

Project Presentation: U-Net Implementation

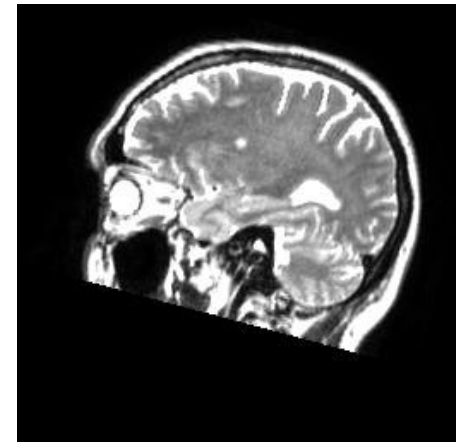
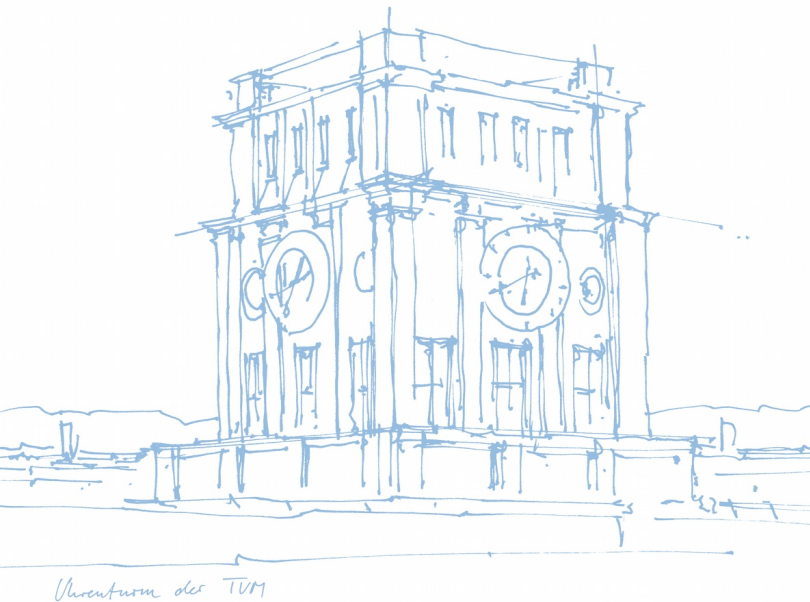
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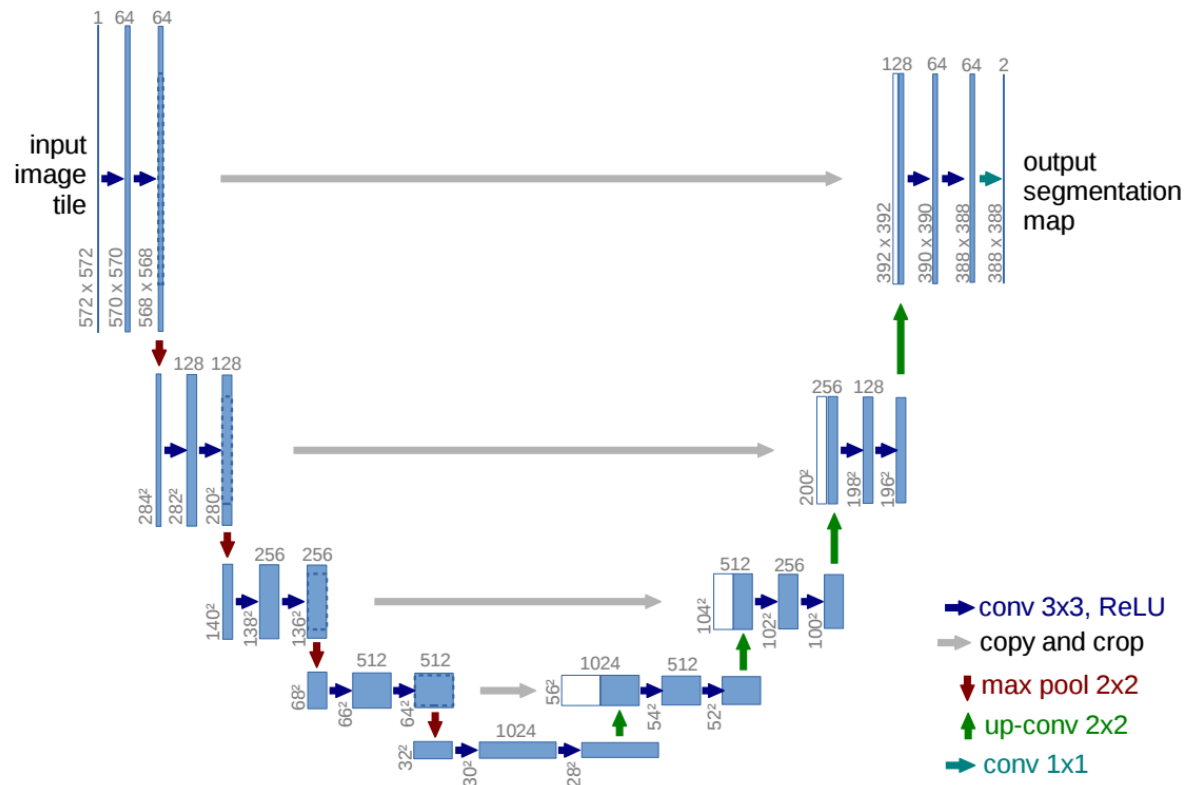
Chair for Computer Aided Medical Procedures & Augmented Reality

