Deep-learning-based image segmentation for uncommon ischemic stroke

From infants to adults

Zoetmulder, R.

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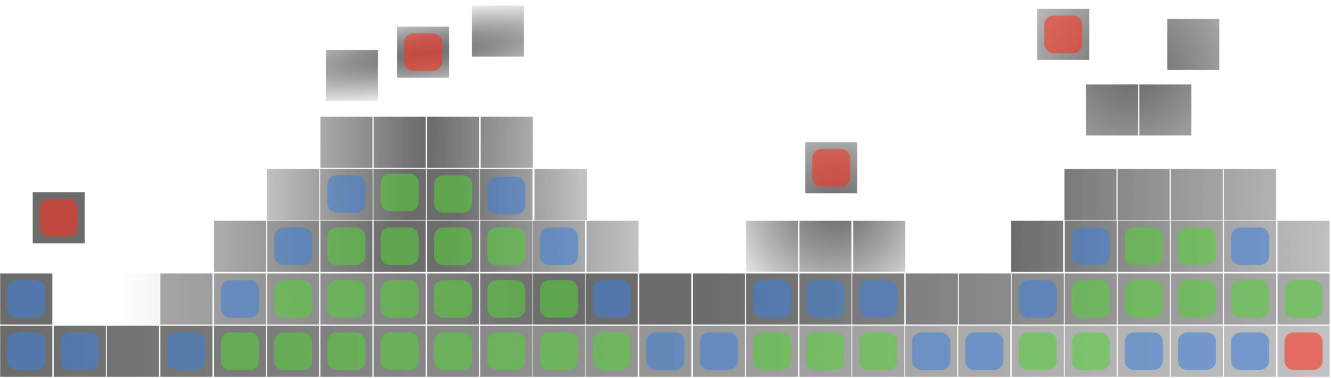
Appendix



Abbreviations

95% CI	95% Confidence Interval
ACS	Anterior Circulation Stroke
ADC	apparent diffusion coefficient
AIS	Acute Ischemic Stroke
ANN	Artificial Neural Network
ATLAS	Anatomical Tracings of Lesions After Stroke
BA	Brain Anatomy
BAHC	Brain Age Healthy Cohort
BGT	basal ganglia and thalami
BST	brainstem
CB	cerebellum
CNN	Convolutional Neural Networks
CT	Computed Tomography
CTA	Computed Tomography Angiography
DWI	Diffusion Weighted Imaging
eCSF	extra-ventricular cerebro-spinal fluid
FLV	Final Lesion Volume
FN	False Negative
FP	False Positive
FU-NCCT	Follow-Up Non-Contrast Computed Tomography
GAN	Generative Adversarial Network
GM	gray matter
HAS	Hyper-dense Artery Sign
HS	Hemisphere separation
ICC	Intraclass Correlation Coefficient
ISLES	Ischemic Stroke LEsion Segmentation
LVO	Large Vessel Occlusion
mIOU	mean Intersection Over Union
MPR	Multi-Planar Reformatting
MR	Magnetic Resonance
MRI	Magnetic Resonance Imaging
mRS	modified Ranking Scale

MS	Multiple Sclerosis
NCCT	Non-Contrast Computed Tomography
PAIS	Perinatal Arterial Ischemic Stroke
PC-ASPECTS	Posterior Circulation Alberta Stroke Program Early Computed Tomography Score
PCS	Posterior Circulation Stroke
rhEPO	recombinant human erythropoietin
ROI	Region-of-Interest
rTPA	recombinant Tissue Plasminogen Activator
TP	True Positive
VBR	Volume-based Removal
vCSF	ventricular cerebro-spinal fluid
VOI	Volume-of-Interest
WM	white matter

Portfolio

Portfolio

Name PhD student: Riaan Zoetmulder
PhD period: 2018 - 2022
Names of PhD supervisor(s) & co-supervisor(s): Henk Marquering, Ivana Išgum & Efstratios Gavves

1. PhD training

	Year	ECTS
General courses		
Project Management	2020	0.6
Specific courses		
Scientific writing in English	2019	1.5
Entrepreneurship in the health and life sciences	2021	0.5
Seminars, workshops and master classes		
Presentations		
CV Eng, SOOS Talk, QIA/QurAI groups	-	-
(Inter)national conferences		
MICCAI	2020	1.4
Other	-	-

2. Teaching		
	Year	**ECTS**
Lecturing		
Tutoring, Mentoring		
MAM 10	2018	2
MAM 11	2019	2
MAM 12	2020	2
Statistics, Simulation & Optimization	2018	3.5
Statistics, Simulation & Optimization	2019	3.5
Deep Learning	2020	3.5
Supervising		
Master Thesis (Mahsa Mojtahedi)	2020	1.1
Other		
AI Journal Club AMC (Organisation)	2018 - 2020	1.8
SOOS Talk (Attendence)	2018 - 2020	1.8

3. Publications	
Peer reviewed	**Year**
Automated Final Lesion Segmentation in Posterior Circulation Acute Ischemic Stroke Using Deep Learning *(Shared First Author)*	Diagnostics 2021
Domain- and task-specific transfer learning for medical segmentation tasks *(First Author)*	Computer Methods & Programs in Biomedicine 2022
Deep Learning Based Posterior Circulation Stroke Detection and Segmentation in Computerized Tomography Using a Moving Volume of Interest *(First Author)*	2022 Diagnostics
Submitted	**Year**
Brain Segmentation in Patients with Perinatal Arterial Ischemic Stroke *(First Author)*	2022

Acknowledgements

PhD students have a reputation for being hermits that spend all of their time in a dimly lit room, slaving away at finding solutions to obscure scientific problems. Of course this is an exaggeration of life as a PhD student. In reality, PhD students work in fairly well lit rooms. They are also allowed to go out, but only to meet with their supervision team. As such, obtaining a PhD is more of a team effort than people are led to believe. Hence, I would like to extend my gratitude to the members of my supervision team: Henk A. Marquering, Efstratios Gavves & Ivana Išgum. Thank you for all the time and effort that you have invested in my personal development and research projects.

You cannot spell laboratory, without labor. This is why academics refer to laboratories as labs, such that they get associated with likeable dogs rather than hard work. I have had the luck of being a member of three labs. Unfortunately, none of them had any Labradors, but all of them had affable, smart, and supportive colleagues. These three labs were the department of biomedical engineering and physics, the qurAI group, and VIS-Lab. Here I would like to express appreciation to my fellow PhD candidates and Post-Docs. Despite the prolonged lock-downs, you have all been a very important source of support during my PhD candidacy. I hope to stay in touch with you after my PhD.

Finally, I would like to thank those that were not directly involved in the PhD process or part of any lab, but that were supportive during this time. One group of people that I would like to thank are those from the other labs for the many lunches, talks, and gym sessions that we have had. Another group that I would like to express my gratitude to are my friends, that had to put up with the stressed out and less-than-optimal version of me. Finally, I would like to thank my family that have always been supportive of me going through this process.

About the Author

Riaan Zoetmulder was born in Amsterdam on the 19*th* of June 1991. After his secondary education he studied psychology and economics and finance at the University of Amsterdam. After obtaining his bachelors degrees, he switched to artificial intelligence and received his masterś degree cum laude in 2018. During his masters thesis he worked on the interpretability of neural networks for image classification problems. After completing his masters degree he started working as a PhD student at the Amsterdam University medical centers, location AMC. The results of which are described in this thesis.