Style Transfer 101

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Style Transfer

Introduction

- Gatys, Ecker, Bethge: “A Neural Algorithm of Artistic Style”
- Source: https://arxiv.org/pdf/1508.06576.pdf

Content Image

Style Image

Style Transfer Model

Artistic Image

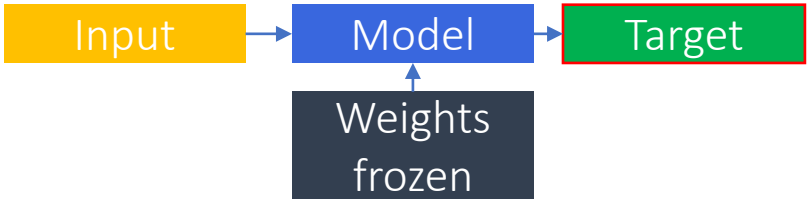
Style Transfer

Pretrained Network

- a pretrained network is used, e.g. VGG16, VGG19
- CNN not changed during training
- only artistic image modified

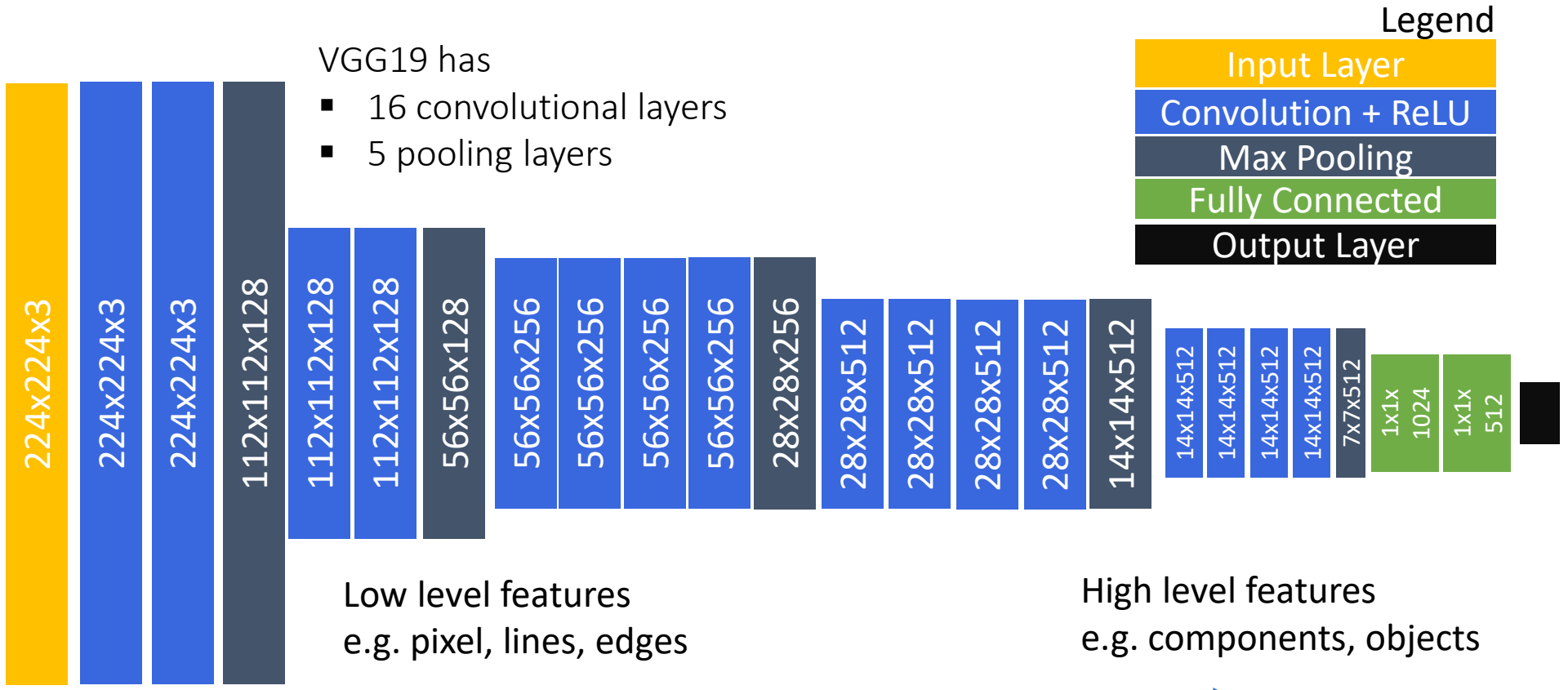
