Bregman Cost for Non-Gaussian Noise

One of the tasks of the Bayesian inverse problem is to find a good estimate based on the posterior probability density. The most common point estimators are the conditional mean (CM) and maximum a posteriori (MAP) estimates, which correspond to the mean and the mode of the posterior, respectively. From a theoretical point of view it has been argued that the MAP estimate is only in an asymptotic sense a Bayes estimator for the uniform cost function, while the CM estimate is a Bayes estimator for the means squared cost function. Recently, it has been proven that the MAP estimate is a proper Bayes estimator for the Bregman cost if the image is corrupted by Gaussian noise. In this work we extend this result to other noise models with log-concave likelihood density, by introducing two related Bregman cost functions for which the CM and the MAP estimates are proper Bayes estimators. Moreover, we also prove that the CM estimate outperforms the MAP estimate, when the error is measured in a certain Bregman distance, a result previously unknown also in the case of additive Gaussian noise.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, Scientific Computing, Westfälische Wilhelms-Universität Münster
Contributors: Burger, M., Dong, Y., Sciacchitano, F.
Number of pages: 12
Publication date: 2016

Publication information
Place of publication: Kgs. Lyngby
Publisher: Technical University of Denmark (DTU)
Original language: English
(DTU Compute-Technical Report-2016; No. 8).
Electronic versions:
tr16_08_Burger_M.pdf
Research output: Research › Report – Annual report year: 2016