
Style Transfer

What are we going to do today

1. What is style transfer
2. How does it work
3. Training a style transfer model with Spell!
4. Running the model with ml5.js: demo

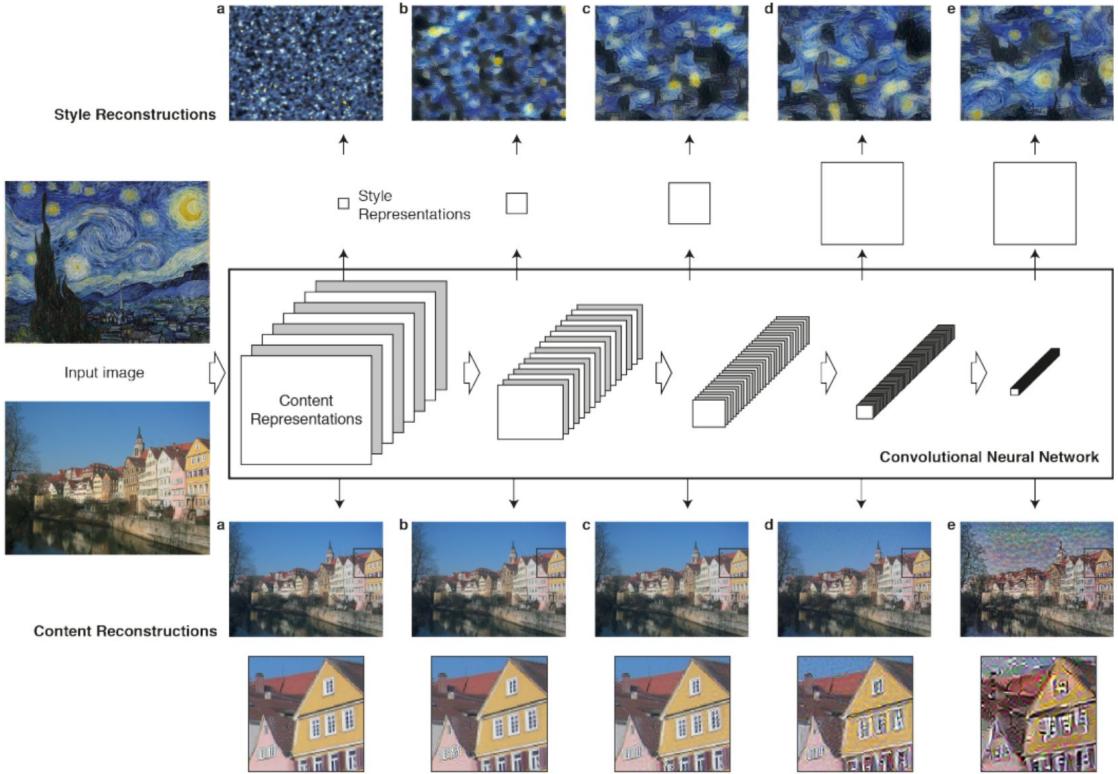
What is style transfer?

Recast the content of one image in the style of other image[1].

Source: A Neural Algorithm of Artistic Style [Gatys et al, 2015]

