Information-theoretic estimation

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Neyman and Scott showed the statistical inconsistency of maximum likelihood for a problem in which two data are sampled from each of arbitrarily many Gaussian distributions, where each Gaussian distribution has an unknown mean and shares the same unknown standard deviation, sigma. A similar inconsistency in maximum likelihood can be shown in single (and multiple) factor analysis for simultaneous estimation of load and score vectors. Maximum likelihood can also be shown to be inconsistent for fully-parameterised Gaussian mixture modelling.

Minimum message length (MML) (Wallace and Freeman, 1987, Journal of the Royal Statistical Society Series B 49, 223-65) is an information-theoretic Bayesian point estimation method which is invariant and whose general statistical consistency is attested to by general theoretical results (e.g., Wallace and Freeman, 1987). MML has been shown in practice to be consistent and to perform well for the problems above (e.g., Dowe and Wallace, 1997, Computing Science and Statistics 28, 614-18) and also to perform well for small samples from circular data.

Dowe recently conjectured that "any estimation technique which is always both invariant and statistically consistent while always providing internally consistent (concurring) parameter estimates must necessarily be Bayesian."

The panel will discuss issues pertaining to the conjecture and its importance.

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