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VIDEO COMPRESSION

Homework #3 – ENTROPY CODING

METHOD

Quantization table

16	11	10	16	24	40	51	61
12	12	14	19	26	58	60	55
14	13	16	24	40	57	69	56
14	17	22	29	51	87	80	62
18	22	37	56	68	109	103	77
24	35	55	64	81	104	113	92
49	64	78	87	103	121	120	101
72	92	95	98	112	100	103	99

Encode:

Use two for-loop with a step size of 8 (block size) to visit all 8x8 blocks.
For each block, perform DCT and then divide the result by quantization table to obtain quantized DCT 2D-array.
Use zigzag_order function to visit all pixels in one block and get a 1D-array output.
Use RLE_encoding function to encode the zigzag_order output, and save all function outputs to an encoded array.
Save final encoded array to "np.npz", this is image DCT encode value.

Decode:

Use RLE_decode function with encoded array to get decoded image.

Function:

Zigzag_order function is zigzag scan. It is used for encoding will convert a 2D-array input to a 1D-array output, for decoding will convert a 1D-array input to a 2D-array.
RLE_encoding function counts the number of zero pixels and appends the total number of zero pixels along with now non-zero pixel to the output array.
RLE_decode function is used to restore each 8x8 block. Process each value of encoded to get a decoded 1D-array, then use zigzag_order to get decoded block, append all decoded block to list. Use two for-

loop with a step size of 8 (block size) to visit all 8x8 blocks, take the corresponding block multiply by quantization table, then use IDCT to get the result, put the result to corresponding location.

RESULT

Encode block DCT

Decode

Feedback

The decoded image also shows clear traces of each block, the decoded image cannot be like the original image because after encoding, the image is divided into blocks for processing, and some information is lost during the DCT and quantize processes, so there is no way to completely restore it during decoding, and there will be some small errors.