A simple mixture model for probability density estimation based on a quasi divergence

Osamu Komori
Department of Electrical and Electronics Engineering
University of Fukui
3-9-1 Bunkyo, Fukui 910-8507, Japan
e-mail: o_komori@u-fukui.ac.jp

Shinto Eguchi
Department of Mathematical Analysis and Statistical Inference
The Institute of Statistical Mathematics
10-3 Midori-cho, Tachikawa,Tokyo, Japan
e-mail: eguchi@ism.ac.jp

A simple mixture model for probability density estimation is proposed based on a loss function associated with a generator function Φ. The function Φ is assumed to be a strictly increasing and concave function, leading to a class of quasi divergence that does not require a bias correction term to obtain a consistent probability density estimator. This property enables us to conduct the probability density estimation in a computationally efficient way, which is in clear contrast with the property of the original U-divergence. The statistical as well as information geometric properties are investigated. Some simulation studies are conducted to demonstrate the performance of the proposed method.

Keywords: Probability density estimation, Quasi divergence, U-divergence References

References

[1] Murata, N., Takenouchi, T., Kanamori, T. and Eguchi, S. (2004). Information geometry of U-boost and Bregman divergence. *Neural Computation 16*, 1437?1481