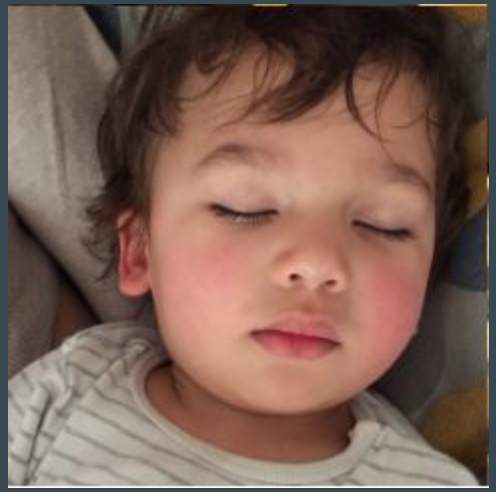
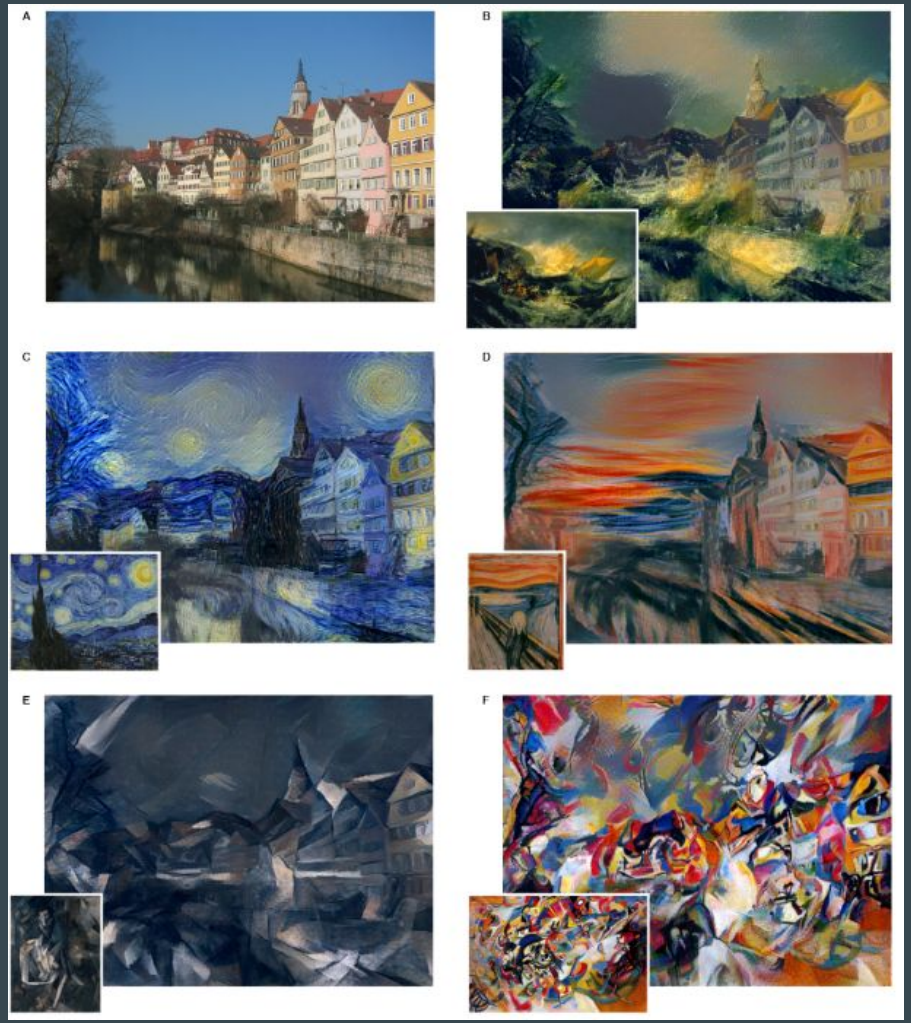
Artistic Style Transfer

ARMAN MANN 13BCE0073
PRATEEK BHATNAGAR 13BCE0409

Problem Statement

To utilise a method to transfer the style of one image to the subject of another image. Identify and preserve the content of the subject image, identify and merge the style of the artist image with the subject image. The resultant image preserves the content of the subject image and has an artistic style that is inherited and merged from the artistic image.



