On the convergence and consistency of the blurring mean-shift process

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Abstract The mean-shift algorithm is a popular algorithm in computer vision and image processing. It can also be cast as a minimum gamma-divergence estimation. In this paper we focus on the "blurring" mean-shift algorithm, which is one version of the mean-shift process that successively blurs the dataset. The analysis of the blurring mean-shift is relatively more complicated compared to the nonblurring version, yet the algorithm convergence and the estimation consistency have not been well studied in the literature. In this paper we prove both the convergence and the consistency of the blurring mean-shift. We also perform simulation studies to compare the efficiency of the blurring and the nonblurring versions of the mean-shift algorithms. Our results show that the blurring mean-shift has more efficiency.