Typical Deep Learning Training

Style Transfer Training



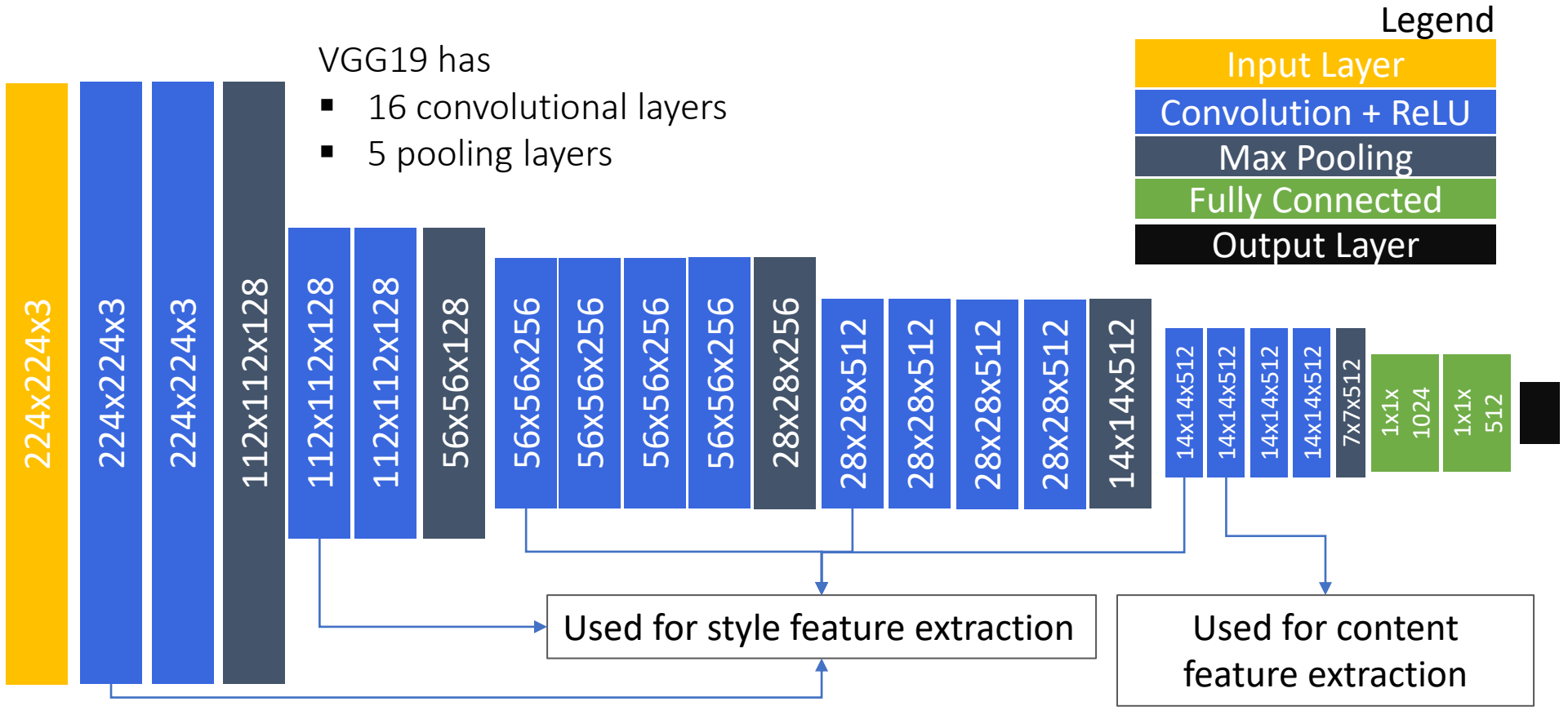
Style Transfer

Pretrained Network



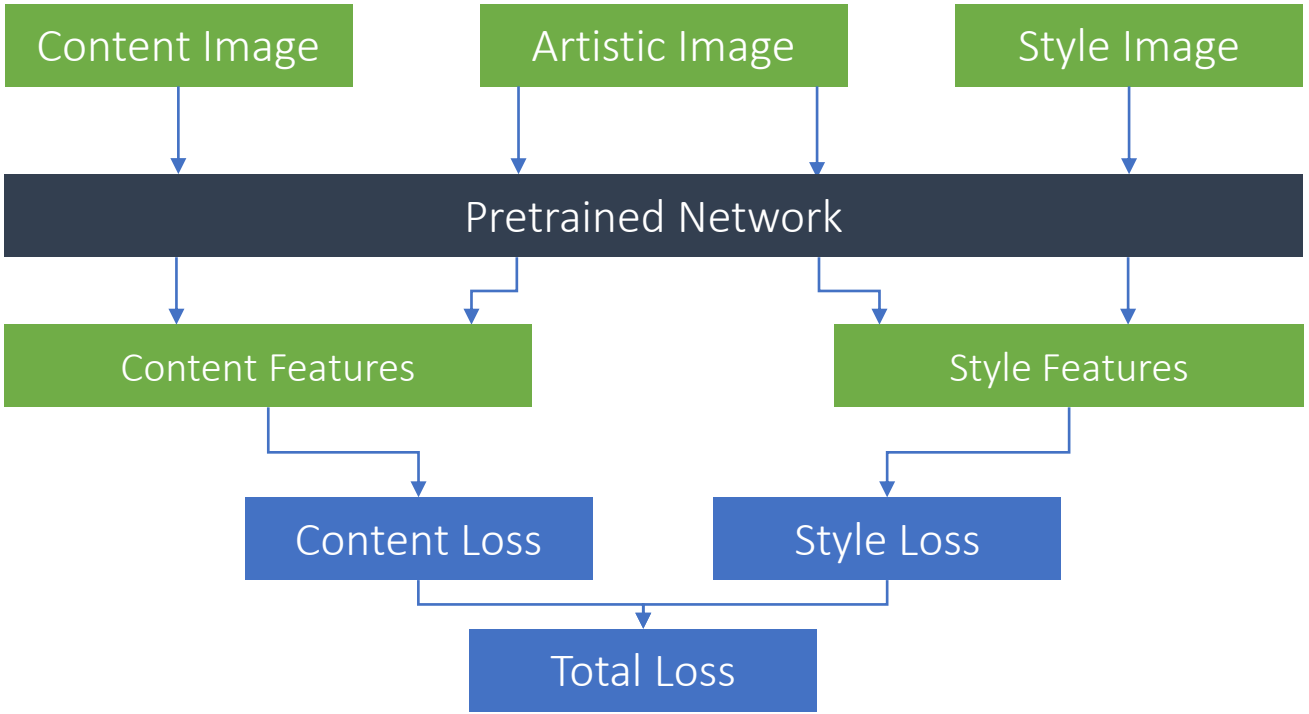
Style Transfer

Pretrained Network



Style Transfer

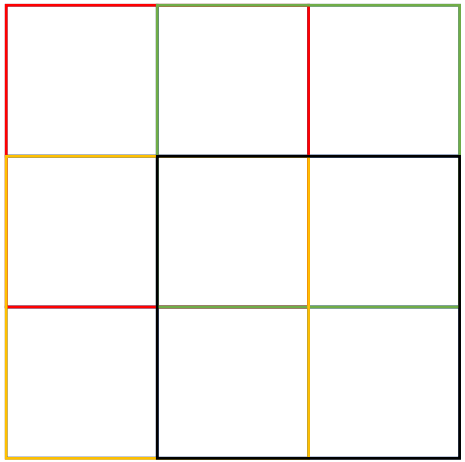
