Chapter – 7
CONCLUSION

In this thesis, we conclude that the proposed decision-based, edge-detail preserving algorithm has both the characteristics of computational efficiency and image restoration. It maintains a great balance between both of them. From the results one can easily find that the proposed algorithm outperforms the other existing filters visually, quantitatively and temporally as detailed in Chapter 2.

In Chapter 3, we have proposed a method to remove the salt and pepper noise using B-splines. The results for two images are shown. From these results, it is clear that the algorithm works efficiently up to 95% salt and pepper noise. The proposed method provides efficient result due to the continuity properties of the B-splines. From the result we can find out that after applying the proposed method the images corrupted with salt and pepper noise have better PSNR and SSIM values. After the comparison done with various other methods it shows that our proposed algorithm works better than the many methods used for removing salt and pepper noise.

In Chapter 4, we have proposed an expeditious algorithm for removing the salt and pepper impulse noise in fingerprint images using B-spline interpolation. The algorithm not only removes noise from the fingerprint image but also does efficient edge detail preservation. The quantitative performance of the proposed algorithm is evaluated using measures like PSNR for % Noise density ranging from 15% to 95% as shown in Table 4.1. The figures 2-6 shows the efficiency of proposed algorithm. The algorithm is fast enough in having time complexity of only 45 seconds using MATLAB 7.14 with a Core 2 Duo 2.2 GHz processor system.
In Chapter 5, we have proposed adaptive median-based lifting filter for the salt and pepper denoising. The lifting scheme of the second-generation wavelets has been modified. The computed results of the proposed filter is compared with various existing filters. The comparison of these results shows the superiority of the proposed filter in terms of image quality measured through Mean SSIM, PSNR and good computational efficiency.

The proposed algorithm using median-based lifting filter generates results that are superior to the existing methods for noise removal. The algorithm has been seen to yield better PSNR than given in [1-2] and [4–10]. First, we compare our results with Edge Preservation Filter [EPF] of [41]. The comparative evaluation of our proposed method with [41] has been done in Table 1. Our proposed algorithm gives excellent PSNR values greater than 43dB for noise ratios less than or equal to 10%. For noise ratios between 10% and 20%, the PSNR varies between 43.0821 and 39.0591dB.

Even for a noise ratio of 50%, we get a PSNR of 33.2258dB with 2 iterations of the algorithm. All theresultsgeneratedfornoiseratioslessthan50%havebeen generated by a single iteration of the algorithm. For noise ratios of 80% and 95%, we get PSNR values of 24.4037 and 23.8363dB respectively. It took 3 iterations of the algorithm to get the results in the case of 80% noise and 4 iterations of thealgorithmminthecaseof95%noise. For implementing our algorithm, we have used MATLAB 7 on a 1.73-GHz Pentium M Processor with 256MB of RAM. The algorithm has been found to be pretty fast. For restoring 512×512 Lena image corrupted with 95% noise, we needed 4 iterations of our algorithm and the execution took only 96s.