

IMPULSE NOISE FILTERING USING GENETIC ALGORITHM

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Abstract

A method for impulse noise filter construction, based on the switching scheme with two cascaded detectors and two corresponding estimators is constructed. Genetic programming as a supervised learning algorithm is employed for building two detectors with complementary characteristics. Both detectors are based on the robust estimators of location scale-median and Median of Absolute Deviations. This filter is capable of effectively suppressing all kinds of impulse noise, in contrast to many existing filters which are specialized only for a particular noise model. Estimators are precise in estimating the noise in the filtered pixel left out by the detector. The samples marked as noisy by the first detector is not treated by the second. The proposed model is a combination of commonly used noise models: salt-and-pepper and uniform impulse noise models. The salt and pepper noise and impulse noise in an image are effectively detected and eliminated by employing genetic algorithm to the components of the detector. The evolutionary approach has allowed the development of high performance detector structure, which would otherwise be impossible to construct.

Keywords : Genetic algorithm, digital image processing, filters

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