Losses



Style Transfer

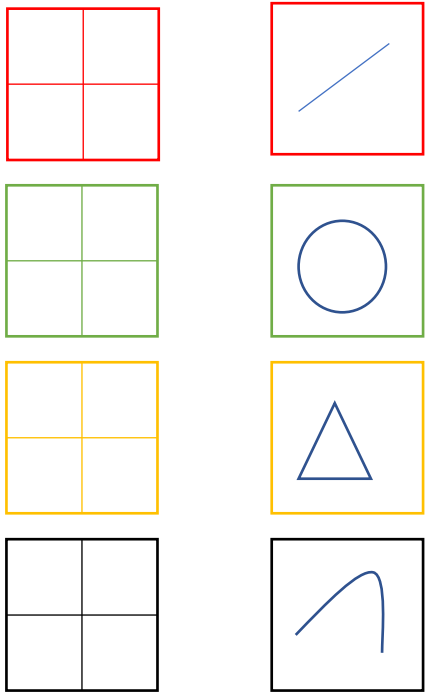
Feature Maps

Sample Image shape:
[3, 3, 3]



nn.Conv2d(in_channel=3,
out_channel=4,
kernel_size=2)

Feature Maps Examples

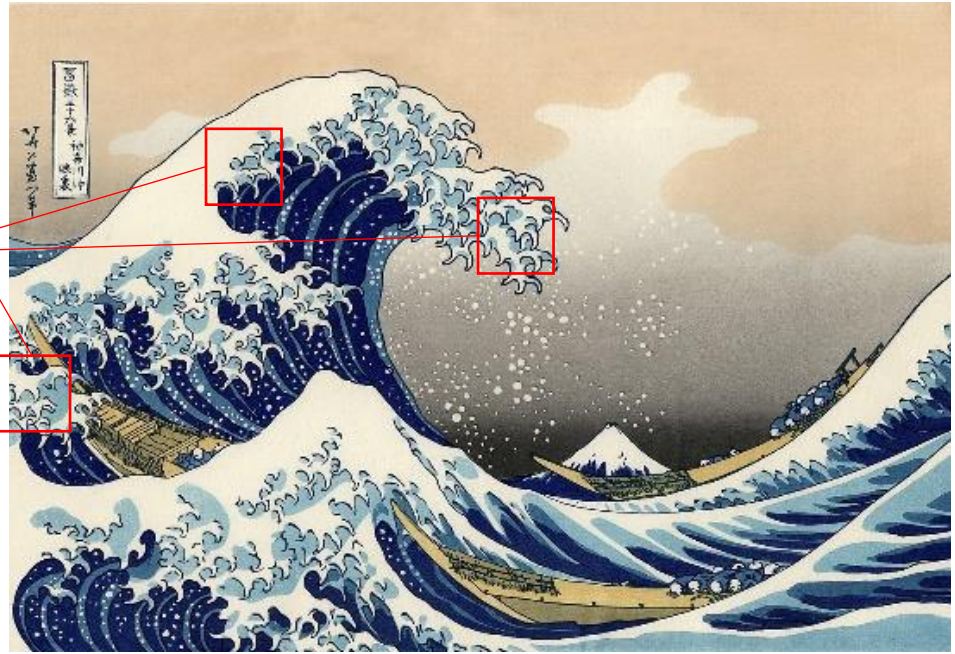


Style Transfer

What is Style?

