CHAPTER VII

CONCLUSION AND FUTURE WORKS

7.1 CONCLUSION

Significant advances in digital video compression and communication methods make it possible to deliver high-quality video at low bit rates for today's networks. Many of the internet applications, such as video buffering, uploading etc., need advanced compression technologies for the ease of the operation in the application oriented environment.

The video compression method is essential for the delivery of high-quality video frame in the multimedia applications. By proper adaptation of the video compression method, the transmission of the video with the limited bandwidth to convey high-quality user information can be achieved. In the video compression, motion estimation is the vital task. Within video coding, motion estimation contributes to the largest gain in compression but is also the most computationally intensive part of it. In motion estimation, similarities between different video frames are searched and identified; redundant data are then eliminated or minimized to reduce temporal redundancy within a video sequence.

Many fast motion estimation methods have been developed over the last decade, most of these methods come with a high computational time and poor visual quality in the video compression. In this research work, two different ways to increase the PSNR and SSIM and also to reduce the computational time, of ME block in the video sequence containing motion discontinuities were suggested.

At first, this research work proposed an AOSH search algorithm and tangent weighted trade-off function for the motion estimation in the H.264/AVC video compression standard. The integration of the hybrid search scheme reduces the number of search points and the trade-off based evaluation results in the best selection of the matching block. The experimentation of the proposed motion estimation scheme results in the video compression with the better compression performance and without any compromise in the video quality. The AOSH method attained the SSIM value of

0.9725, which is 0.2125 greater than that of the H.264/AVC standard and 0.2325 greater than that of elastic motion estimation method for the garden video. The proposed AOSH algorithm achieved PSNR value of 36.889dB and 38.792dB for lower and higher bit rates respectively but the H.264 shows the values of 23.39dB, 23.45dB and elastic method show the values of 23.16dB, 23.31dB.

Secondly an AOCSH search algorithm and fuzzy tangent weighted trade-off function for the motion estimation in the H.264/AVC video compression standard was suggested. The incorporation of the cross search identifies the direction of the motion in the block, thereby reducing the need of the search point in every possible direction. The fuzzy tangent weighted trade-off function is used to evaluate the search point resulted from the square and the hexagon search. The evaluation of the proposed motion estimation scheme results in the maximum PSNR value of 39.13dB, maximum SSIM of 0.9954 and least computational time 3.28sec for the foreman video as compared to the existing video compression standards.

7.2 FUTURE WORKS

The motion estimation scheme of the video codec standards presented in this thesis may be enhanced in different ways.

- The broader problem to study in the future is to explore the theoretic aspects of the rate-distortion complexity trade-offs and their application in the video compression.
- Further reduction, in computational complexity and number of search points in the block matching algorithm, can be achieved in the future works of the motion estimation scheme.
- The discontinuities in the image frame leads to the faulty motion vector generation. The search algorithms of different patterns can be tried for the quick movement detection.
- Further enhancement can also be made for the block evaluation with the multiple parameters. The soft computing methods can also be enabled to reduce the computational complexity.