EAST WEST UNIVERSITY

# Group Work

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**Submitted By**

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## Submitted To


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This article tries to integrate the benefits of two crucial transformations in picture compression, the Discrete Cosine Transform (DCT) and Haar wavelet transform. Two methods were used: creating a new hybrid transform and applying the Haar and DCT transforms independently to each 8x8 block. Findings demonstrate that our technique works better than the existing DCT and Haar approaches, maintaining decent picture quality even at high compression ratios, providing a higher PSNR than DCT for the same compression ratio, and enabling better edge recovery than the Haar transform. Image compression is an effective method for minimizing the amount of highly linked data needed to describe a picture. Two well-liked methods for compressing images are the Wavelet Transform and the Haar Transform.

The Peak Signal-to-Noise Ratio (PSNR) gauges how well lossy compression can reconstruct audio. To get a higher peak signal-to-noise ratio (PSNR), this study proposes a hybrid DCT-Haar block compression approach that includes both of them. The procedure entails dividing the image into 8x8 blocks, computing the DCT and Haar transforms for each block, applying a specific quantization, getting the PSNR of both results, sending the block with the highest PSNR, and sending a signaling bit indicating the type of transform. The 8x8 block's relevant information is extracted using energy compactness and quantization, and the leftover data is set to zero. DCT quantization concentrates the low frequencies that carry important information in the block's top left corner, while the values below a threshold are zeroed after performing the Haar transform.

To compare the algorithm's effectiveness, the compression ratio must be computed. We utilized a series of four grayscale images to test our suggested methodologies. This study compared the effectiveness of the DCT and Haar transforms used on 8x8 blocks using the same quantization technique. The findings showed that for certain pictures, our approach, especially when there is greater compression, offers a higher PSNR than DCT for the same value of m. It was also evident that our technique has a greater recovery than DCT for the Barbara picture, which contains a lot of high frequencies due to the large number of edges.

This study showed that employing the DCT and Haar transforms together produces better outcomes than using each one separately. Findings demonstrated that our technique consistently provides a greater PSNR than the DCT transform used alone for the same parameter m, as a result, the PSNR rises and the edge recovery of the Haar transform is improved.