

## VC Seminar Project Group 3

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## Image compression

Reducing the size of image without losing visual quality. Making it easier to store and transmit

## Lapped transform

Mathematical technique used in signal and image processing to achieve overlapping of blocks of data, reducing artifacts typically associated with block-based transforms

## DCT

Technique used in image and signal processing to represent an image as a sum of cosine functions oscillating at different frequencies. It is particularly known for its application in JPEG image compression.

## Effective image compression

- Training convolutional filters that act as the lapped transform and its inverse
- Creating neural network, defining a loss function, and optimizing the filters based on training data.

## Convolutional Layer

- Filter: matrix of weights
- Stride: The step size of filter to move
- Padding: Adding border to input image to control spatial size
- Activation function: Non-Linear functions to add non-linearity into the model

## Transposed convolutional layer

- Applies the inverse transform filters to reconstruct the image
- The input channels of this will be equal to the output channels of convolutional layer
- The output channels will be 3 (RGB) the desired output channels of our reconstructed image
- Kernel size, stride and padding will be same

# Steps of Compression

- Data preprocessing
- Convolutional layer
- Training the model
- Compression
  - Transformation with convolutional layer
  - Quantization
  - Conversion to Byte Stream
- Decompression
  - Byte Stream to quantized
  - Dequantization
  - Inverse transformation

Original Image



Reconstructed Image



Original Image



Reconstructed Image



Original Image



Reconstructed Image



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