Evaluation of CNN architectures for text detection in historical maps

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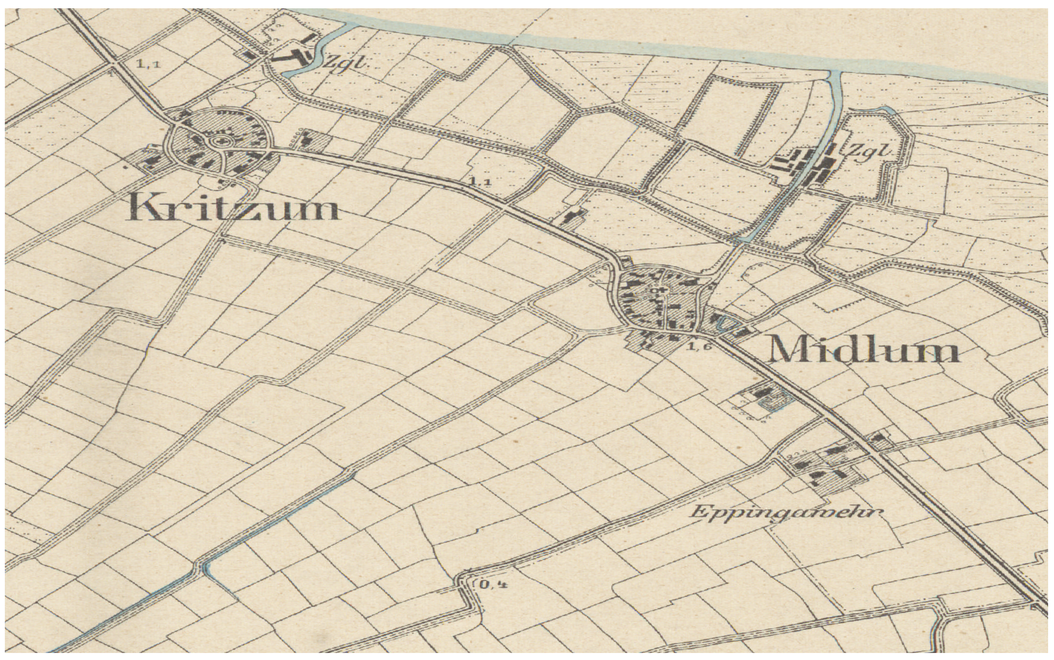

Figure: Historical map from Leer 1897/1898

Abstract

We evaluate different densely connected fully convolutional neural network architectures to find and extract text from maps. This is a necessary preprocessing step before OCR can be performed.
In order to locate the text, we train a neural network to classify whether a given input is text or not. Our main focus is on the output level, either classifying text or no text for the whole input or predicting the text position pixel wise by outputting a mask.
Acquiring enough training data especially for pixel wise prediction is quite a time consuming task, so we investigate a method to generate artificial training data. We compare three training scenarios. First training with images from historical maps, which is quite a small dataset, second adding artificially generated images and third training just with the artificially generated data.

Training data

Figure: Trainings excerpts from maps with target pixel mask.

Figure: Artificially created training images with target pixel mask.

Classification

Task: classify input as text / no text.

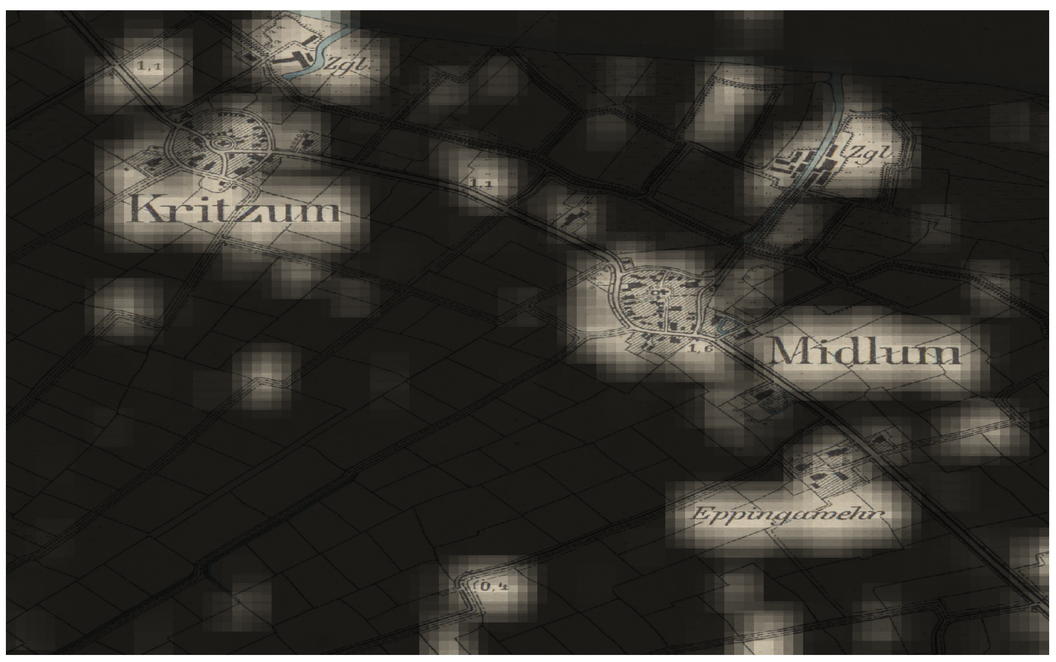

Figure: Training with a fifty-fifty split between artificially generated images and excerpts from maps. Prediction overlaid over the map.

