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Indirect Estimation of Signal-Dependent Noise With Nonadaptive Heterogeneous Samples

Abstract:

We consider the estimation of signal-dependent noise from a single image. Unlike conventional algorithms that build a scatterplot of local mean-variance pairs from either small or adaptively selected homogeneous data samples, our proposed approach relies on arbitrarily large patches of heterogeneous data extracted at random from the image. We demonstrate the feasibility of our approach through an extensive theoretical analysis based on mixture of Gaussian distributions. A prototype algorithm is also developed in order to validate the approach on simulated data as well as on real camera raw images.