



Image Colorization

Sebastian Dauenhauer, Peter Stein

Einführung

Um was geht es?

UM WAS GEHT ES?



Kolorierung von Schwarz-Weiß-Foto durch Deep Learning

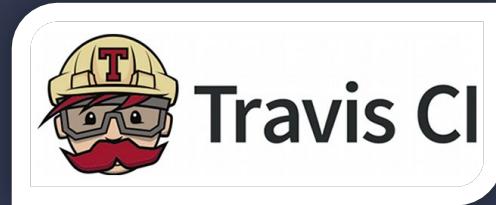
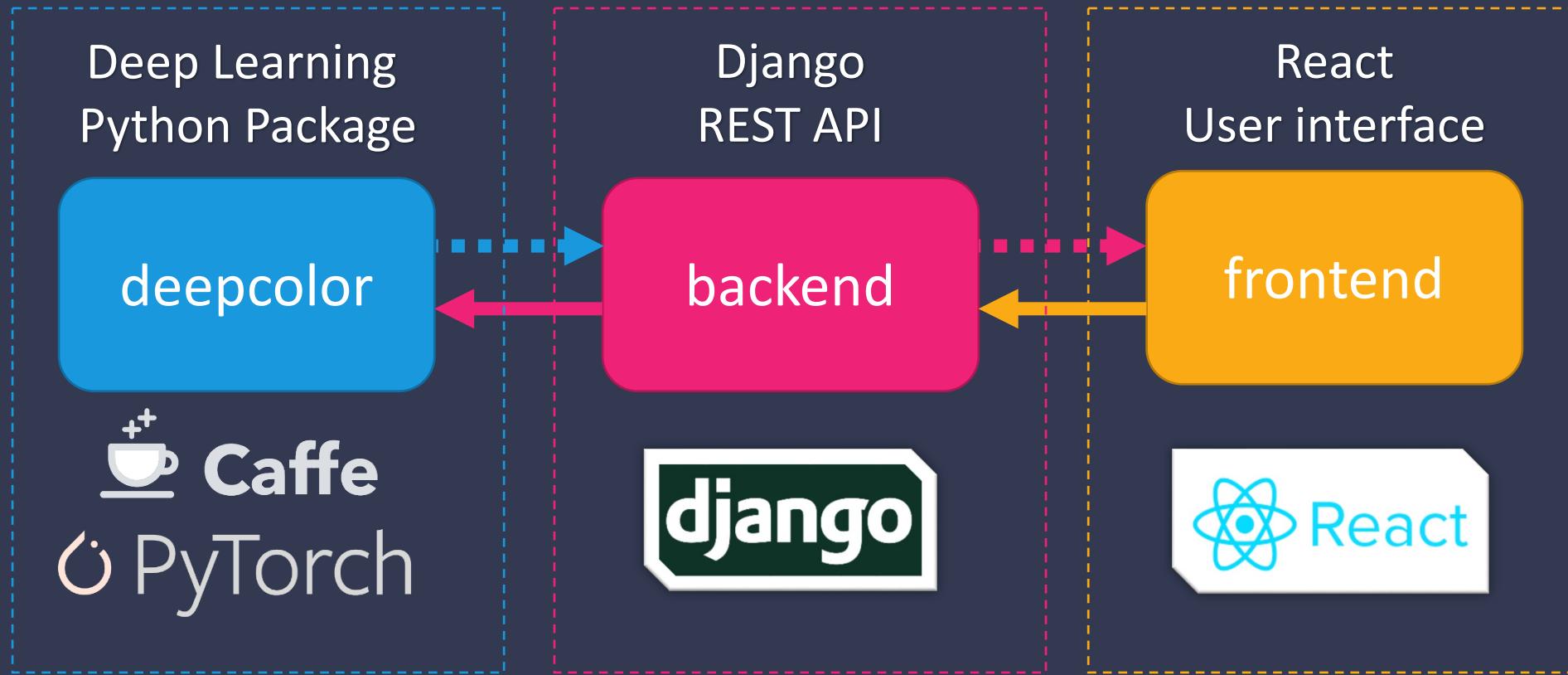
Ziel: Webseite