München, July 18, 2016



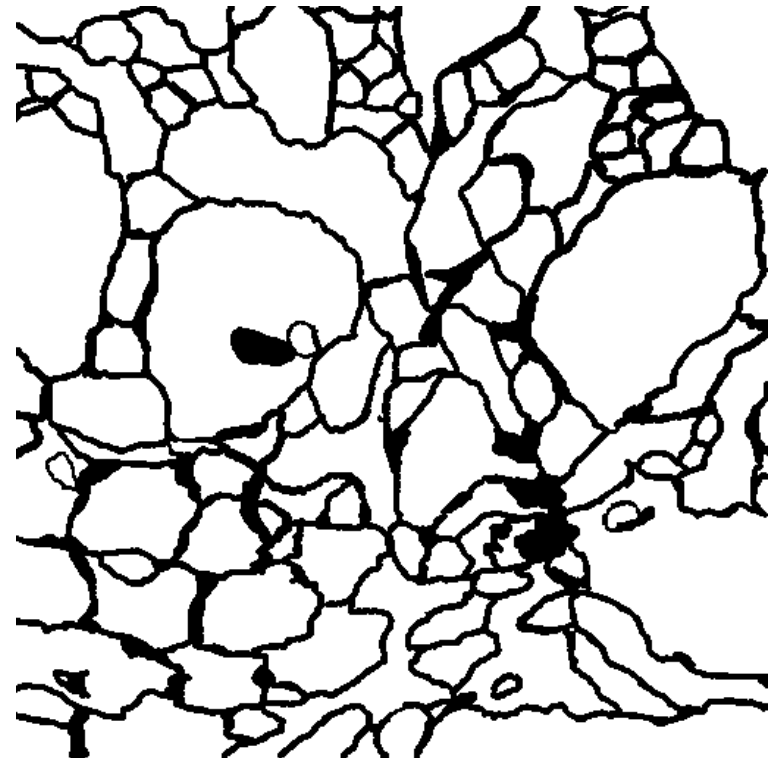
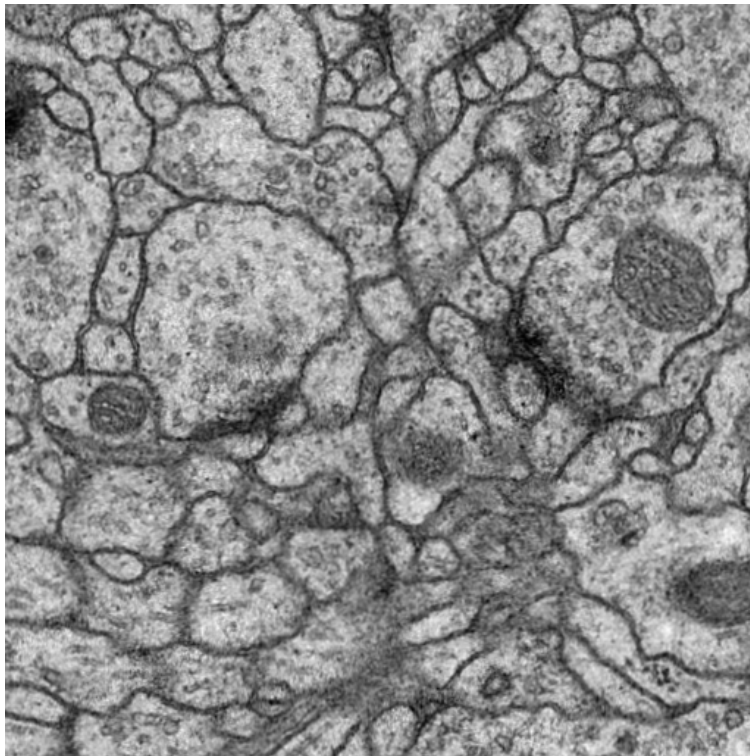
U-Net Architecture [Ronneberger et al., 2015]