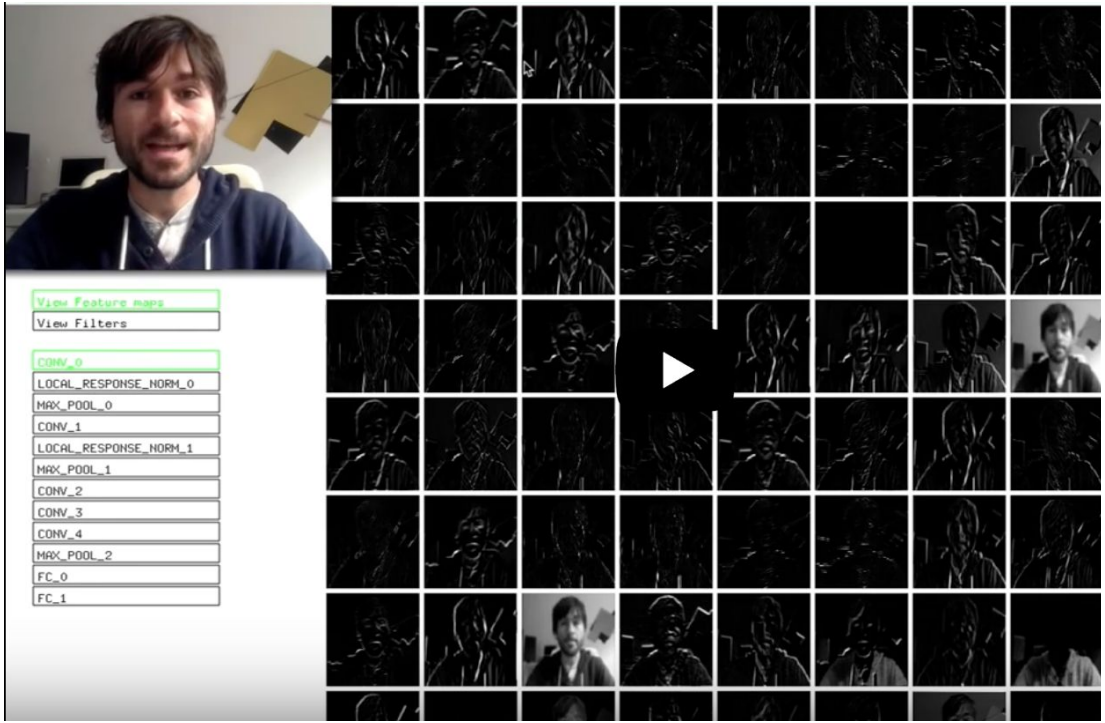
How does style transfer work?

- VGG



Source: A Neural Algorithm of Artistic Style [Gatys et al, 2015]

What Neural Networks See



Source: What Neural Networks See by Gene Kogan

Different kinds of style transfer

- Style transfer [Gatys] 2015
- Fast Neural Style 2016
- Artistic Style Transfer For Videos 2016
- Deep Photo Style Transfer 2017
- AI Learns Semantic Style Transfer 2017
- Universal Neural Style Transfer 2017

Different kinds of style transfer

Fast Neural Style, Source: Perceptual Losses for Real-Time Style Transfer and Super-Resolution, Justin Johnson, Alexandre Alahi, Fei-Fei Li, 2016

- Microsoft COCO dataset

Different kinds of style transfer

Artistic style transfer for videos, Source: Artistic style transfer for videos, Manuel Ruder, Alexey Dosovitskiy, Thomas Brox 2016

Different kinds of style transfer

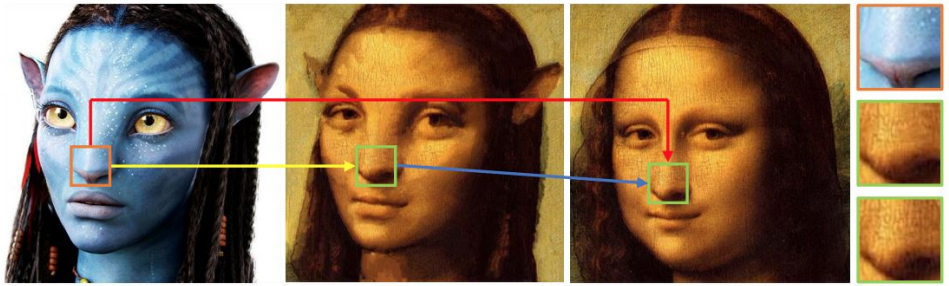
Deep Photo Style Transfer Source: Deep Photo Style Transfer Fujun Luan, Sylvain Paris, Eli Shechtman, Kavita Bala, 2017

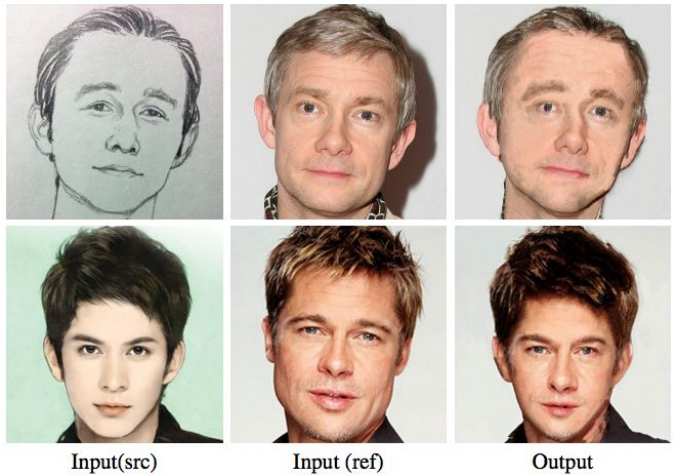
Image Source: deep-photo-styletransfer by Fujun Luan