Eine Webseite zur Kolorierung von Bildern

<https://demos.algorithmia.com/colorize-photos>

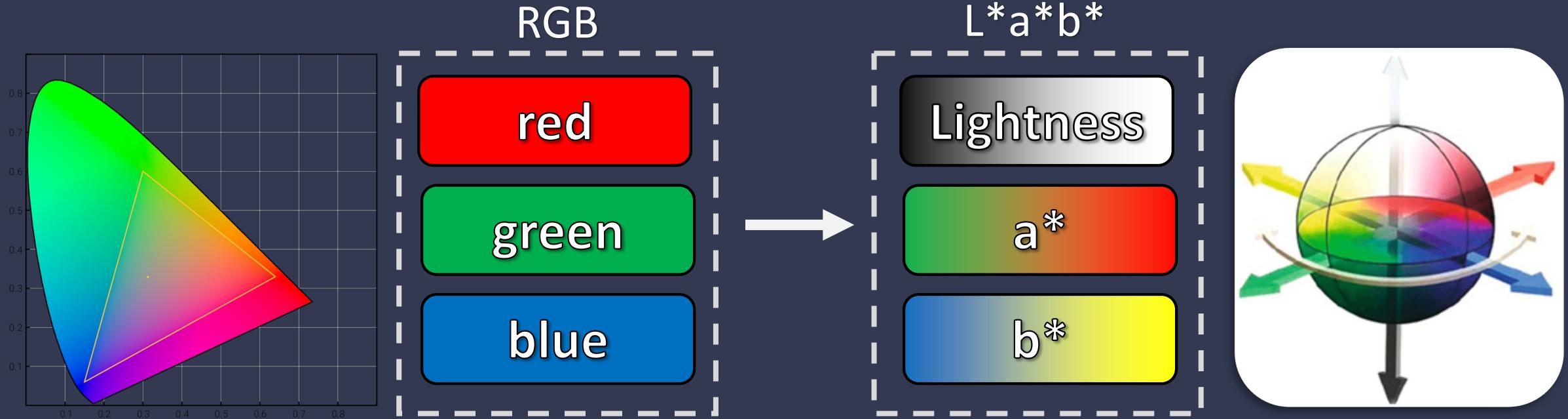
Architektur der Projekts



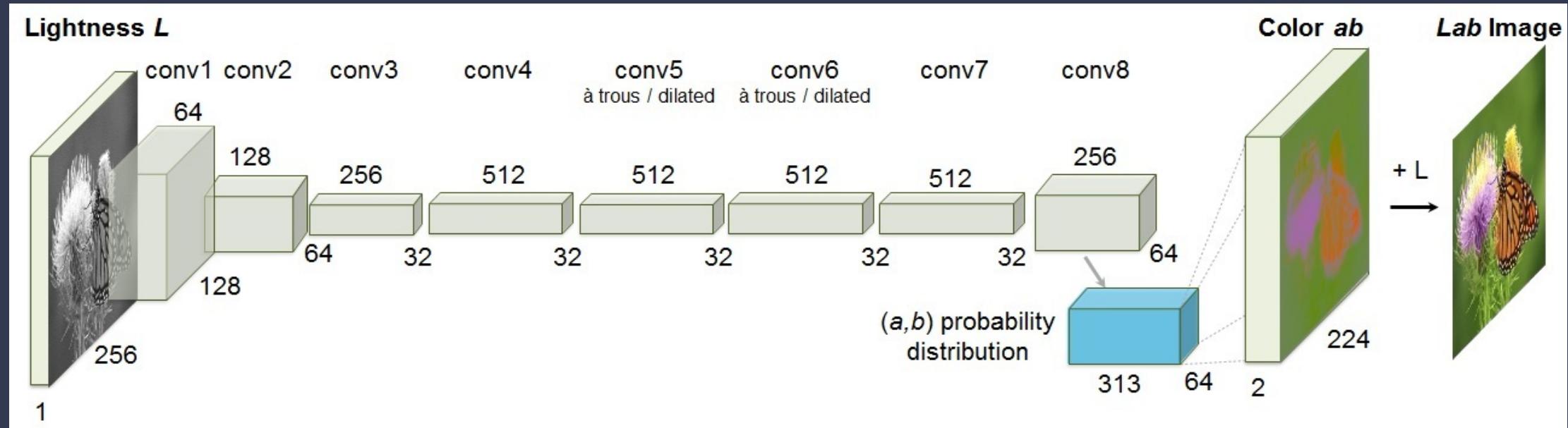
Colorful Image Colorization

Neuronale Netz von Richard Zhang

$L^*a^*b^*$ Farbraum Konvertierung



Richard Zhangs Netzwerk

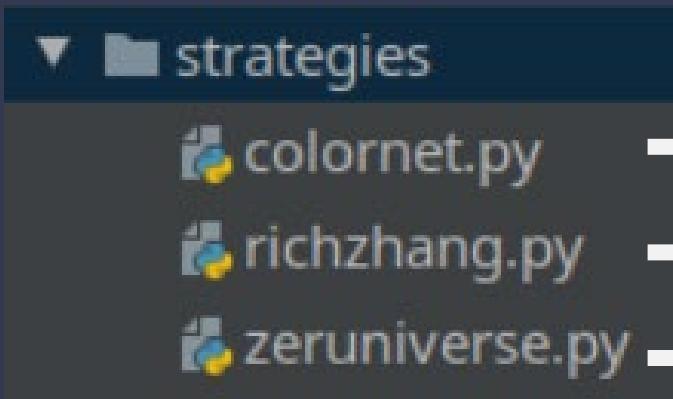


deepcolor

Python Colorization Package

deepcolor: colorize_image

```
def colorize_image(image: Image, strategy, gpu=False) -> Image:  
    if not strategy:  
        return image  
    return strategy(image, gpu)
```



