Abstract

In recent years, ultrasonography is being used for effective diagnosis of various organs such as the heart, kidney, prostate, liver, ovary, uterus, thyroid glands etc. Unfortunately, one of its shortcomings is the low contrast, high noise images which are an inevitable byproduct. This is due to an artifact known as "Speckle" which obscures fine details in an image and may lead to erroneous diagnosis. Hence Speckle Filtering is a prerequisite in ultrasonography, provided that the features of interest for diagnosis are not lost. This paper presents a Hybrid and multistage Filtering approach in order to reduce the Speckle noise and improve the visual quality for better diagnosis. The performance of our approach is compared with the other Speckle reduction Filters on the basis of image quality parameters like Peak Signal to Noise Ratio (PSNR), Effective Number of Looks (ENL), Image Quality Index (IQI) and Mean Structure Similarity Index Map (MSSIM). We could achieve in Multistage approach a better performance with higher value of PSNR (79.915), IQI (0.9497), MSSIM (0.9945) and ENL (0.0984) compared to Hybrid Filter.
A Novel Approach for Speckle Reduction and Enhancement of Ultrasound Images


Index Terms

Computer Science  Signal Processing
Keywords
Spatial Filter  Hybrid Filter  Multistage Filter  Matlab