CHAPTER 14

CONCLUSION AND FUTURE WORK

14.1. Conclusion

Video transcoding is a core technology for providing universal multimedia access by the Internet users with different access links and devices. Video compression algorithms used in the standardizing H.264 are very different and difficult from that of in the previous traditional video compression standards. This research work proposed a new approach of compressed domain homogenous video transcoder using integer transform in compliance with H.264 Standard.

In this research work, the integer reversible transform has been evolved and proved. The complete architecture of compressed domain transcoder using Integer transform in compliance with H.264 Standard has been developed. It has been modified to suit hardware implementation and coded in MATLAB. Standard YUV sequences have been used and the efficacy of this algorithm has been demonstrated through various performance parameters. Input bitstreams are generated with the help of reference software and used for experimentation. The functionality of the transcoder has been thoroughly checked.

This research work paved a way of using integer transform in video transcoding architectures. The integer transform based processes definitely help implementing the algorithm in hardware. The transcoder architecture is incomplete without reuse techniques engine that creates the intelligence of transcoding. It has been proved that reuse techniques engine, the pivot of transcoding processes, reduces the complexity of processes maintain the same quality and file size.

This research work proposed the method of computing the complexity. The Reuse Model of research model has significantly reduced computational complexity. It has also been proposed that the combination of Quality, File size and Complexity shall be used as one of the important metrics to evaluate the video processing.
14.2. Future Work

This research work has created three avenues for future work, as follows.

i. Implementation of this algorithm

ii. Exploration-in-depth of processes in this research work

iii. Extension to different transcoding techniques

This algorithm is implemented in MATLAB environment. The same can be implemented using ‘C’ or ‘C++’ to create software transcoder. Firmware and Hardware implementation also can be developed.

This research focussed on integer 4x4 transform only. The integer 8x8 transform may be defined to address 8x8 prediction types, its transforms and mode decisions. Mode Decision based on different transforms (like HADAMARD) can be tried. Simplification of Motion Estimation with less computation can be another area of interest. Refinement of motion estimation with the help of reuse supplied syntax elements can be done. Handling Bi-Predictive Frames (B-Frames) in Standalone Model and Reuse Model can be addressed separately. The syntax element modification techniques in reuse engine for different GOP can be explored as a significant research area.

The research work may be extended to other profiles such as Main, Extended Profiles in H.264 Standard. There are possible research areas which can work on bitrate and / or frame rate adaptation in compressed domain. At the CODEC level, H.265 transcoding is the next coming technology. The compressed domain transcoder in compliance with H.265 may be developed based on this research work.