- Selbsttrainiertes Netz
- Richard Zhang
- Jeffery (Zeyu) Zhao

deepcolor: Command line tool

```
ptr@exone:~/workspace/hskl/DL-SS20-T1-image-col/deepcolor
[ptr@exone deepcolor]$ deepcolor --help
usage: deepcolor [-h] [--version] [--strategy STRATEGY [STRATEGY ...]] [--gpu] image

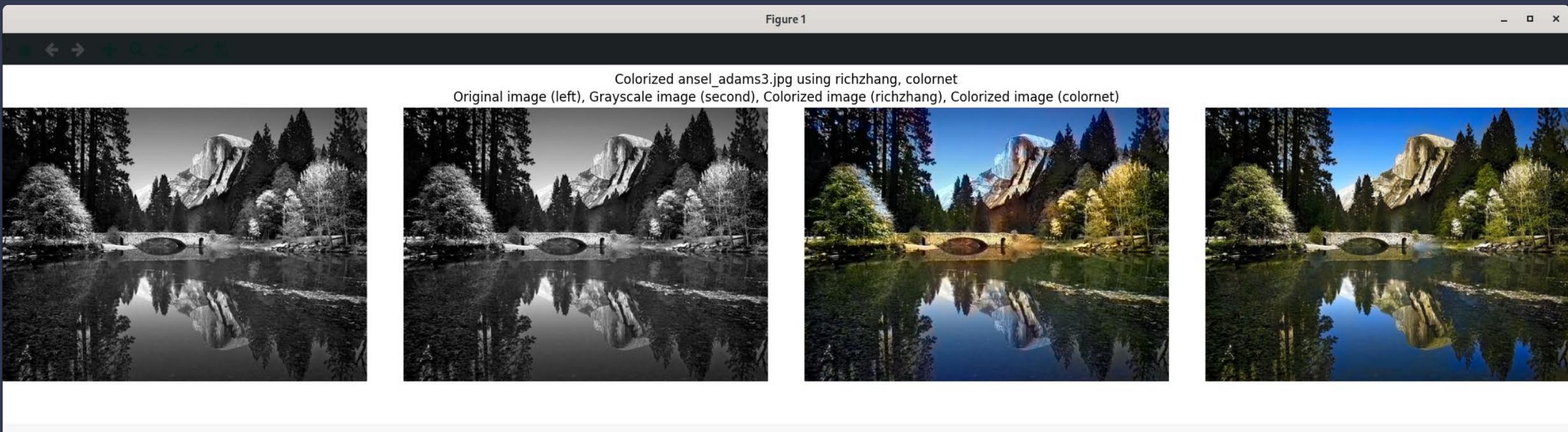
deepcolor - A tool to colorize black and white pictures

positional arguments:
  image                  Image path

optional arguments:
  -h, --help              show this help message and exit
  --version               show program's version number and exit
  --strategy STRATEGY [STRATEGY ...]  Colorization strategies to use. Available
                                      strategies: richzhang, colornet, zeruniverse
  --gpu                   Run in CUDA mode rather than CPU
[ptr@exone deepcolor]$
```

deepcolor: Beispiel

```
[ptr@exone deepcolor]$ deepcolor data/ansel_adams3.jpg --strategy richzhang colornet
```



Backend

Django Backend

REST API: Endpoints

GET /api/v1/strategies

POST /api/v1/images

GET /api/v1/images

GET /api/v1/images/<id>

DELETE /api/v1/images/<id>

REST API: GET /api/v1/strategies

GET /api/v1/strategies



```
{  
  "strategies": [  
    {  
      "name": "Richard Zhang",  
      "var": "richzhang"  
    },  
    {  
      "name": "Colornet",  
      "var": "colornet"  
    },  
    {  
      "name": "neural-colorization",  
      "var": "zeruniverse"  
    }  
  ]  
}
```

REST API: POST /api/v1/images

POST /api/v1/images

▼ Form Data view source

file: (binary)

strategy: colornet



```
{  
    "id": 5,  
    "original": "/media/wargreymon_3qd1PJ7.jpg",  
    "colored": "/media/colorized_wargreymon_bjbjXyT.jpg",  
    "strategy": "colornet"  
}
```