- Selected colors
- Color distributions
- Stroke width

- Correlations of features

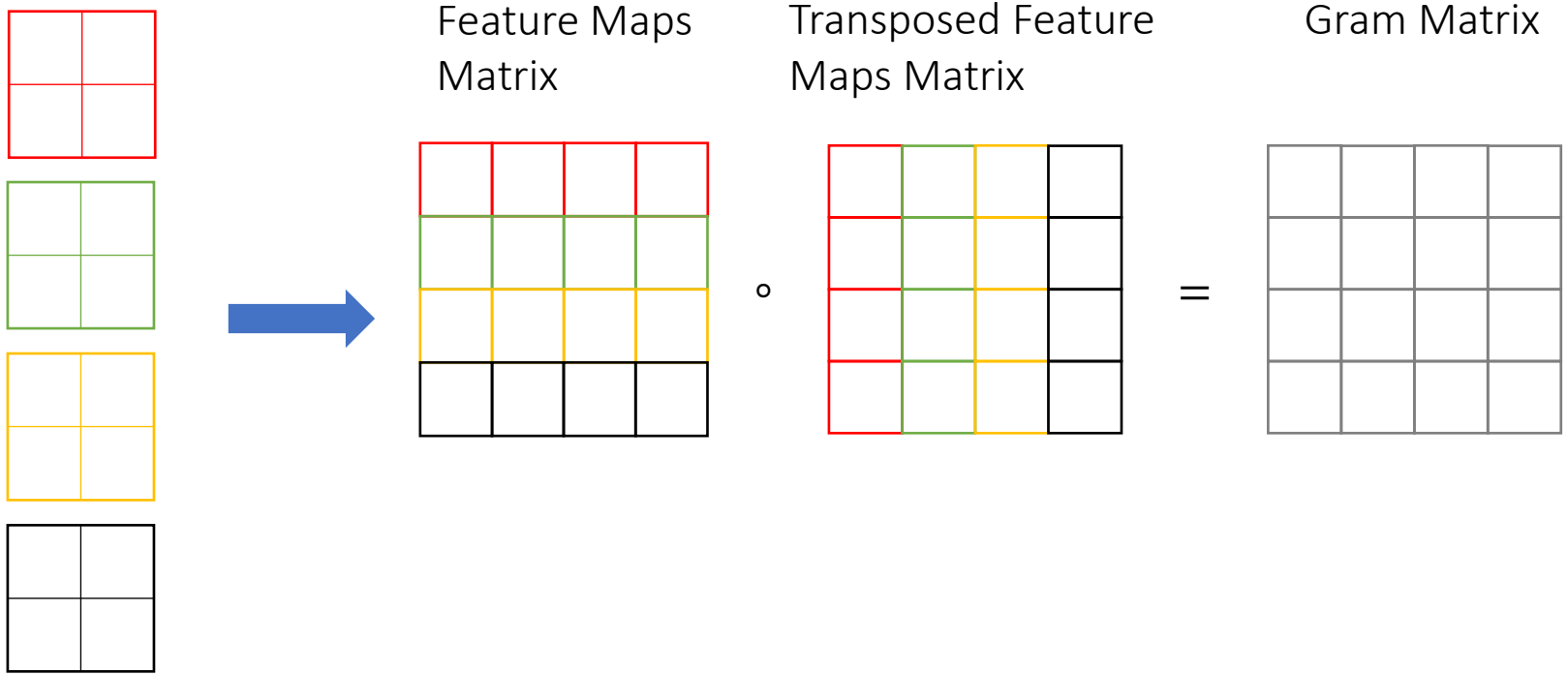


Katsushika Hukusai: „The Great Wave off Kanagawa“

Style Transfer

Correlation between Feature Maps

Feature Maps



Style Transfer

Coding Example

Content

Style

Target