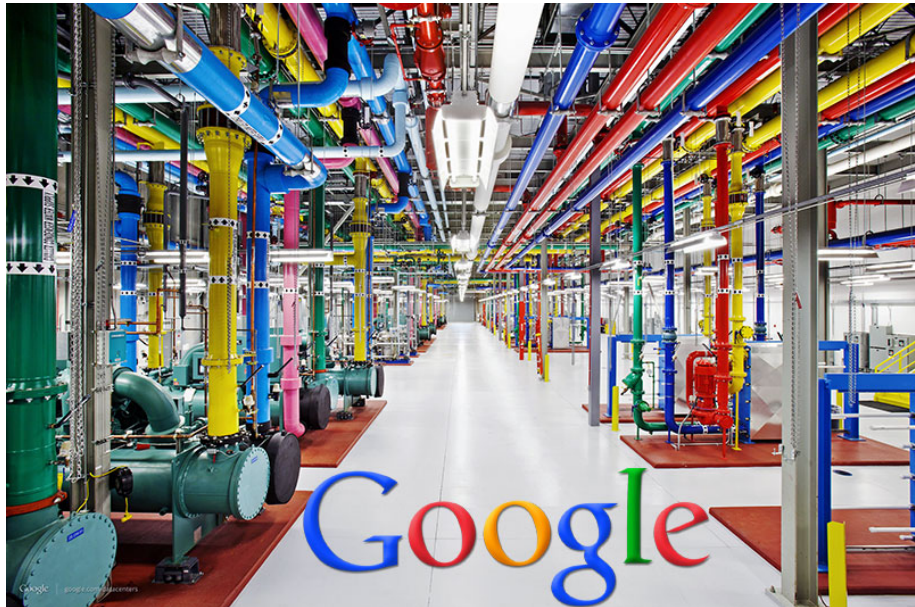
- **Krzysztof Dembczyński:**

- ▶ Main interest: **machine learning**
(multi-label classification, structured output prediction, preference learning, learning theory)
- ▶ Past interest: multi-criteria decision aiding, decision rule models
- ▶ Education: MSc (2001), PhD (2009).
- ▶ Postdoc: Marburg University (2009-2011).



- We both work in Laboratory of **Intelligent Decision Support Systems**, headed by **Roman Słowiński**, at **Poznań University of Technology**.
- We try to do our best in machine learning: conference articles at **ICML**, **NIPS**, **COLT**, journal articles in **MLJ**, **DMKD**, **TDE**, serving as PC members of major AI conferences (**ICML**, **NIPS**, **COLT**, **IJCAI**, **AAAI**).

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Active Competitions

All Competitions

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			The Hunt for Prohibited Content Predict which ads contain illicit content	3 months 28 teams \$25,000

A plenty of machine learning competitions

Binary classification

- We know relatively much about solving simple learning problems such as binary classification:
 - ▶ Advanced theory,
 - ▶ Implemented fast algorithms,
 - ▶ Almost a mature technology,
 - ▶ The main problems are: feature engineering and gathering of supervised examples.
- But we need to go beyond this problem . . .

Agenda

- 1 Binary Classification
- 2 Bipartite Ranking
- 3 Multi-Label Classification
- 4 Reductions in Multi-Label Classification
- 5 Conditional Ranking

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