

# INFORMATION THEORY BASED INFERENCE, AND APPLICATIONS FOR DATA MASSIVES

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## **Abstract**

Traditionally, information theory focused upon applications in [tele]communications and referred mainly to coding, transmission, or compression of signals. However, implicitly, from its very beginning, information theory was closely related to statistics and machine learning. Thus, many other fields like stochastic inference, estimation and decision theory, optimization, communication or knowledge representation benefit from basic results from information theory.

The goal of the tutorial is to overview applications and new developments in information theory relevant to inference, as well as general methods for information processing and understanding. Among the topics envisaged are: applications and extensions of Rate-Distortion theory, the methods of information bottleneck, ICA and source separation, MDL and related methods, information and/or complexity based estimation, and inference, and applications like entropy of shape, coding of image semantics, image information mining, etc.