Topic: Preference Aggregation and Preference Elicitation

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Course content

After recalling some fundamental notions of decision theory, the course presents methods and algorithms for handling preferences.
First, we will see languages to represent preferences so that reasoning can be performed in an efficient way. Second, we will address the problem of acquiring preference information by interactive elicitation approaches. Third, we will consider aggregating presences in multi-objective settings (where we want, among other things, to formalize the notion of fairness) and in social choice for group recommendations. Finally, we will look at rankings and methods for learning preferences from data.

Topics

- Foundations of decision theory, utility theory, decision-making under uncertainty, decision-making under risks. (quick reminder)
- Languages for representing preferences (CP networks, GAI models,..)
- Incremental preference elicitation: approaches based on minimax regret, Bayesian approaches
- Aggregation in multi-objective optimization (Choquet,Sugeno), and elicitation
- Social choice theory and group recommendations
- Models for rank data: distance-based models, probabilistic models.
- Preference Learning and an introduction to recommender systems (time permitting)

Related Textbooks

- Martin Peterson. *An Introduction to Decision Theory*. Cambridge University Press, 2017.
- Vicenç Torra, Yasuo Narukawa. *Modeling decisions - information fusion and aggregation operators.* Springer 2007.
- Stuart Russell and Peter Norvig. *Artificial Intelligence: A Modern Approach*, 4th edition, Pearson *(chapters 15 and 16).*
- Johannes Fürnkranz and Eyke Hüllermeier (Editors). *Preference Learning.* Springer, 2011.