Jpeg Compression

Pictures, Images and Waves

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JPEG Image Compression

- Joint Photographic Experts Group

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- Lossy compression

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  - Smaller file size
  - Maintain image quality
  - Human perception is limited

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Lossy vs Lossless

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  - Compression ratio of $\frac{20}{10} = 2$
- Many other methods
- JPEG specific to images

Mathematical Basis

- Discrete Cosine Transform

$$D_m^M(u) = c_m \sqrt{\frac{2}{M}} \cos\left(\frac{\pi m(2u+1)}{2M}\right) \qquad m = 0 \ldots M-1$$

$$G(m,n) = \sum_{u=0}^{M-1} \sum_{v=0}^{N-1} g(u,v) D_m^M(u) D_n^N(u)$$

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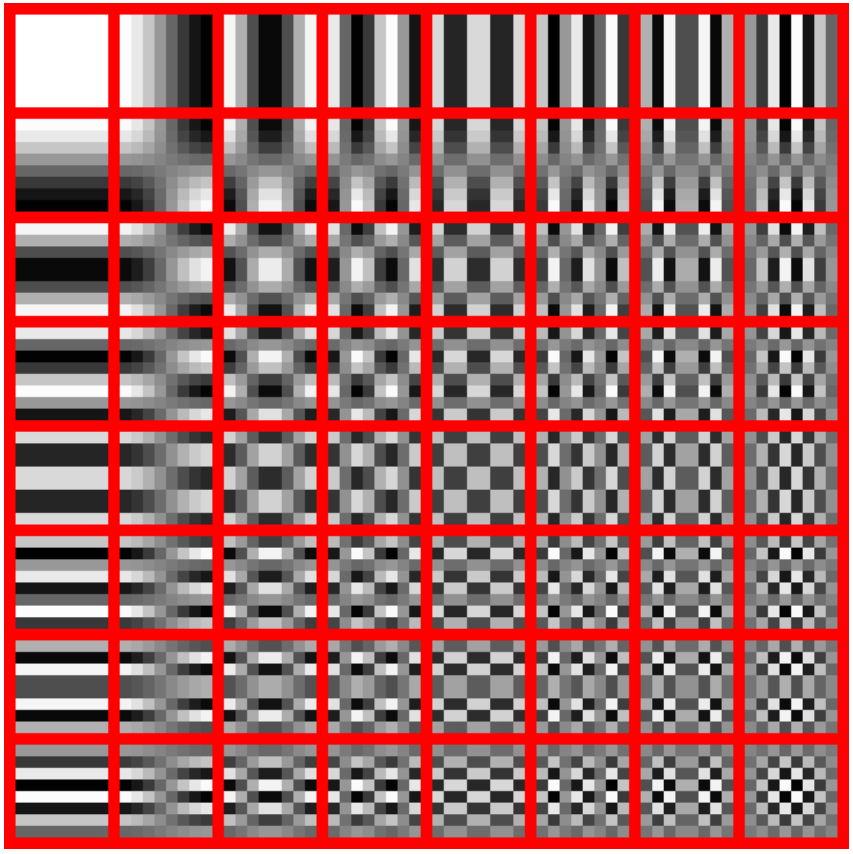
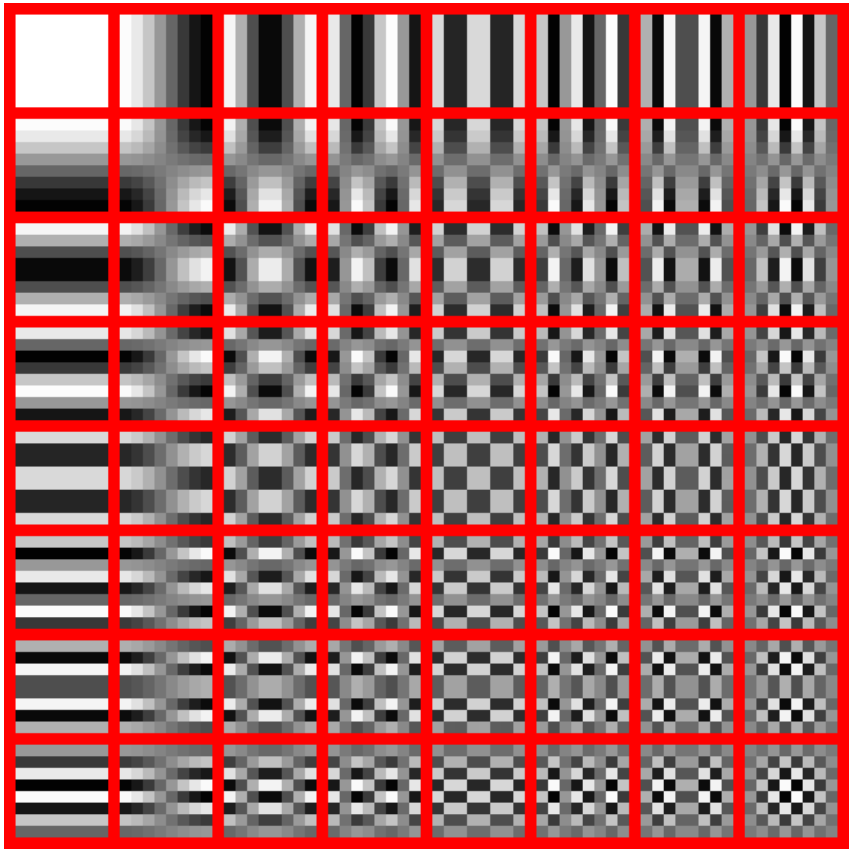


