Unet Conclusion

1   Four Unet result comparison

In my code I used 4 different variant Unet: Unet, Unet residual, cascade Unet, cascade Unet residual. Each Unet model use pixel wise cross entropy as loss function. The respective output image and score of 4 different variant Unet as followed image, the precision, recall F1 Score value as followed table.
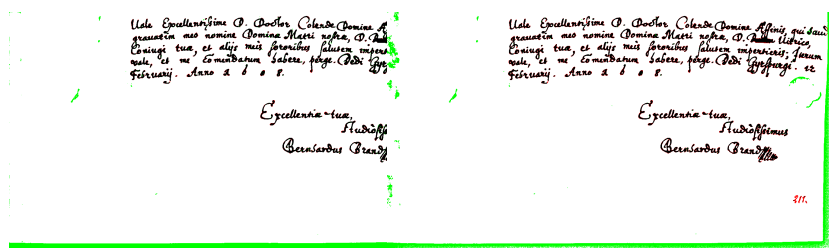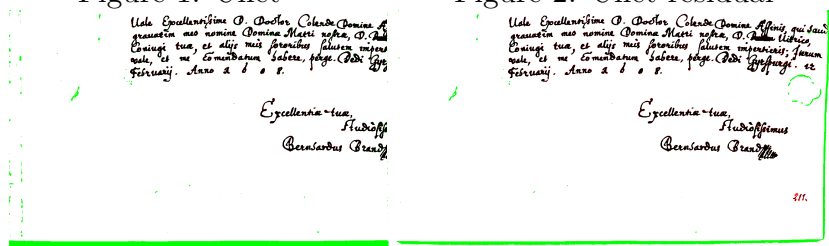

Figure 1: Unet

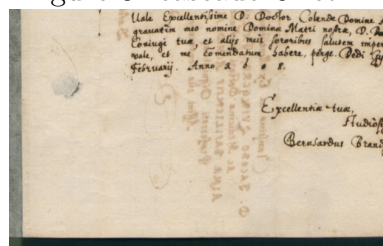Figure 2: Unet residual

Figure 3: cascade Unet

Figure 4: cascade Unet residual
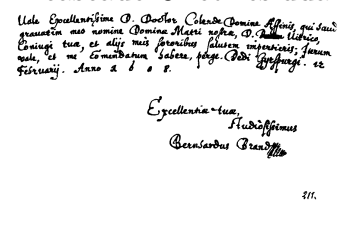
Figure 5: Input Image

Figure 6: Ground Truth

	Precision	Recall	F1 Score
1	0.3382	0.7873	0.4731
2	0.4024	0.854	0.5471
3	0.3669	0.9463	0.5288
4	0.6254	0.8962	0.7367

Table 1: Result of 4 variant Unet

Compare these 4 result, residual Unet ist better than Unet, cascade Unet is also better than Unet. Residual cascade Unet has the best score compare to others. Unet is a end to end model.The contracting path could be regard as an encoder, it capture context product compact feature map.Then symmetric expanding path is a decoder, which allows precise localization to retain spatial information.

2 Why use these Algorithm to improve

Further more Residual Unet block it is safe to train deep layers in order to get enough learning power without worrying about the degradation problem too much. Even in the worst case, blocks in those layers can learn to be an identity mapping and do no harm to performance.

A series of Unet are concatenated to acquire high-resolution features and capture complementary contextual information. The cascade structure will multiply the network depth, which could enhance the ability of a network to extract semantic features. But on the other hand it exacerbate the gradient vanishing problem. After using residual network the result could be better.

3 How to run the code

In pycharm terminal input *python main_1.py train* or *python main_1.py test* could train or test the model.