Different kinds of style transfer

Semantic Style Transfer Source: Visual Attribute Transfer through Deep Image Analogy

Jing Liao, Yuan Yao, Lu Yuan, Gang Hua, Sing Bing Kang





Different kinds of style transfer

Universal Neural Style Transfer Source: Universal Style Transfer via Feature Transforms Yijun Li, Chen Fang, Jimei Yang, Zhaowen Wang, Xin Lu, Ming-Hsuan Yang

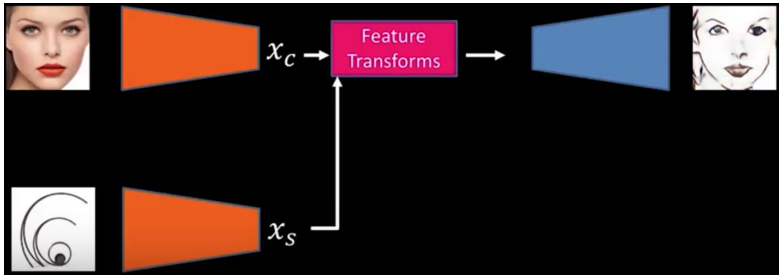
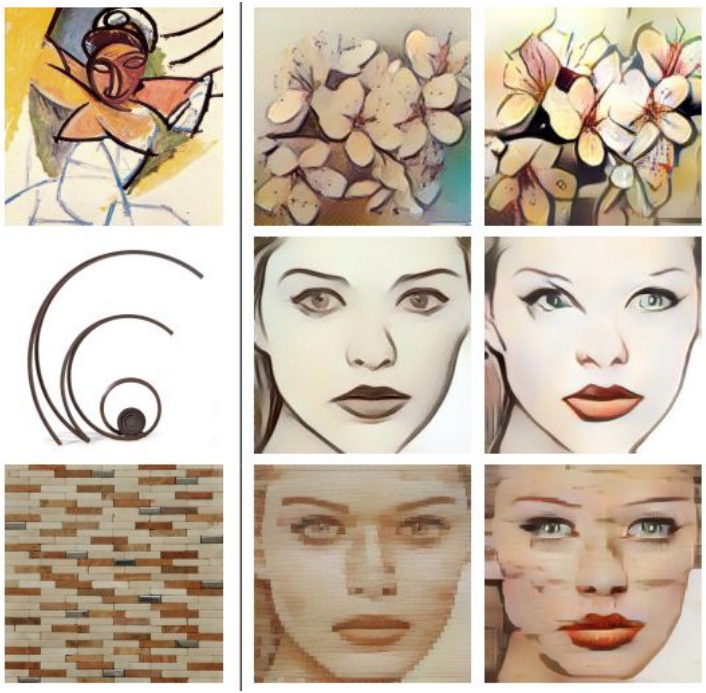


Image Source: two minute papers Youtube Channel



Different kinds of style transfer

Fast style transfer implementation in tensorflow by Logan Engstrom

- **Style transfer [Gatys] 2015**
- **Fast Neural Style 2016**

\+ **Instance Normalization**

- Artistic Style Transfer For Videos 2016
- Deep Photo Style Transfer 2017
- AI Learns Semantic Style Transfer 2017
- Universal Neural Style Transfer 2017

Training a style transfer model with Spell!

1. **Preparing the environment**
2. **Downloading Datasets** (~1 hour)
3. **Training with style.py** (~2 hour)
4. **Converting model to ml5js**

Detailed instruction: https://github.com/yining1023/styleTransfer_spell

For step 1-3, also see Transferring Style Tutorial from Spell

Set Notifications on Spell: https://web.spell.run/settings/notifications

Customizing Environments on Spell:
https://spell.run/docs/customizing_environments/

Running the model with ml5.js

- Style Transfer an image
- Style Transfer with a Webcam
- Fast Style Transfer with ml5.js

Resources

- A Neural Algorithm of Artistic Style [Gatys et al, 2015]
- What Neural Networks See by Gene Kogan
- Transferring Style Tutorial from Spell
- Style Transfer tutorial from ml5.js
- ml5.js
- Two minute papers Youtube Channel

Credits

- Fast style transfer implementation in tensorflow by Logan Engstrom
- Fast style transfer in deeplearn.js by Reiichiro Nakano

Wrapping up

- Training a style transfer model with Spell!
- Running the model with ml5.js: demo