Conceptual Basis

- Based on waves
- Split image into "waves"
  - Vertical
  - Horizontal
- Want to choose the waves that we remove so that they won't be missed.



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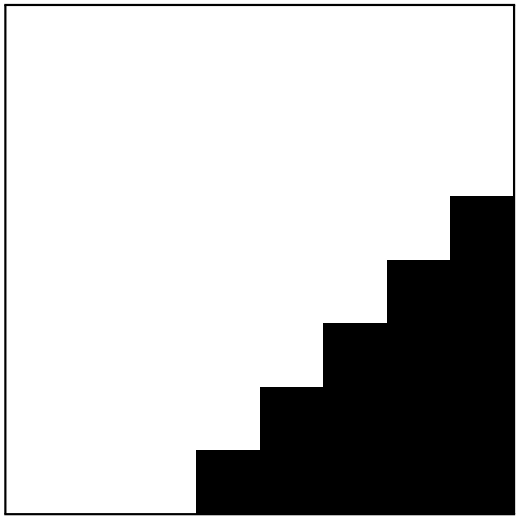
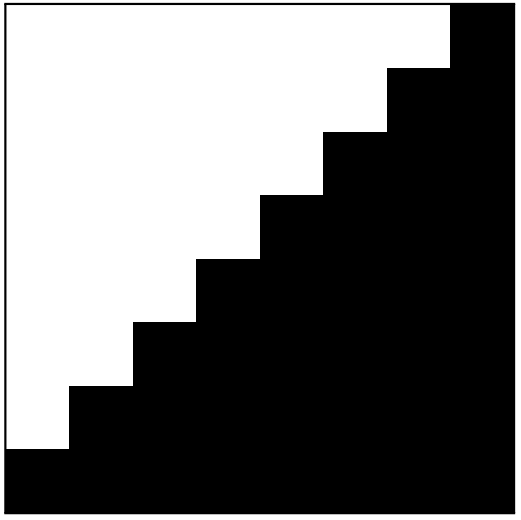




Original Image

- 236 KB
- Uncompressed GIF image

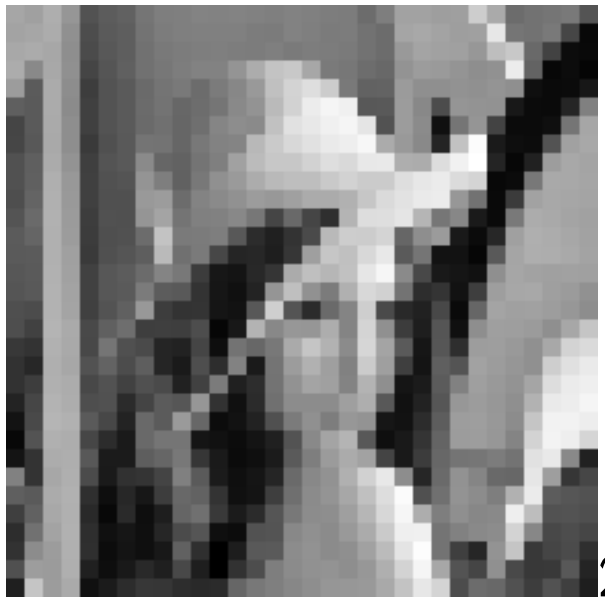
Results

A bit more information about this

41.4 KB

25.4 KB

36.9 KB



2.5 KB

Compressed Image

- 41.1 KB
- Compressed JPEG image