ABSTRACT

Information technology has seen significant developments with innovations in communication technologies and image processing techniques. Most of the information consists of images and generation, transmission and decoding of images are major activities in everyday life. Corruption of images with noises may take place in every part of generating, transmitting and decoding of images. Noise reduction is an essential part in any image processing applications. Removing noise with retention of image information is a major challenge.

In this thesis works efforts are made to develop hybrid filters using wavelet thresholding and bilateral filters in different configurations to exploit the meritorious features of both the filters and at the same time overcome their limitations. The configurations and parameters of the different proposed filters are tuned and evaluated first by trial and error method. Three models out of 48 models are found to be comparatively better. The parameters of these three models are optimized using floating point genetic algorithm (FPGA) for finding the most promising model.

It is observed that application of bilateral filters on wavelet decomposed subbands in any combination with wavelet thresholding deteriorates the performance of the model, whereas, application of bilateral filters before or after or on both before and after decomposition enhances the performance. Also, efforts are made to improve the most promising hybrid model by replacing the wavelet soft thresholding based filter part with fuzzy soft thresholding and tested on different images impregnated with high level of noises. Performance of the most efficient hybrid model is encouraging and impressive.