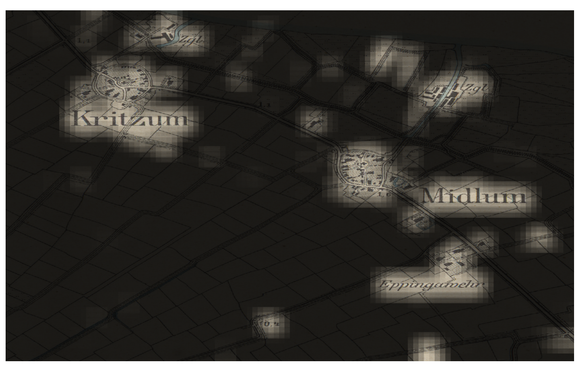

Figure: Training only with excerpts from maps.

Figure: Training only with artificially generated images.

Pixel masks

Task: classify each input pixel as text / no text.

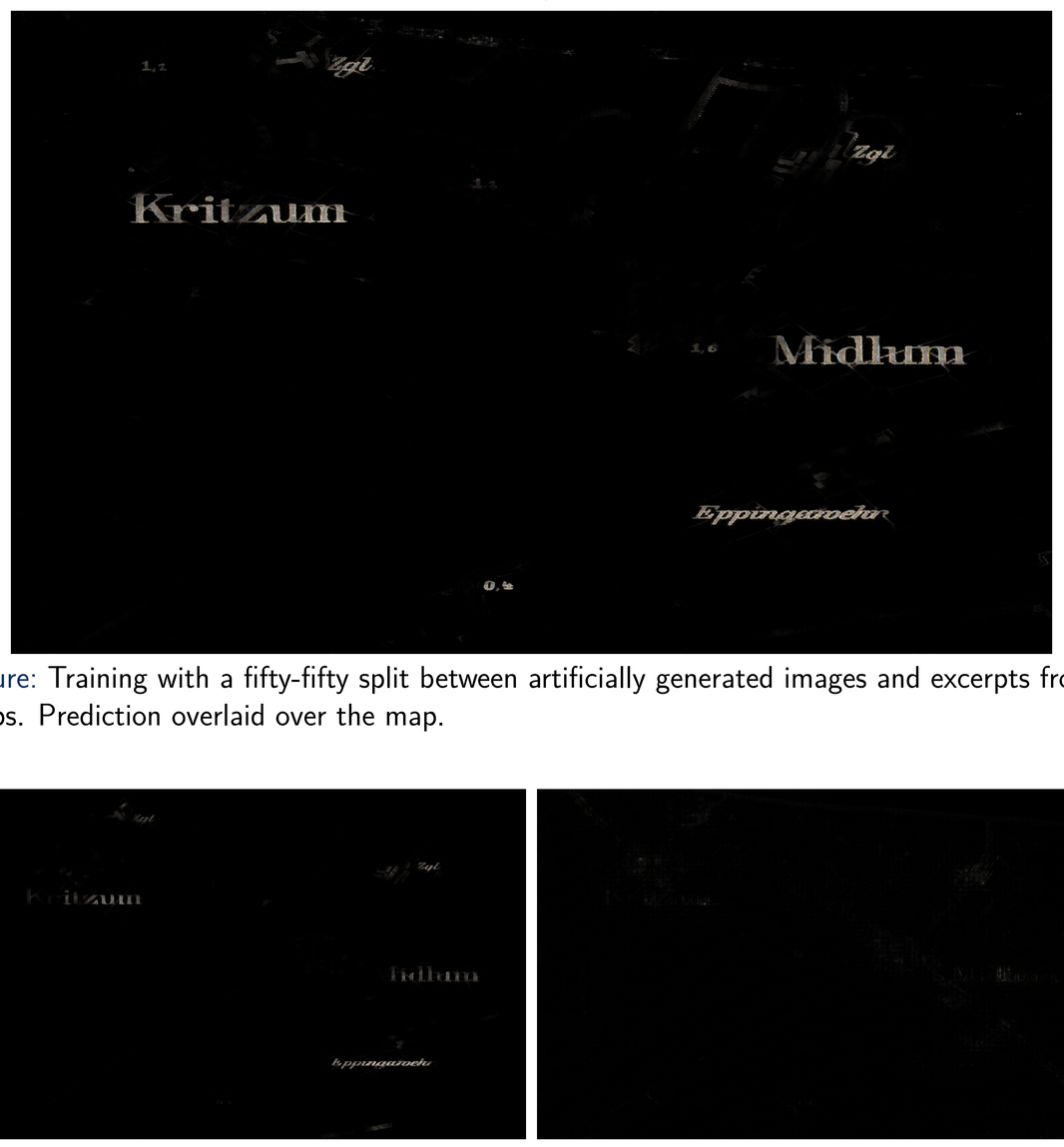

Figure: Training with a fifty-fifty split between artificially generated images and excerpts from maps. Prediction overlaid over the map.

Figure: Training only with excerpts from maps.

Figure: Training only with artificially generated images.

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