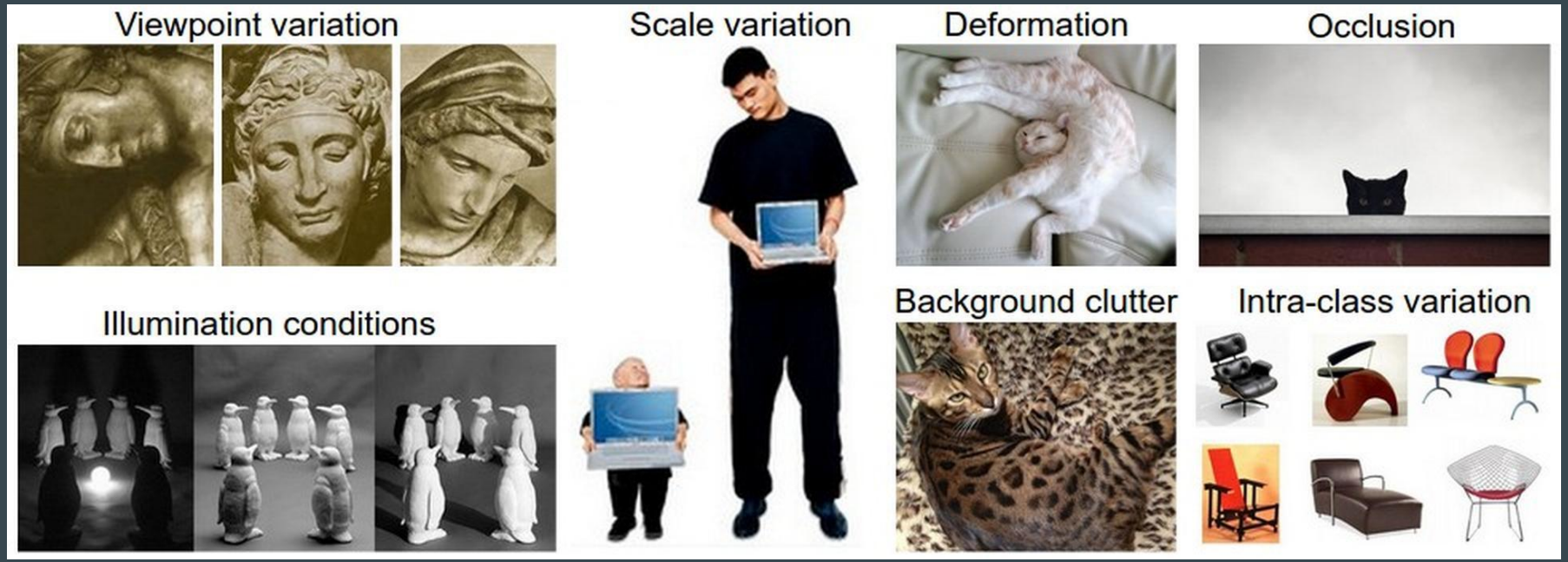

A
B
C
D
E
F

Convolutional Neural Networks

The class of Deep Neural Networks that are most powerful in image processing tasks are called Convolutional Neural Networks. Convolutional Neural Networks consist of layers of small computational units that process visual information hierarchically in a feed-forward manner.

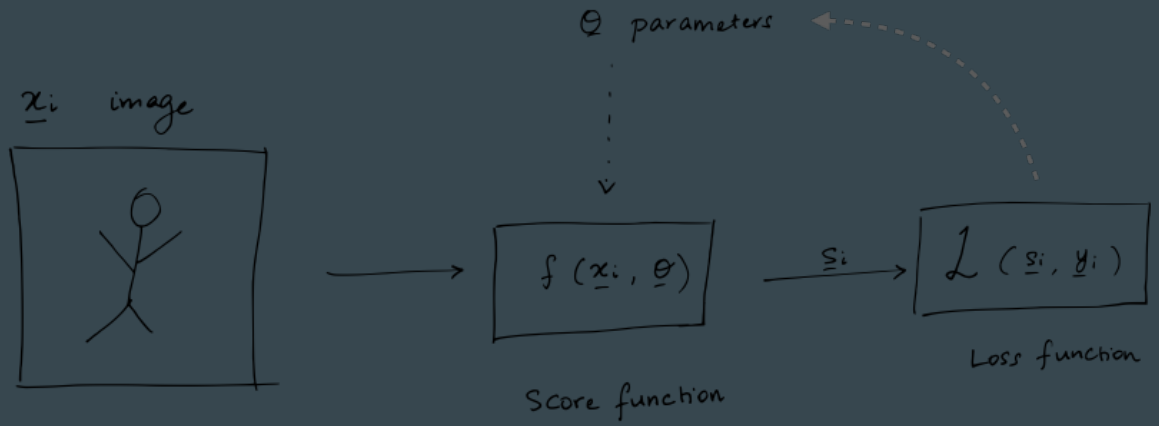
In machine learning, a convolutional neural network (CNN, or ConvNet) is a type of feed-forward artificial neural network in which the connectivity pattern between its neurons is inspired by the organization of the animal visual cortex.

