

BAYESIAN ANALYSIS OF THE VAN BAAREN MODEL FOR PAIRED COMPARISON

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Abstract

The technique of paired comparison is being commonly studied these days because of its attractive applications for the comparison of several objects, simultaneously. This technique permits the ranking of the objects by means of a score, which reflects the merit of the items on a linear scale. The present study is concerned with the Bayesian analysis of a paired comparison model, namely the van Baaren model VI using the informative and the conjugate priors. For this purpose, an inclusive elicitation technique to evaluate the hyperparameters of the prior distributions has also been elaborated. The joint posterior distribution for the parameters of the model, their marginal distributions and their inferences are obtained via programming in the SAS package. The model is also tested for its appropriateness.

Keywords: Bayesian hypothesis testing; Conjugate prior; Informative prior; Posterior distribution; Predictive probability.

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1. Introduction

When the objects that can be scored on the same scale, are compared subjectively, they are ranked on the basis of the scores. In some cases, especially when more than two objects are being compared simultaneously, it is not possible to assign the score to every object on the same scale. In such circumstances, the technique of paired comparison comes to rescue. In this method, the treatments are presented in pairs to one or more judges who in the simplest situation, choose one from the pair or simply just have no preference. Wherever sensory testing is involved, this method has its frequent applications. It is used in taste testing, in professional and intercollegiate sports competitions, market

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