

Data and decisions

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17-21 September 2018 (5 sessions) | 09:30 - 11:30 (a total of 10 hours)

Data serves to improve decision making. Data has been shown to be an extremely useful resource in many fields including communications, information technology, weather forecasting, and economics, where data processing techniques developed under paradigms such as machine learning and data science are enabling many critical applications. This course provides an introduction to data-based decision problems from classical decision/game theory developed in the 40s by von Neumann, Blackwell, and others to its application to modern machine learning problems.

PROGRAMME:

1. Decision problems
 - 1.a. Consequences and preferences
 - 1.b. Actions, states, and loss functions
 - 1.c. Entropy, regret, and divergence
2. Data-aided decision problems
 - 2.a. Value of data
 - 2.b. Data transformations
 - 2.c. Blackwell's theorem

PREREQUISITES: Basic knowledge of probability calculus and linear algebra.

REFERENCES:

- [1] D. V. Lindley, Making decisions. John Wiley and Sons, London, 1985.
- [2] Peter D. Grünwald and A. Philip Dawid. "Game theory, maximum entropy, minimum discrepancy and robust Bayesian decision theory." *Annals of Statistics*, 32(4): 1367–1433, 2004.

***Registration is free, but inscription is required before 12th September:** So as to inscribe go to <https://bit.ly/2m8NkZ6> and fill the registration form. Student grants are available. Please, let us know if you need support for travel and accommodation expenses when you fill the form.