- Main feature: skip connections for reusing finer feature maps.
- Used for medical image segmentation.



U-Net: Biomedical Image Segmentation

- Main feature: skip connections for reusing finer feature maps.
- Used for medical image segmentation.



Idea

- Adapt U-Net Architecture to predict one modality given another.
- Raw volumetric data is available (Brain MRI)



Image Generation

- Generate 2D Images from raw volumetric data.
- Normalize gray scale images.



Issue #1

Fix Bug in ConvTranspose DAGNN Handle. #585

[Edit](#)

 **Merged** lenck merged 1 commit into `vlfeat:master` from `clabaus:patch-1`

 Conversation **1**

 Commits **1**

 Files changed **1**

Showing changes from **all commits** ▾ **1 changed file** ▾

+1 -1  Options ▾

2  matlab/+dagnn/ConvTranspose.m		View
		@@ -33,7 +33,7 @@
33	33	outputSizes{1} = [...
34	34	obj.upsample(1) * (inputSizes{1}(1) - 1) + obj.size(1) - obj.crop(1) - obj.crop(2), ...
35	35	obj.upsample(2) * (inputSizes{1}(2) - 1) + obj.size(2) - obj.crop(3) - obj.crop(4), ...
36	-	obj.size(4), ...
	36	+ obj.size(3), ...
37	37	inputSizes{1}(4)] ;
38	38	end
39	39	
		

Bug Report - Forward Pass Corrupted when Compiling MatConvNet for CPU #629



clabaus opened this issue



clabaus commented



Forward Pass Corrupted when Compiling MatConvNet for CPU

Description:

