# ABSTRACT

The video stream represents the continuous and rapid flow of image files. The video coding performs the compression of both image and audio information. The video compression standards associated to ITU-T and ISO are MPEG-X and H.26X standards. The H.264/AVC is leading video compression standard and it has been adopted in many video coding applications.

In order to compress the video for efficient transmission and storage, the redundancy among adjacent frames must be exploited. A frame is selected as reference and subsequent frames are predicted from the reference frame using a technique known as motion estimation. The purpose of achieving redundancy in motion compensated prediction is to find the best possible block matching without considering a large number of search points to minimize the compression efficiency.

In this research work, two approaches concerned with the block matching for making easy of computation in finding the frame proposed on H.264/AVC. In the first approach, Adaptive Order Square Hexagon (AOSH) search algorithm was developed. AOSH is the integration of square and hexagonal search pattern for finding the searching point with the designed order of the depth. A tangent weighted trade-off criterion is also developed to validate the search points. In the second approach, Adaptive Order Cross Square Hexagon (AOCSH) search algorithm was the combination of the cross, square and hexagonal search pattern was developed.

The validation functions based on the trade-off in the AOSH and AOCSH motion compensated prediction approaches handles the bi-objective of the visual quality and the distortion. The performance of the AOSH and AOCSH method using H.264/AVC are evaluated based on the metrics namely, Structural Similarity Index (SSIM), Peak Signal to Noise Ratio (PSNR) and computational time.

The proposed AOSH algorithm achieves close performance with AOCSH and uses less number of search points, when compared with the existing search algorithms, such as H.264/AVC and Elastic motion estimation method, these algorithms take less computation time and provide good compression efficiency.

***Keywords:*** *Cross search, Square search, Hexagon search, Motion estimation, H.264/AVC, Structural similarity index, Peak signal to noise ratio.*