Decision Making under Complex Information with Applications to Statistics and Machine Learning

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and online via Zoom (Link)
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This talk gives a preliminary outline of my intended cumulative habilitation project. Broadly speaking, the project is about how the decision- theoretic framing of situations under weakly structured information (e.g., complex order structure or imperfect probabilistic information) can be used to solve problems from statistics and machine learning with non-standard data and/or under non-standard uncertainty models.

More concretely, the talk comprises three parts: The first part gives a brief introduction to (statistical) decision theory and outlines how it can be extended to situations under weakly structured information. The second part deals with the question of how the central ordering structure in this context, so-called preference systems, can be algorithmically elicited as efficiently as possible and what benefit is gained from this for the resulting decision theory. Finally, the third part of the talk shows the strengths of a decision-theoretic approach in the context of machine learning. By using this approach, a framework for comparing classification algorithms with respect to multiple criteria simultaneously can be developed, which can also be tested statistically. The talk concludes with some promising perspectives for future research projects.

Biography:
Christoph Jansen is a postdoctoral researcher in the Foundations of Statistics and their Applications group at the Department of Statistics of LMU Munich. In the summer term 2022 he was an interim professor at the same group. Christoph received his PhD in 2018 and his research is at the intersection of statistical decision theory, applied mathematics, and machine learning.