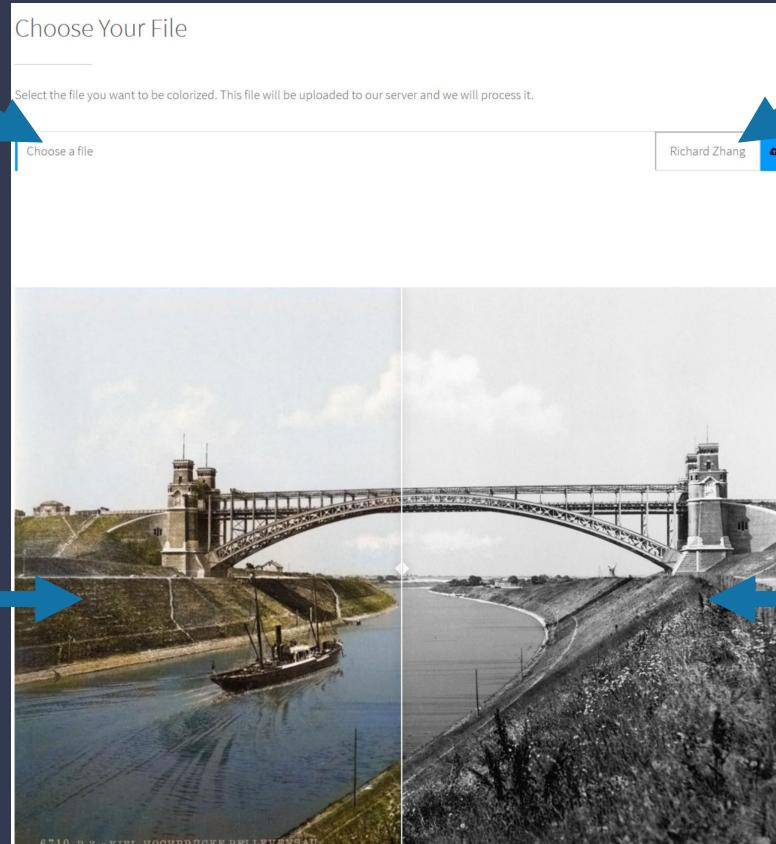
Frontend

React frontend

Frontend

Bildauswahl

Auswahl des Netztes



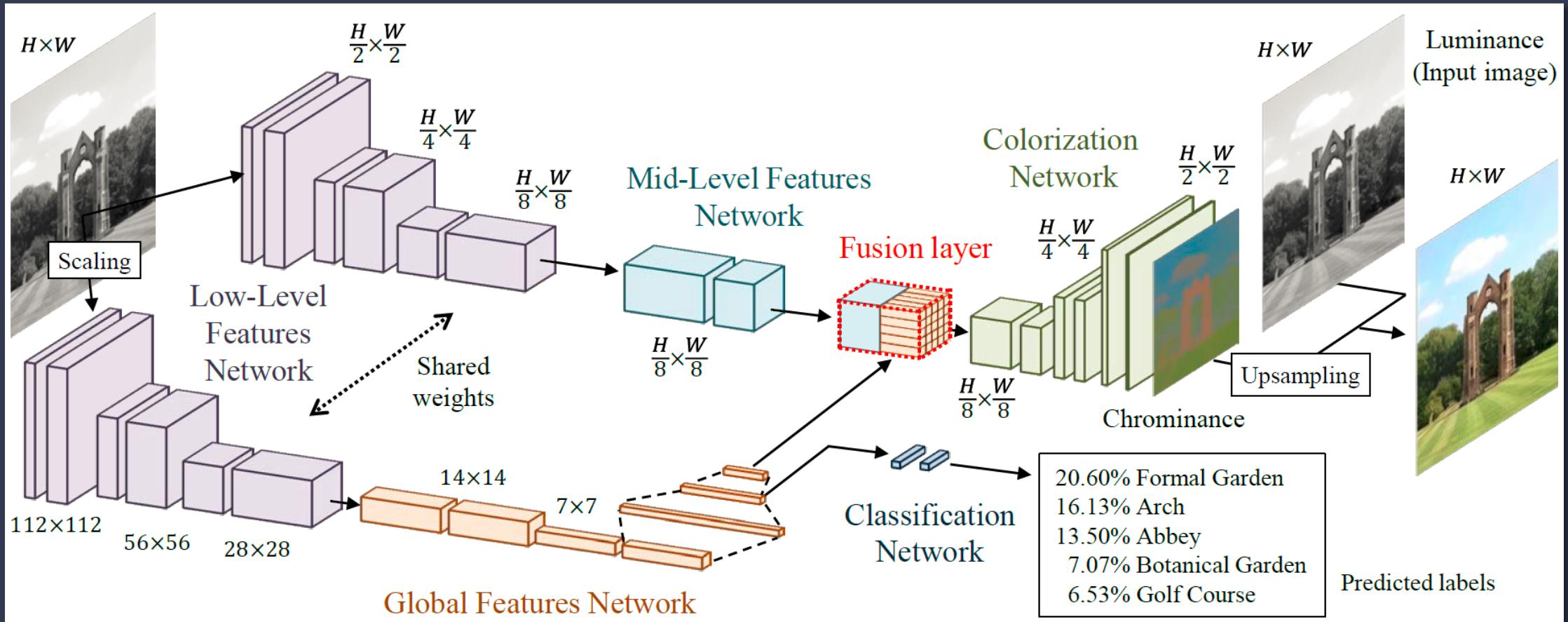
Koloriertes Bild

Originalbild

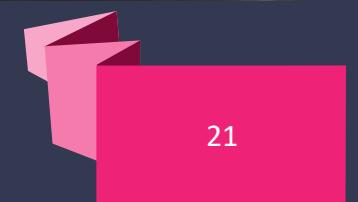
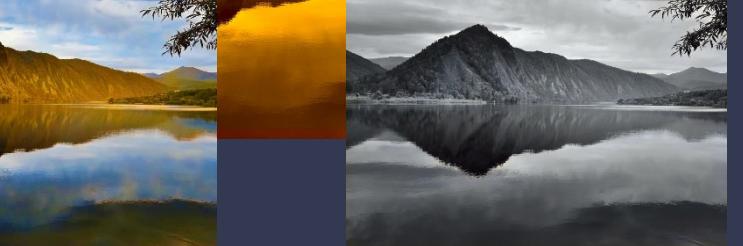
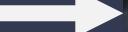
colornet

