# 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 out reconstructed image
* Kernal 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

A collage of airplanes on grass

Description automatically generatedA collage of a body of water

Description automatically generatedA collage of a group of people on motorcycles

Description automatically generatedA collage of hats

Description automatically generatedA house on a cliff

Description automatically generatedA close-up of a child

Description automatically generatedA collage of a red barn

Description automatically generatedA close up of a parrot

Description automatically generatedA collage of a child on a beach

Description automatically generatedA collage of people on a raft

Description automatically generatedA close-up of a window

Description automatically generated

A close-up of a sailboat

Description automatically generatedA person in a black dress

Description automatically generatedA lighthouse and a white fence

Description automatically generatedA collage of a person wearing a red hat

Description automatically generated