ORDER STATISTICS−BASED UNBIASED HOMOMORPHIC SYSTEM TO REDUCE MULTIPLICATIVE NOISE (WedPmPO4)

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Abstract :

In this paper, we propose an order statistics−based unbiased homomorphic system to reduce multiplicative noise. The design of such a system is based on the probability density function (PDF) of the noise. First, we generalize the order statistics−based nonlinear filter called the sampled function weighted order (SFWO) filter proposed in [1] to reduce additive noise, to the case when the additive noise is not symmetric. This generalized SFWO (GSFWO) filter is then used in a homomorphic system to reduce multiplicative noise corrupting a signal. It is shown that the output from this GSFWO filter−based homomorphic system will be biased and hence, a bias compensation technique is applied to the output to get the unbiased estimate. A study of the qualitative and quantitative performance of the proposed GSFWO filter−based unbiased homomorphic system in reducing multiplicative noise is carried out and compared to that of some of the existing ones. It is found that the proposed GSFWO filter−based system consistently outperforms the others irrespective of the type of the PDF of the multiplicative noise.

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