The image classification problem



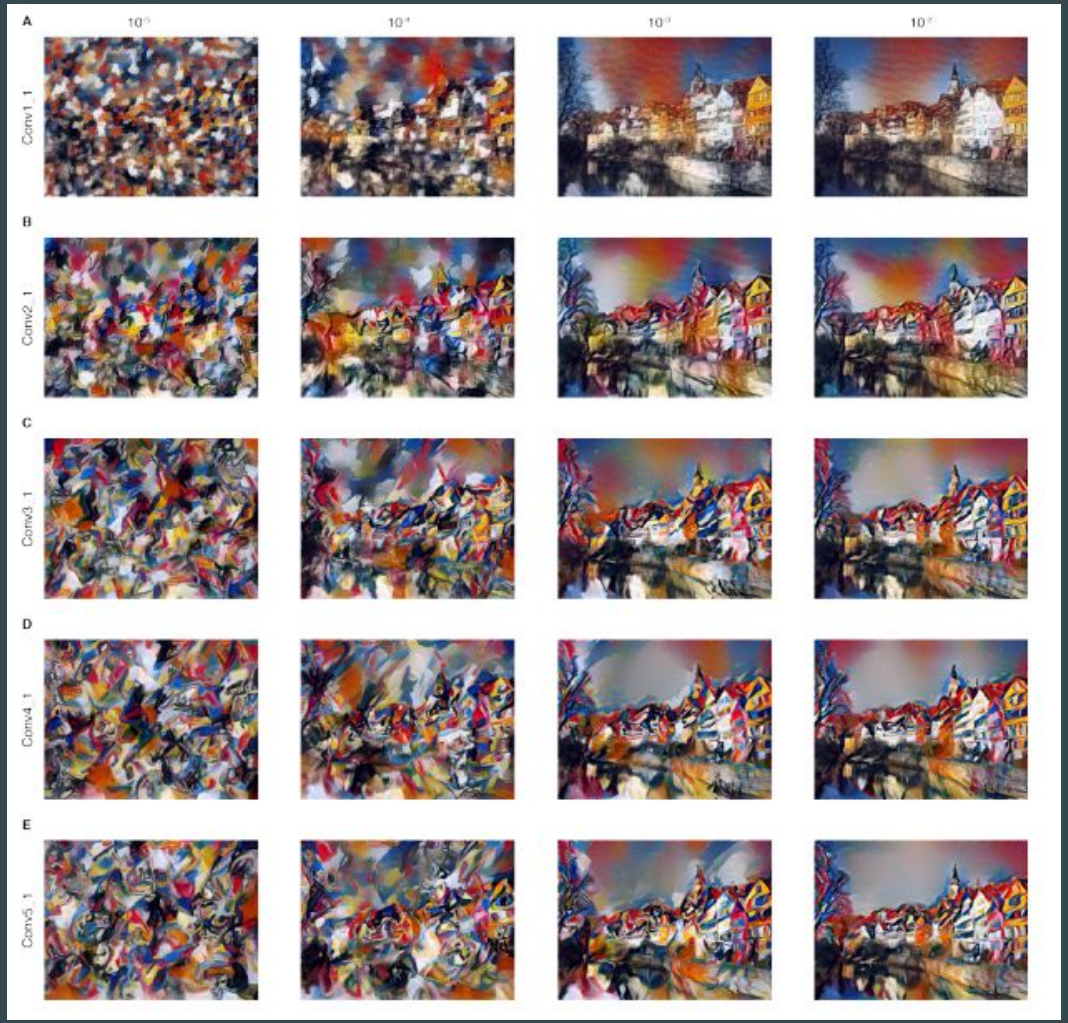
A supervised learning approach to the image classification problem

Supervised learning is now the classic procedure for learning from data, and it is outlined below in the context of the image classification problem:



Architecture / Framework

The results presented in the following slide were generated on the basis of the VGG-Network Convolutional Neural Network that rivals human performance on a common visual object recognition benchmark task and was introduced and extensively described in [22] We used the feature space provided by the 16 convolutional and 5 pooling layers of the 19 layer VGGNetwork. We do not use any of the fully connected layers.The model is publicly available and can be explored in the caffe-framework. [24] For image synthesis we found that replacing the max-pooling operation by average pooling improves the gradient flow and one obtains slightly more appealing results, which is why the images shown were generated with average pooling.


A
B
C
D
E
Conv1_1
Conv2_1
Conv3_1
Conv4_1
Conv5_1

Methodology

Our algorithm takes two images: an input image which is usually an ordinary photograph and a stylized and retouched reference image, the reference style image. We seek to transfer the style of the reference to the input while keeping the result photorealistic. We use a photorealism regularization term in the objective function during the optimization, constraining the reconstructed image to be represented by locally affine color transformations of the input to prevent distortions.

Thank You!