The Full Bayesian Significance Test for Separate Hypotheses

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Abstract

A typical problem of discriminating between models consists of determining which of m alternative models, $f_k(x, \psi_k)$, more adequately fits or describes a given dataset. In general the parameters ψ_k have distinct dimensions, and the models f_k have distinct (unrelated) functional forms. In this case it is usual to call them "separate" models (or hypotheses). Atkinson [1], although in a different theoretical framework, was the first to analyse this problem using a mixture formulation, $f(x|w_1 \dots w_m, \psi_1 \dots \psi_m) = \sum_{k=1}^{m} w_k f_k(x, \psi_k)$, where $w_k \geq 0$, $\sum_{k=1}^{m} w_k = 1$.

The Full Bayesian Significance Test (FBST) was introduced by Pereira and Stern in 1999 and its invariant formulation was presented by Madruga et al [2]. The FBST was applied in mixture model selection by Lauretto and Stern [3] and performed very well when compared with model-based clustering methods.

In this article we propose the FBST as a robust tool for the test of separate hypotheses, in the context of mixture formulation. Simulated experiments in the Lognormal *versus* Gamma and other classical problems are analysed, where the FBST performance is compared with Bayes Factors [4].

References:

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