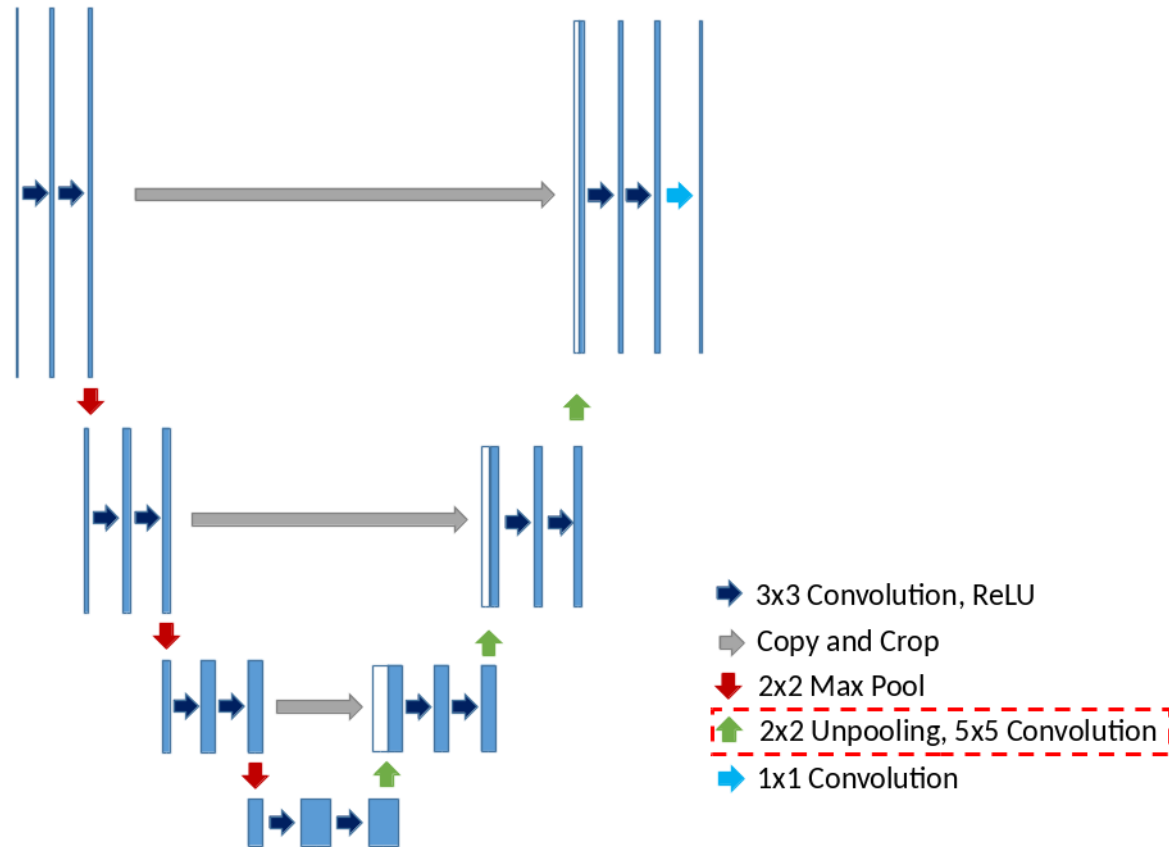
When evaluating some network architectures, the output results differ depending on the number of input images. If only one image is used as input, the output is corrupted (In my case weird vertical stripes or huge values for some pixels). If more images (>2) are given as input, the output seems fine.

- Error only occurs using some network architectures (I could not figure out what exactly triggers the error). A simple network architecture producing this error is implemented in the attached zip-file.
- MatConvNet compiled for CPU (MatConvNet with GPU support seems to work fine so far)
- Tested with MatConvNet Beta18 and Beta20
- Matlab R2016a
- gcc version 4.7.4 (Ubuntu/Linaro 4.7.4-3ubuntu12)

Script and Images for reproducing bug:

[BugReport.zip](#)

