CHAPTER VI

CONCLUSION

6.1 Summary of the Results

The proposed new fuzzy based adaptive median filtering algorithms for removing high density impulse noises in digital color images can provide much acceptable and recognizable image restoration even with 5% of input signal. It can give better results at 35%, 55% and 75% noise levels with an incomparable visual quality than other adaptive median filters. Although, the median filters such as SMF, RAMF, DBA and improved DBA algorithms are giving better results in the quantitative metrics of up to 60% noise level, they produce impulse patches at the noise level greater than 60%.

Furthermore, DBAs produce horizontal and diagonal streaks at high noise densities. But the proposed fuzzy logic decision based median filters eliminate the streaking effect by careful selection of neighboring pixels. The proposed filters are faster than RAMF ASMF, FBDA and NAFSMF, since they use a small and fixed window of size $3 \times 3$. In addition, they affect a smooth transition between the pixel values by utilizing the correlation between neighboring processed pixels while preserving edge details, thus leading to better edge preservation. The proposed filters are tested from low to high noise densities ranging up to 95% on different grayscale images and color images, that yield recognizable and patches free image restoration. The significant difference in PSNR, MSE, MAE, RMSE, Processing Time, IEF, SSIM, IQI and visual perception from other competitive non fuzzy and fuzzy filters.
quantify a dominance of the proposed filters. It is evident that the proposed algorithms results outperform the existing methodologies.

6.2 Future Scope of the Work

As a future work, the proposed filters can be extended to restore the digital images and digital videos corrupted by other impulse noise models that include

- random valued impulse noises
- additive impulse noises (Impulses followed by Cauchy and Gaussian distribution)

This can be tried by accommodating more intelligent hybrid soft computing techniques into the domain of impulse restoration.

Furthermore, the proposed filters can be extended to a global module towards the restoration of all types of impulse corrupted digital images through all the impulse noise ratios can be tried in the future.