Selbsttrainiertes Deep Neural Network

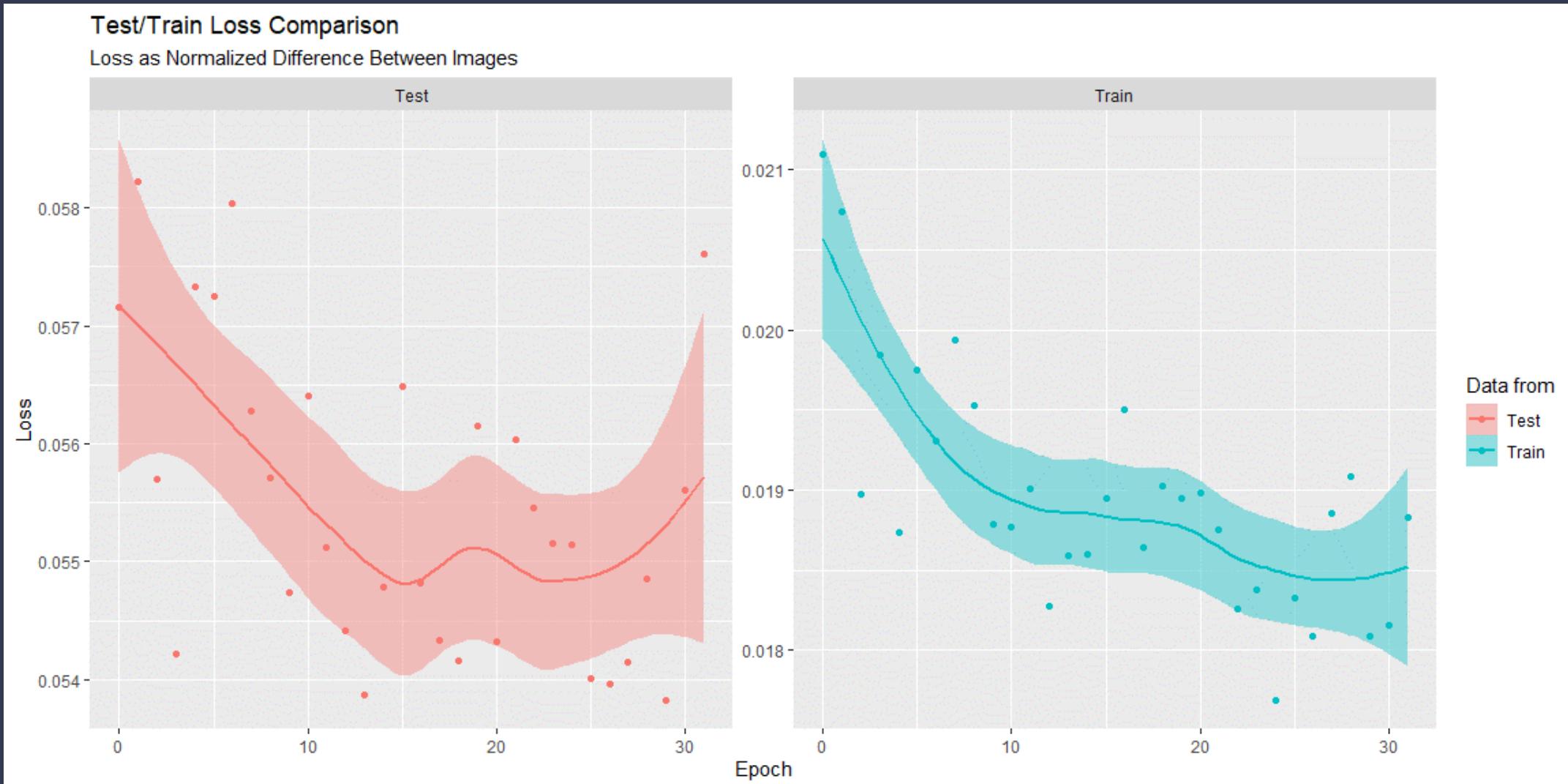
Struktur des Netzwerks



Training



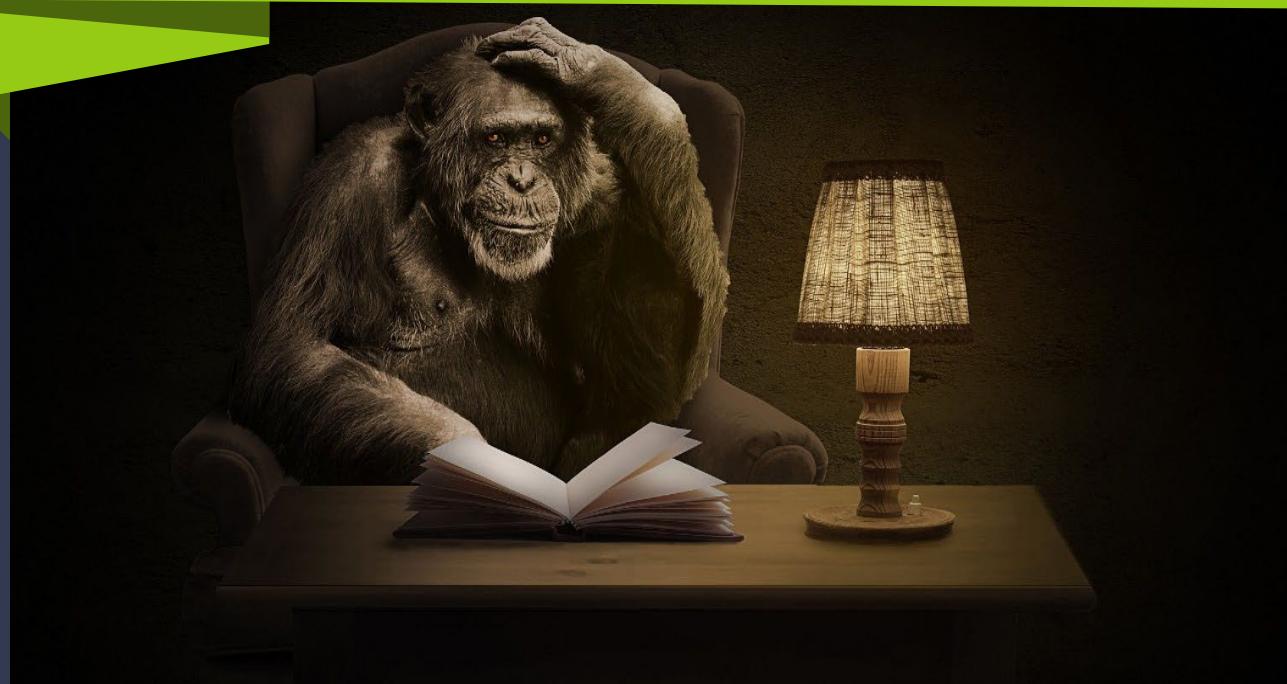
Training und Test



Ergebnisse



DANKE FÜRS ZUHÖREN!



