Nummernschilderkennung mit Python

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Pipeline

Pipeline

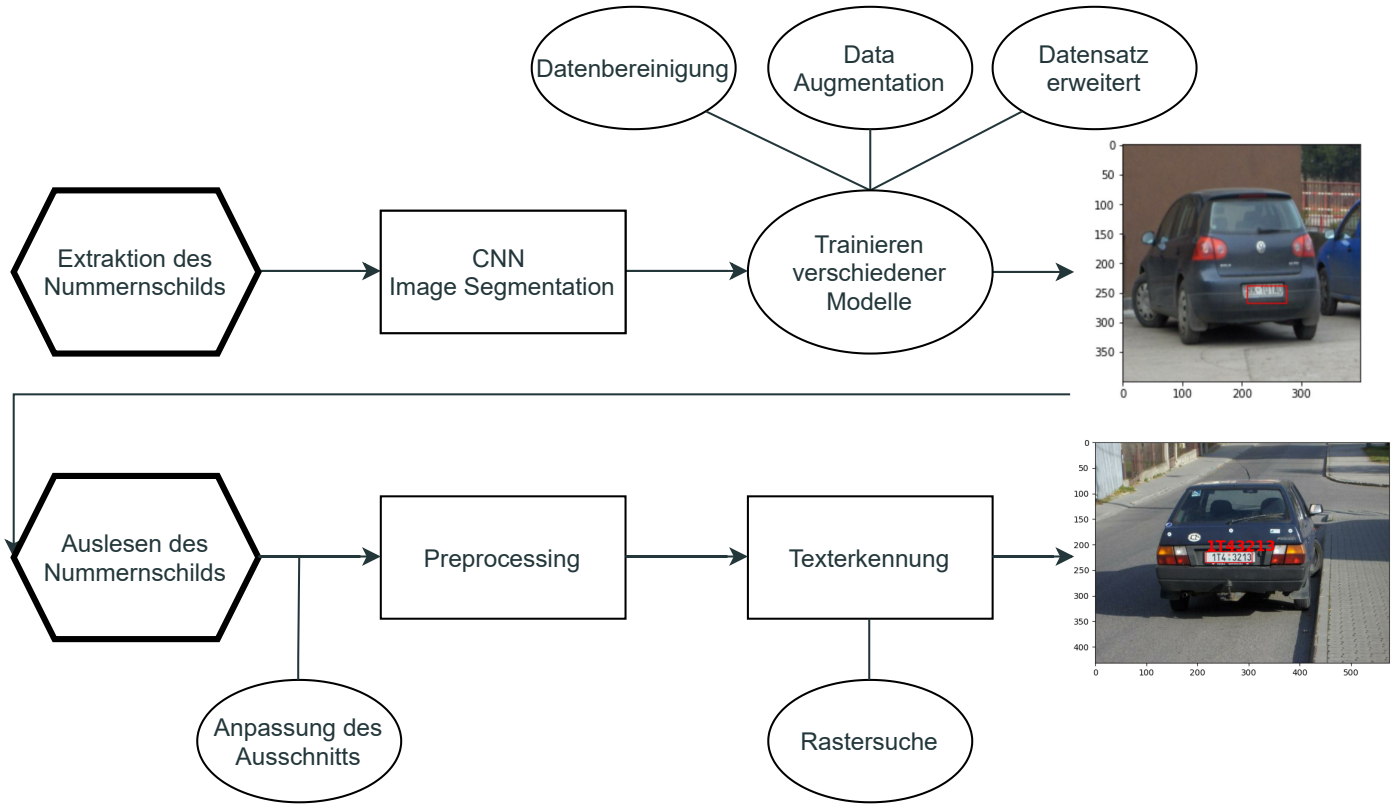
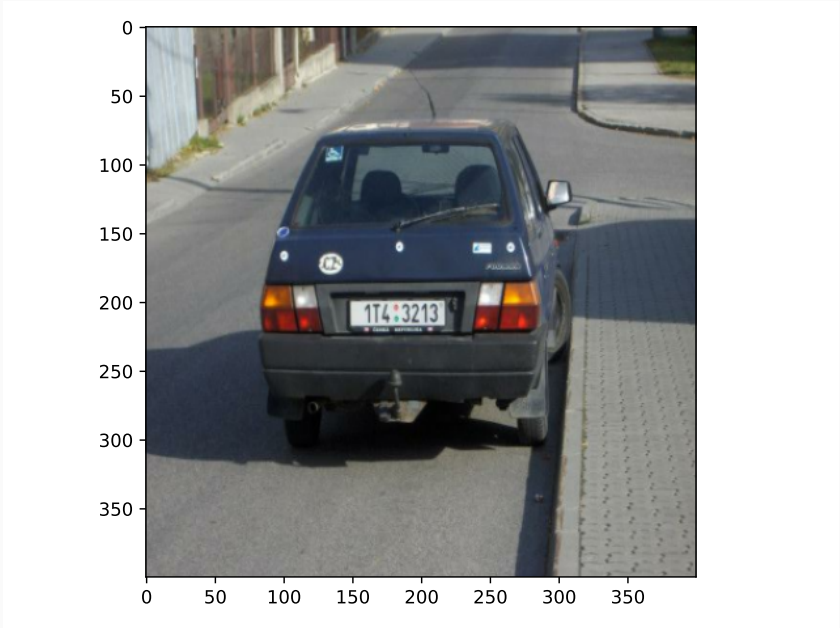
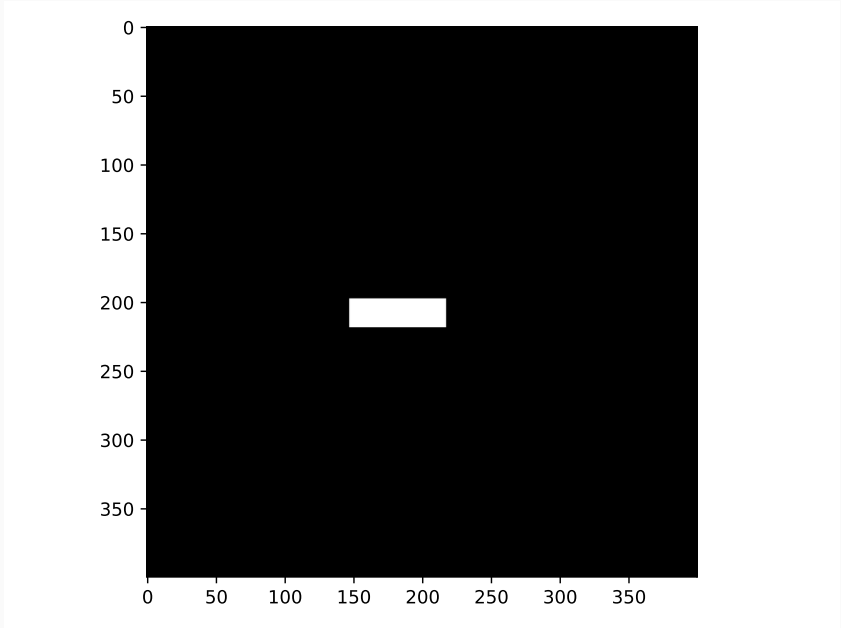