U-Net Implementation with Unpooling

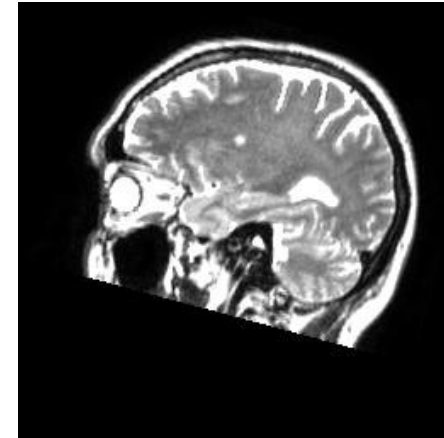


U-Net Implentation with Unpooling – Results

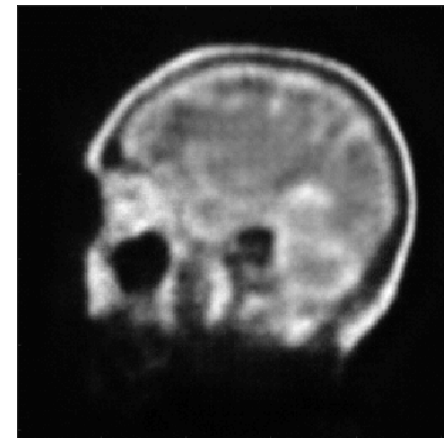
Input Image



Target Image

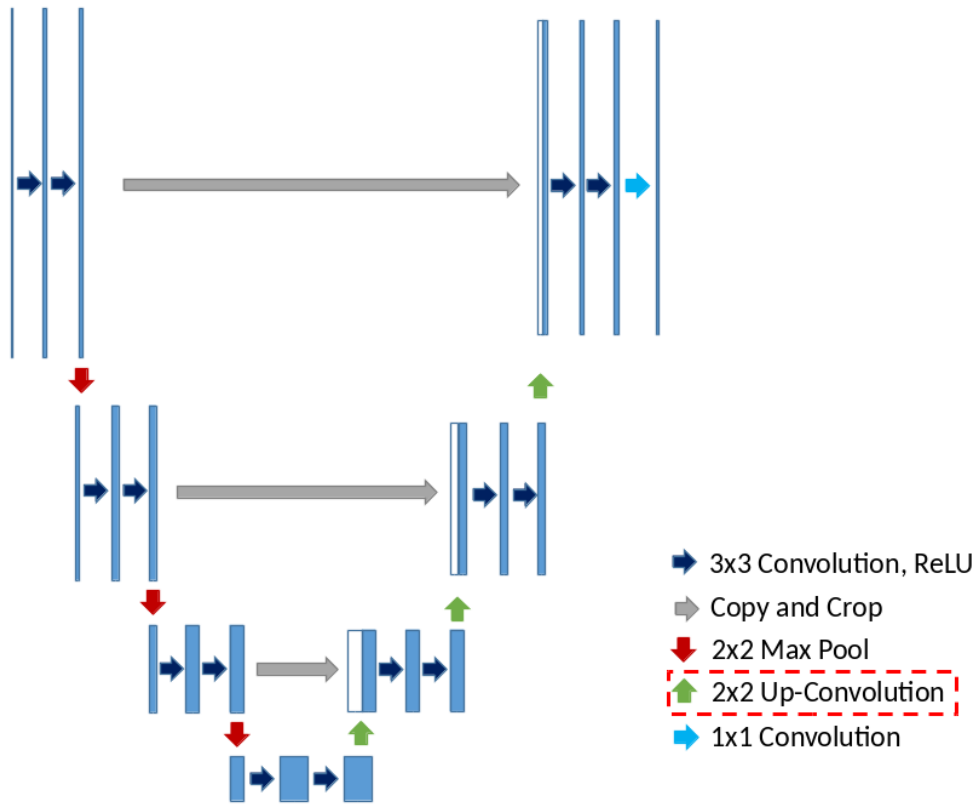


Output Image



- # of images: 8000
- # of epochs: 22
- Learning rate: $1e-7$
- Weight decay: 0.01
- Momentum: 0.9

U-Net Implementations with Up-Convolutions



Conclusion

Bei kleinen Aufzählungen auf Aufzählungszeichen verzichten und ggf. zusätzliche Leerzeile
Nur wesentliche Punkte nennen und Themen auf verschiedene Seiten splitten.

Punkt 1

Punkt 2

Wenn Unterpunkte in einer Aufzählung nötig sind ist ein Einrücken möglich

- Unterpunkt 1
 - Unterpunkt 1
 - Unterpunkt 2

Bei größeren Listen die Standardeinstellung • verwenden

- Unterpunkt 1
- Unterpunkt 2
- Unterpunkt 3