Gibt es Fragen?

SEBASTIAN DAUENHAUER



PETER STEIN



Hochschule
Kaiserslautern
University of
Applied Sciences

Credits & Copyrights

- **Links:**
 - <http://richzhang.github.io/colorization/>
 - <http://iizuka.cs.tsukuba.ac.jp/projects/colorization/en/>
 - <https://github.com/zeruniverse/neural-colorization>
 - <https://github.com/shufanwu/colorNet-pytorch>
- **PowerPoint Template:**
 - <https://www.showeet.com/12/12/2017/templates/origami-creative-powerpoint-template/>
- **Bilder:**
 - [Pixabay \(CC0 Public Domain license\)](#)
 - https://www.researchgate.net/figure/The-cubical-CIE-Lab-color-space_fig3_23789543

Backup Folien

Plan B

deepcolor: Beispiel 1



Richard Zhang



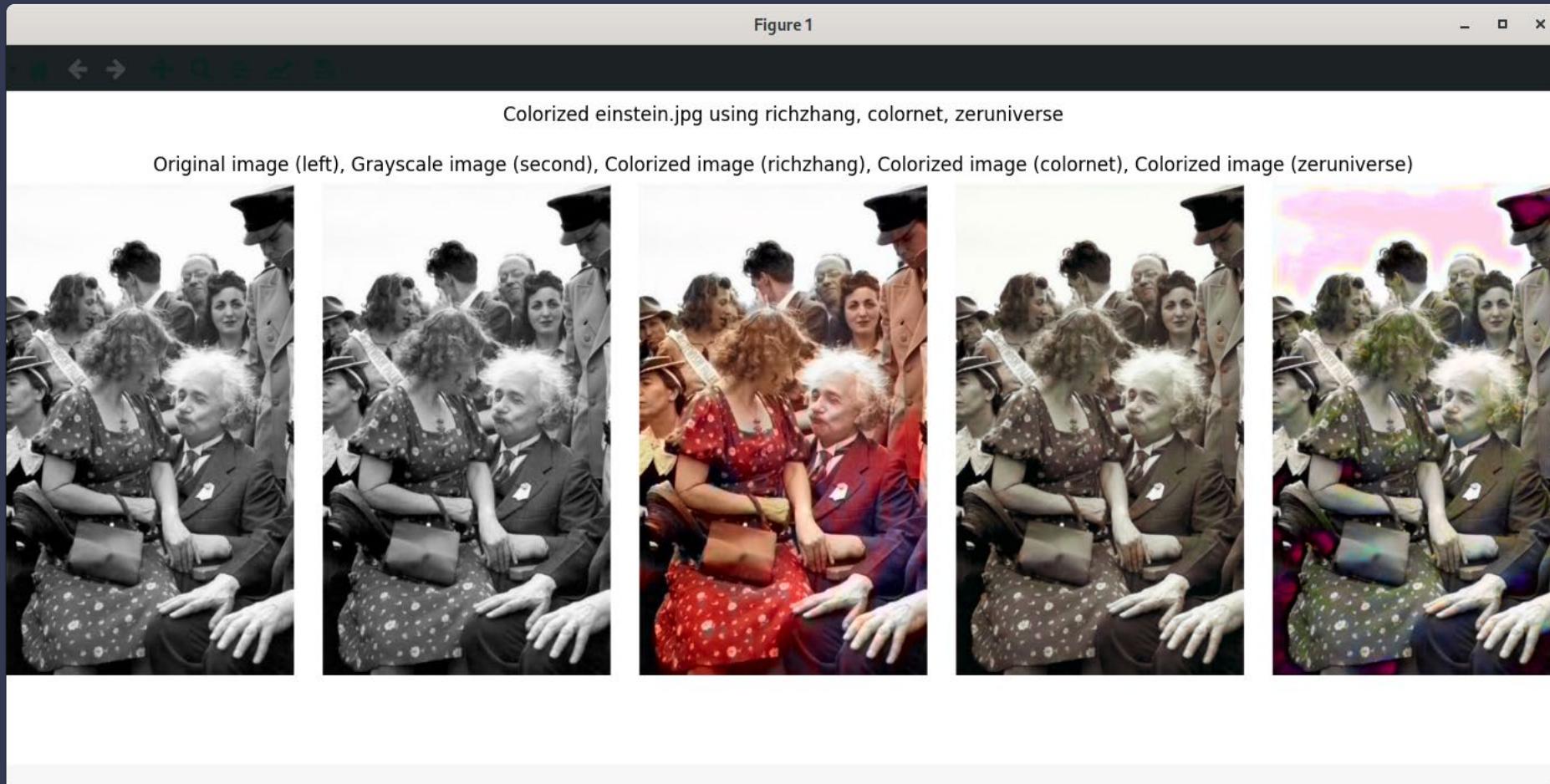
Colornet



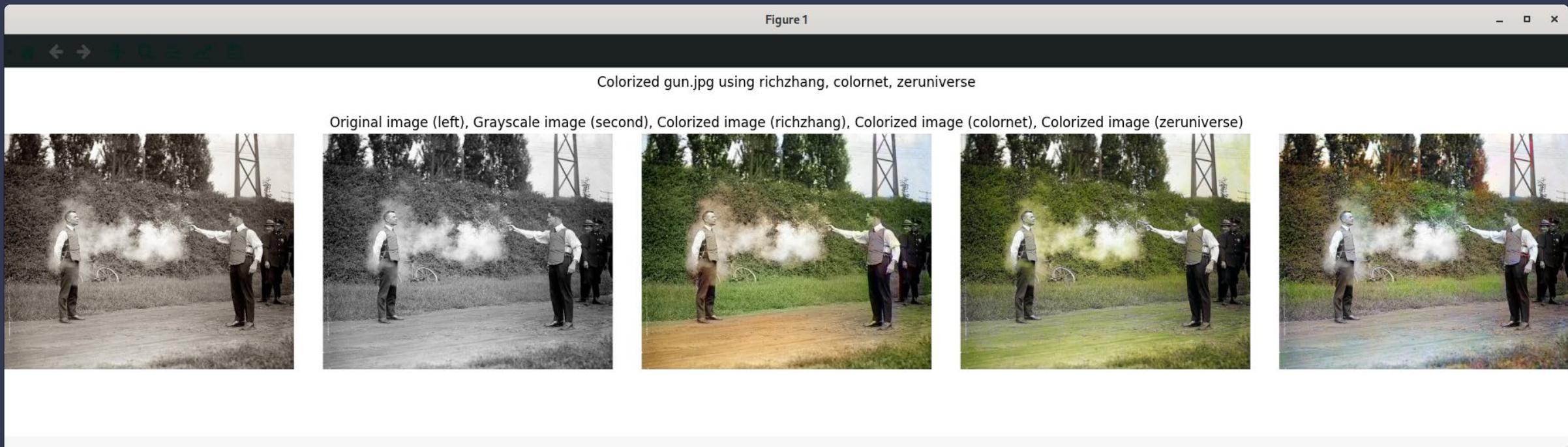
Jeffery Zhao



deepcolor: Beispiel 2

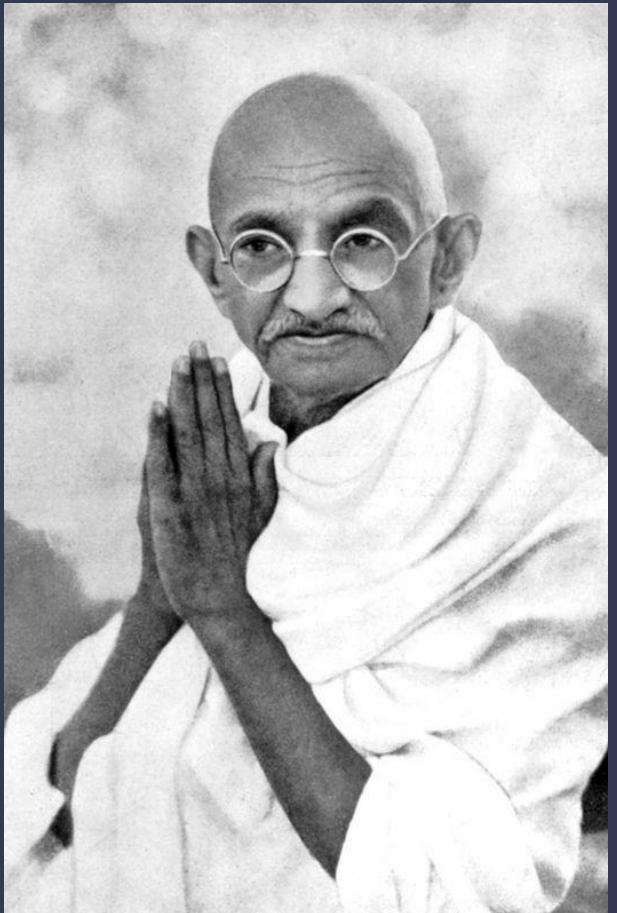


deepcolor: Beispiel 3

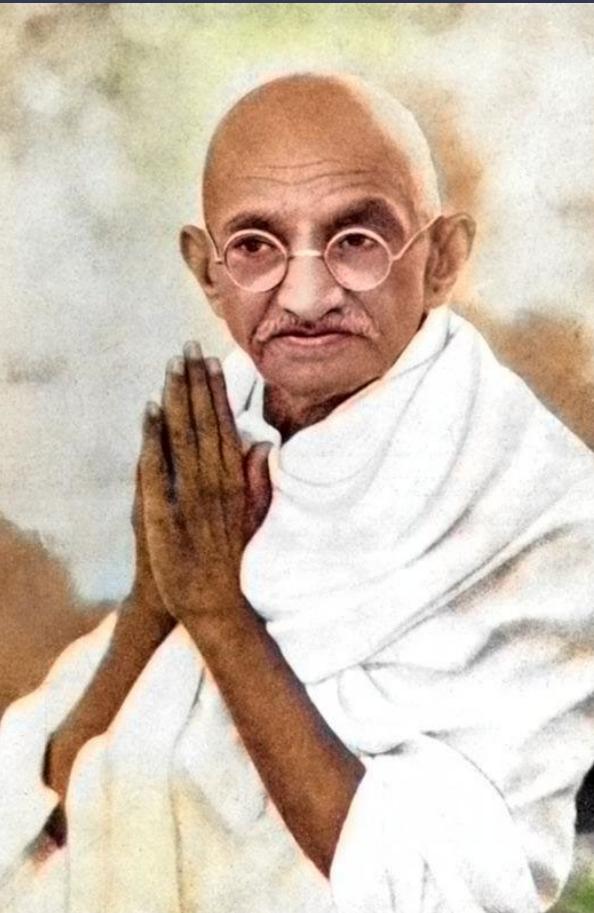


deepcolor: Beispiel 4

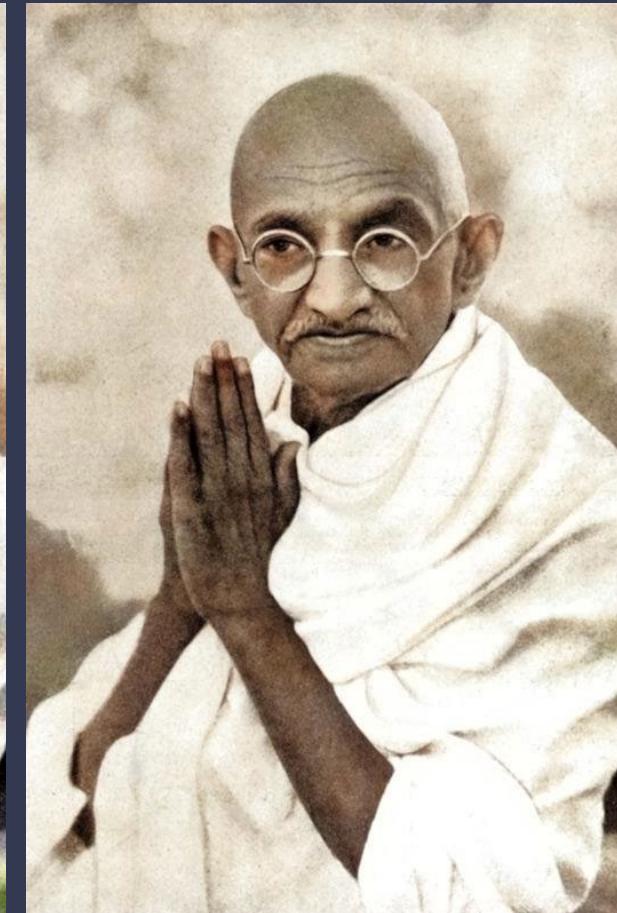