Datenbereinigung
Data Augmentation
Datensatz erweitert
Extraktion des Nummernschilds
CNN Image Segmentation
Trainieren verschiedener Modelle
Auslesen des Nummernschilds
Preprocessing
Texterkennung
Anpassung des Ausschnitts
Rastersuche

Image Segmentation

Trainingseingaben



(a) Eingabe



(b) Ziel

Modellarchitektur

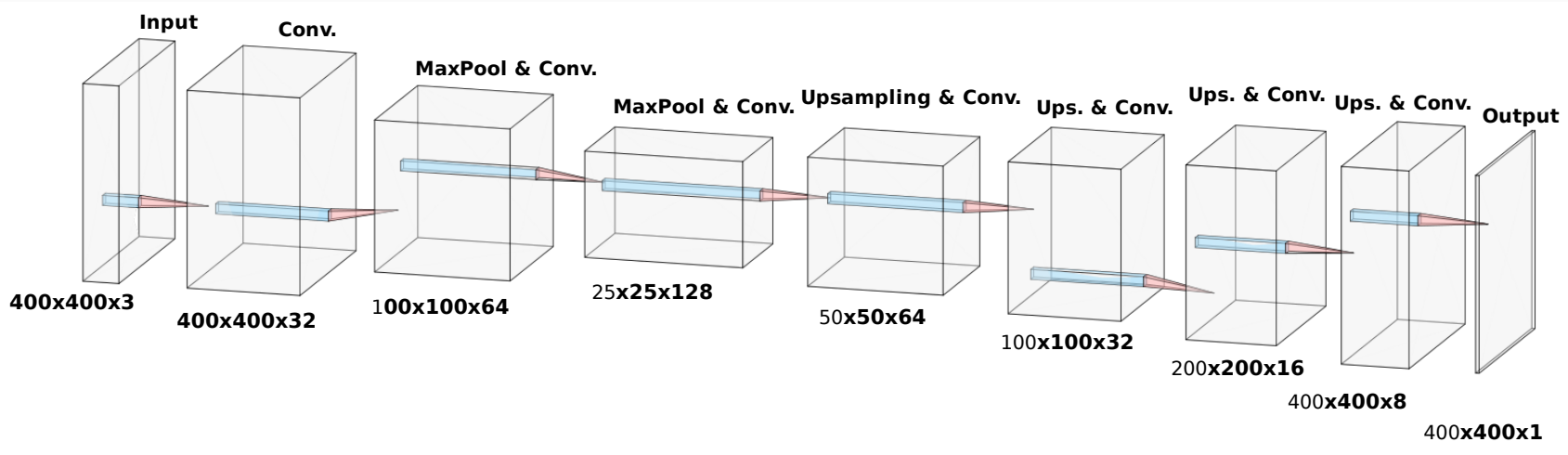
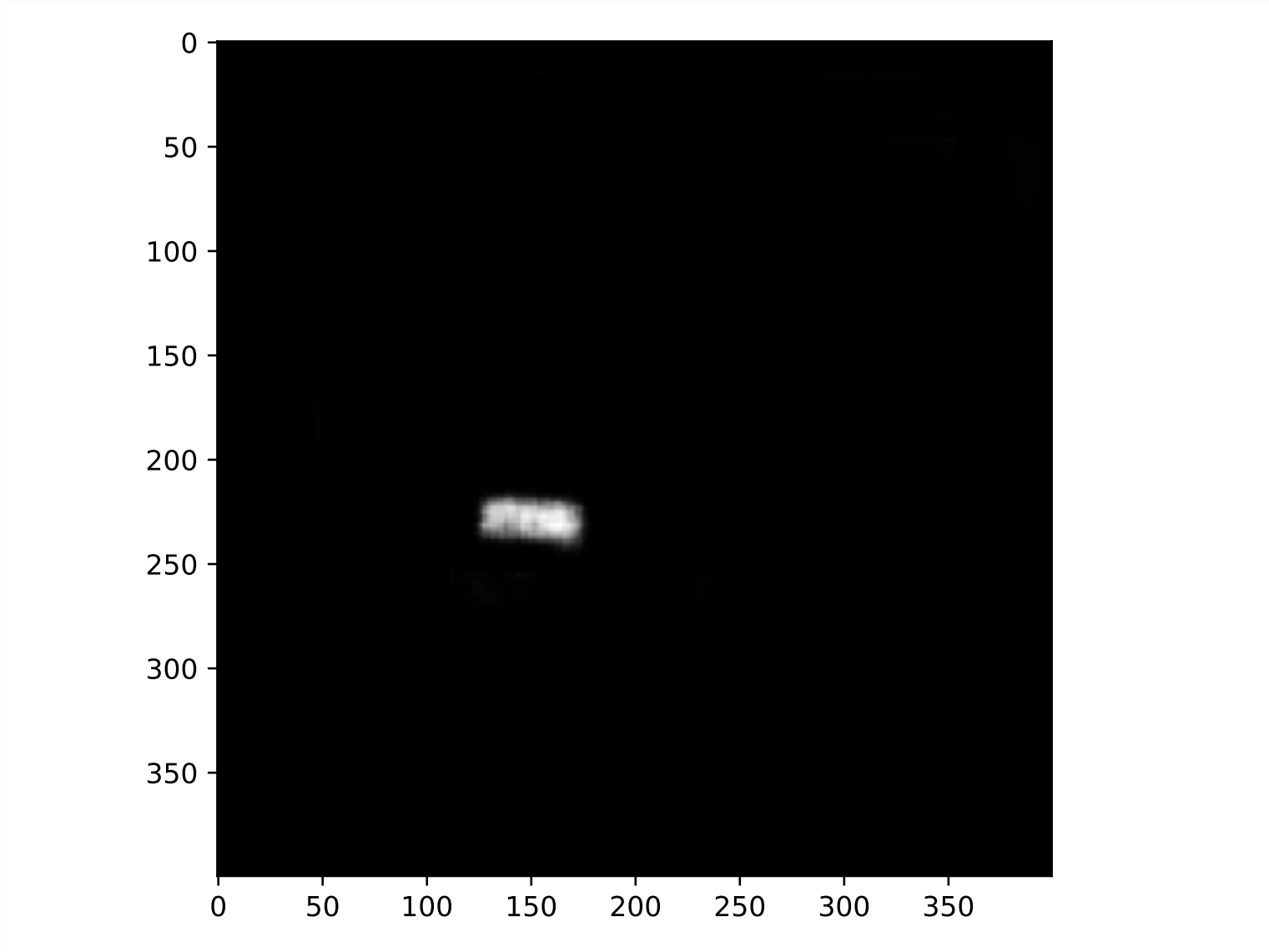
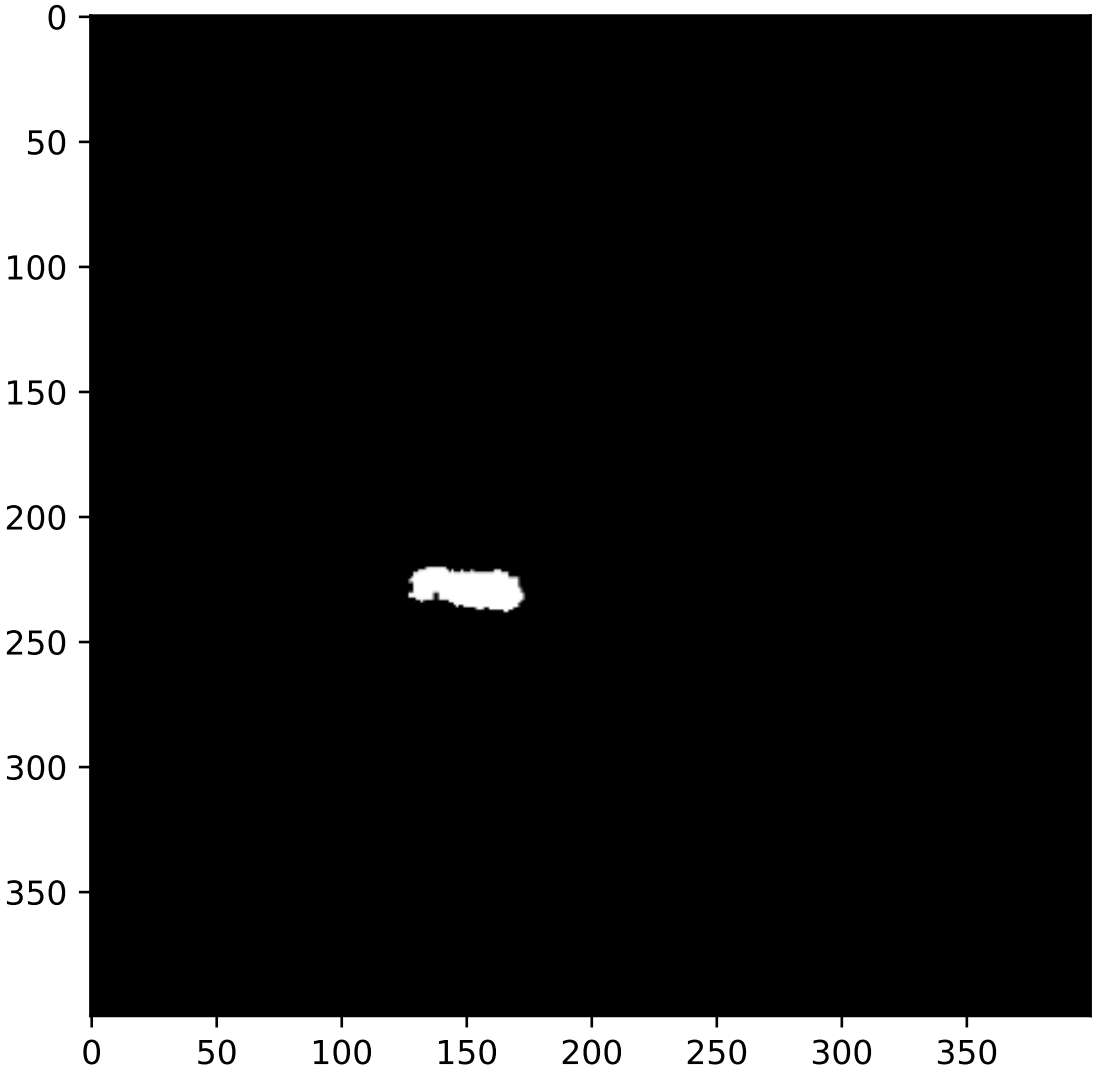


