CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 INTRODUCTION

The results of this study are summed up by way of conclusion in the following section. Some possible ways to extend and develop the scope of this study are highlighted in the second section.

7.2 SUMMARY OF THE WORK DONE

In this study, compression of video signals has been presented. Video compression refers to image compression with motion compensation. This is achieved by exploiting the different types of redundancy in a video and by reducing the redundancy.

Video normally consists of multiple shots and adjacent shots in a video may not be correlated. So the first objective of this thesis is to propose a new concept to detect shot changes and to extract key frames from each shot. SSIM, a quality metric, has been used in this work to detect the shots and to identify the key frames within each shot by introducing a threshold value. Experiments are performed using the proposed technique for the standard video clippings like Claire, Carphone, Mobile etc.

Based on the threshold selection, the probability of false alarm and missed detection change. Performance measures like precision, accuracy and RSI are calculated for the SSIM based shot detection approach and the results
are compared with two existing methods. Next, key frames are identified from each shot using the SSIM concept. It can be observed from the results given in Chapter 3 that the number of shots and key frames extracted varies with respect to threshold value selected. So an adaptive threshold has been used for the proposed shot detection algorithm. It can be noticed that the SSIM technique provides better results.

Video compression is possible by eliminating intra as well as inter frame redundancy. Key frames extracted from each shot are treated as intra frames and a simple intra frame concept which uses SSIM along with LZW coding has been proposed to eliminate the redundancy within the key frames. From the experimental results given in Chapter 4, it is clear that the proposed concept improves the compression ratio and the reconstructed frame quality is also better.

In Chapter 5, a hybrid search algorithm has been proposed which involves the search patterns of both CDS and E3SS algorithms. The performance of the proposed algorithm is evaluated in terms of number of search points, computational time and PSNR. Experimental results prove that proposed algorithm performs better than E3SS and CDS in terms of number of search points and computational time. Temporal prediction errors are computed using interpolation and extrapolation concepts and from the results given in Chapter 5, it is clear that the prediction is good and the interpolated frames are the same as the original frame for the different inputs considered. So the prediction error is very low and bit requirement for encoding the prediction error is also reduced resulting in better compression.

Compression and transmission of patient video signals along with ECG and EEG through telemedicine is essential for making effective critical diagnosis. In Chapter 6 of this dissertation an effort has been made to compress patient video using the proposed concept. For the experimental
study, video sequences of the patient were considered. Only the spatial
treatment is considered for the compression issue. The performance is
evaluated in terms of compression ratio and PSNR. From the results it can be
concluded that the structural similarity approach which preserves the
structural features provides promising compression results.

7.3 FUTURE SCOPE

In this work, a simple technique based on SSIM index has been
employed for detecting the shots from the video and for identifying the key
frames within a shot. SSIM based shot detection produces good results when
the video contains abrupt scene changes like the mixed video. When the
algorithm is tested with cricket match video sequence consisting of fade in,
fade out and dissolve, the results of the proposed algorithm are not
satisfactory. So in future, the algorithm may be modified further to detect hard
as well as soft boundaries.

Once the shots are detected, an attempt has been made to extract the
key frames from the shot. For this, SSIM based technique used in this work is
very simple, less complex but some modification could be done to select an
adaptive threshold so that an optimum number of key frames are selected.
When the extracted key frames are compressed using SSIM along with LZW,
some sort of blocking artifacts occur when the threshold is reduced with an
improvement in compression ratio. Suitable methods may be adopted to
reduce these blocking artifacts.

To estimate the motion vectors, a fast block-matching algorithm
with SSIM as the matching criteria may be applied so that the quality of fast
BMA is improved. In Chapter 5, temporal prediction error is computed based
on interpolation and extrapolation and the prediction is good with reduced
error values. Adaptive error modeling along with suitable context based coding may improve the compression further.

In the compression of patient video, synchronization of the patient video along with EEG signals may be considered in future. Moreover, in this dissertation to compress patient video, spatial redundancy elimination alone is considered and further work can be done to eliminate temporal redundancy.