Grayscale



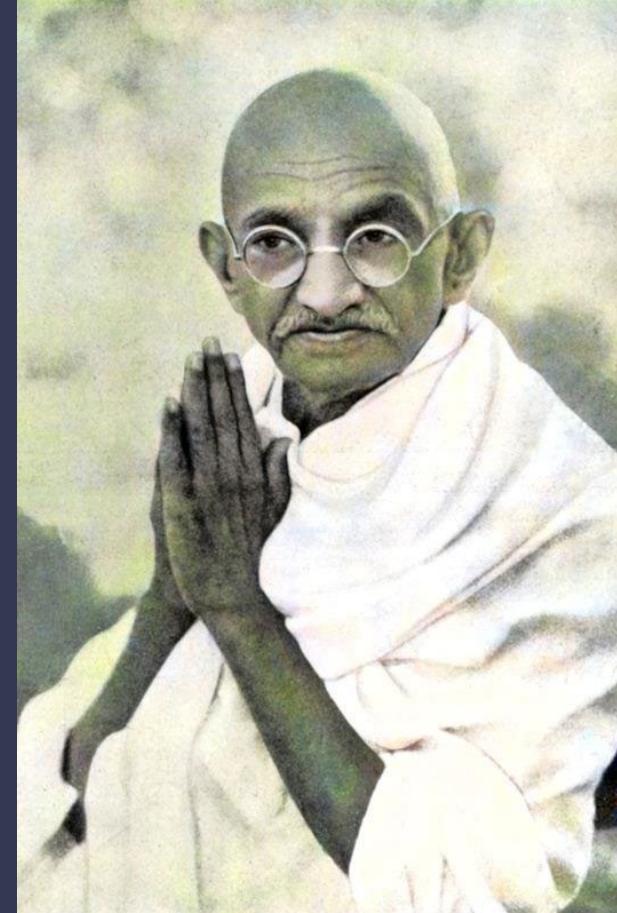
Richard Zhang



Colornet



Jeffery Zhao



deepcolor: Beispiel 5

Grayscale



Richard Zhang



Colornet



Jeffery Zhao



deepcolor: Beispiel 6



Richard Zhang



Colornet



Jeffery Zhao



deepcolor: Beispiel 7



Richard Zhang



Colornet



Jeffery Zhao



deepcolor: Beispiel 8

Grayscale



Richard Zhang



Colornet



Jeffery Zhao



deepcolor: Beispiel 9



Richard Zhang



Colornet



Jeffery Zhao