Abbildung 2: Das Ergebnis nach wochenlangem Ausprobieren.

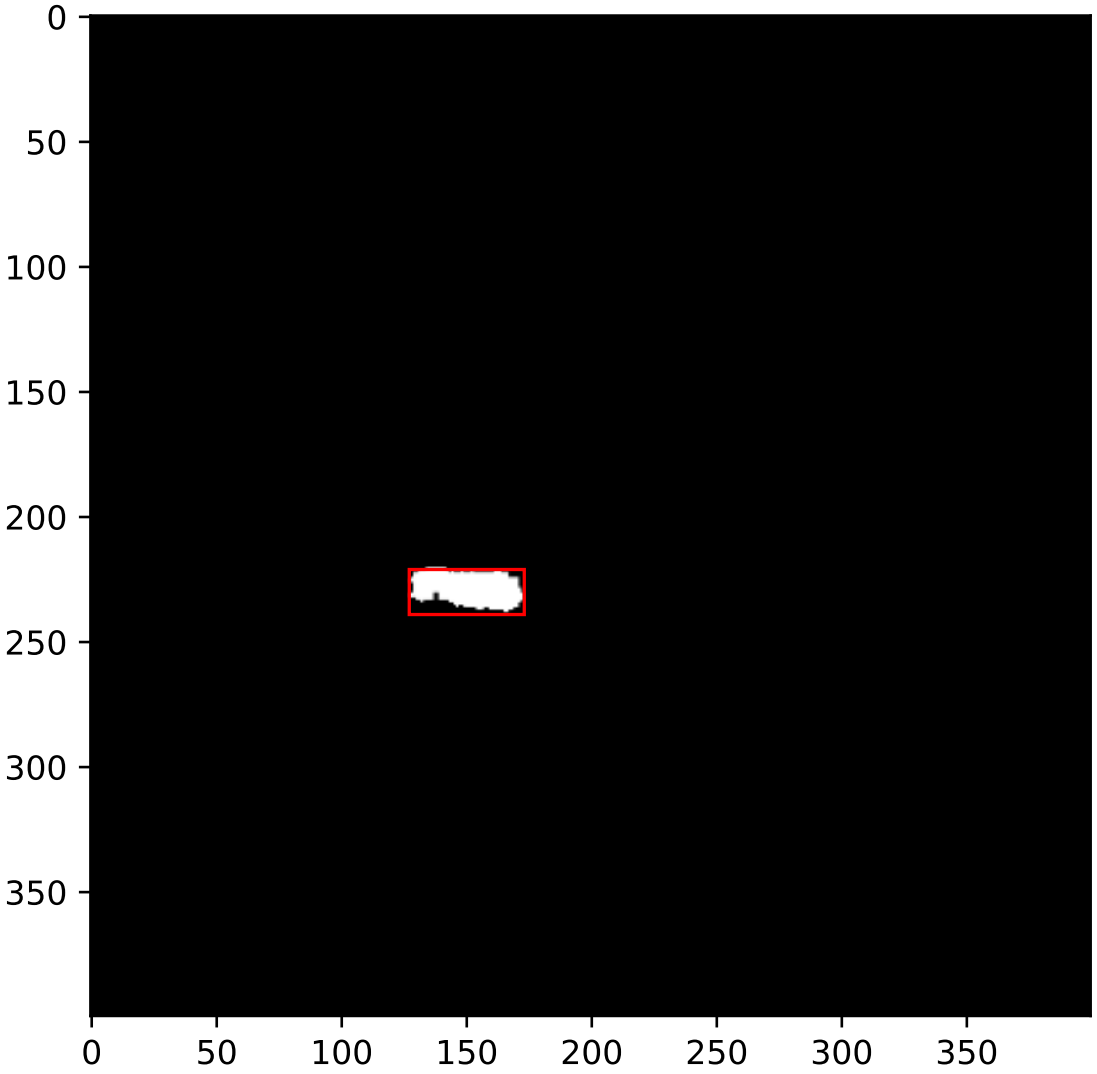
Modellvorhersage



Schwellenwert



Umschließendes Rechteck



Resultat

Details zum Training

Implementierung in Tensorflow, Training auf Google Colab GPU

- 534 Zusätzliche Trainingsbilder hinzugefügt
- Data Augmentation: 949 $\Rightarrow$ 22.776 Bilder
  - Horizontal Flip, Random Cropping, Random Contrast, Random Brightness
  - **Benötigt >14GB GPU Speicher!**
- Gradient Descent mit ADAM Optimizer
- Loss: Binary cross entropy

$$-\sum_{\text{Pixel}} y_{true} \log(y_{pred}) + (1 - y_{true}) \log(1 - y_{pred})$$

- Zur Validierung 20 Bilder aus EU/RO per Hand selektiert
- „Early Stopping“ nach 19 Epochen

Optical Character Recognition

Optical Character Recognition

Dies und das...

Learnings

Learnings

Dies und das...

Evaluator Results

Evaluator Results

Dies und das...

Literatur i

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