Lossless JPEG Image Compression

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Using MATLAB

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❖ Algorithm

Consists of 2 Stages:

- **Prediction Stage**
  1) 3 arrays corresponding to the RGB components are constructed respectively from the original image.
  2) Another 3 arrays are constructed from the original image using the following pixel prediction scheme (A + (B – C) / 2) (Gave the best result out of the 7 available schemes).
  3) The predicted 3 arrays are subtracted from the original 3 arrays and stored in another 3 arrays corresponding to the difference between the original and the predicted image.

- **Encoding Stage**

  The 3 difference arrays are encoded using the Huffman Coding Scheme.

❖ Code Structure

Is similar to a C program where it consists of the following functions:

- **main**

  Scans the original image and generates both the predicted and difference images then invokes the remaining functions to perform the encoding stage.

- **build_huffman**

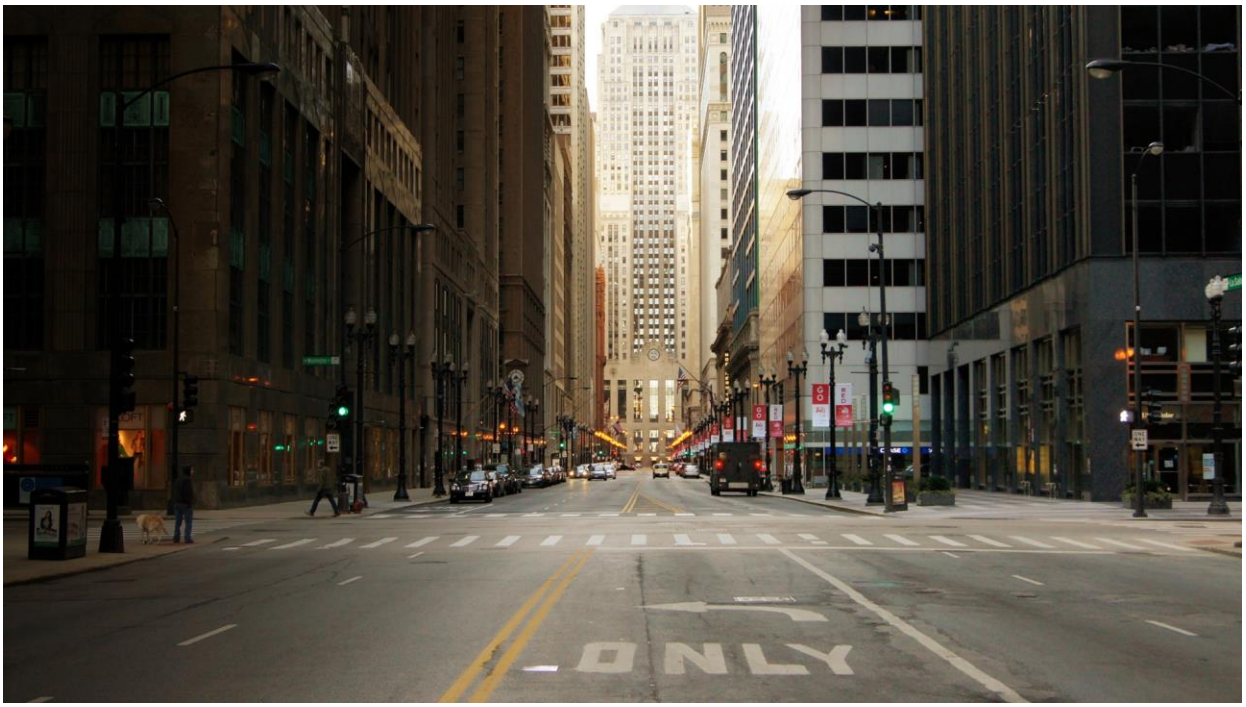
  Constructs a Huffman tree from a given histogram.

- **traverse**

  Traverses a given Huffman tree to produce the count of bits of the compressed image.

❖ Example

Original Image



Compression Ratio = 3.8467