Nick Pawlowski

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Academic

PhD student at BioMedIA group October 2016 - expected Fall 2021
Imperial College London, UK

- Supervisor: Ben Glocker
- Topics: Causality, Outlier Detection, Uncertainty Quantification

MSc in Artificial Intelligence September 2015 - August 2016
University of Edinburgh, UK

- Graduated with distinction
- Supervisor: Amos Storkey
- Thesis: Towards Image-Based Morphological Profiling using Deep Learning Techniques

BSc in Physics October 2011 - June 2014
Humboldt Universität Berlin, Germany

- Graduated with 2.3
- Erasmus year at University of Leeds
- Thesis: Testing and optimisation of a Magnetocardiograph using COMSOL simulations

Professional

Student Researcher December 2020 - present
Research Intern June 2020 - December 2020
Google Health

- Work on implementing and evaluating AI safety methods
- Conceptualising and performing research in AI safety for medical applications in collaboration with Google Brain and DeepMind

Research Collaborator March 2019 - June 2019
Research Intern September 2018 - December 2018
Facebook AI Research

- Implementation of BagNet-based models with different global pooling functions
- Planning and execution of experiments related to the classification of images with small objects of interest

Machine Learning Resident May 2018 - August 2018
X (formerly known as Google X)

- Implementation of Deep Learning based black-box optimisation methods
- Large-scale benchmarking of black-box optimisation methods
- Implementation of RNNs and CNNs for sequence classification tasks

Machine Learning Engineer (Part-time) March 2017 - May 2018
Rasa Technologies GmbH, Remote
- Implementation of new chatbots for various customers
- Design and conduction of experiments around intent classification with outlier detection
- Implementation of StarSpace-based intent classifier

Visiting Scholar at Imaging Platform May 2016 - August 2016
Broad Institute of MIT and Harvard
- Usage of pre-trained neural networks to automate morphological profiling
- Implementation and training of neural networks for morphological profiling

Teaching

Teaching Assistant, Imperial College London, UK
- Co-supervision on MSc projects (2017/18, 2019/20, 2020/21)
- 493 - Data Analysis and Probabilistic Inference (2017-2020)
- 496 - Mathematics for Machine Learning (2017, 2019)
- 407H - Medical Image Computing (2017)

Tutorial Helper at Machine Learning Summer School July 219

Instructor at MedIAN CodeFest September 2017

Course Instructor at TalentAkademie July 2014

Extra-Curricular Activities

Deep Learning Tool Kit for Medical Imaging 2017-2019
- Open source library built in Tensorflow: `github.com/dltk/dltk`
- Implemented easy to use baselines for medical imaging

Edintelligence - University of Edinburgh ML Society November 2015 - May 2016
- Founded Machine Learning Student Group with $\approx$ 100 members
- Organised two talks with professors and PhD students with $\approx$ 50 attendees
- Organised Machine Learning Interview Workshop supported by Amazon

Awards & Scholarships

Top 33% reviewer at ICML 2020
Honorary mention for best reviewer at MIDL 2020
Winner of the Multimodal Brain Tumor Segmentation Challenge (BraTS) 2017
Microsoft Research PhD Fellowship 2016 - present
Scholarship of the German Foundation of German Business (sdw) 2011 - 2016
Scholarship of the Robert Bosch Foundation to attend ESOF 2012 2012

Talks & Services

Invited talk at Google October 2020
Organiser and speaker CauseMIC at MICCAI October 2020
Invited talks at Metrics Lab Kings College London October 2020
Invited talk at Google August 2020
Invited talk at Kheiron ML Reading Group July 2020

Invited talk at Broad Institute Imaging Platform	April 2020
Invited talk at Crick Networking Group AI/ML Workshop	Februar 2020
Invited talk at NYU's CAI^{2}R	Dec 2018
Invited talk at MILA Tea Talks	Oct 2018
Workshop organizer SPIE Medical Imaging Workshop on Deep Learning Toolkits for the Medical Imaging Community	Feb 2018

Reviewing

ICML (2020, 2021), MIDL (2019 - 2021), ICLR (2021), NeurIPS (2020, 2021), MICCAI iMIMIC (2019, 2020), NeurIPS BDL workshop (2019), MedNeurIPS (2018, 2019), IEEE TMI, PLOS Computational Biology

Publications

[1] **Nick Pawlowski** and Ben Glocker. Abnormality Detection in Histopathology via Density Estimation with Normalising Flows. *MIDL Short Paper Track*, 2021.

[2] Abhijit Guha Roy, Jie Ren, Shekoofeh Azizi, Aaron Loh, Vivek Natarajan, Basil Mustafa, **Nick Pawlowski**, Jan Freyberg, Yuan Liu, Zach Beaver, Nam Vo, Peggy Bui, Samantha Winter, Patricia MacWilliams, Greg S. Corrado, Umesh Telang, Yun Liu, Taylan Cemgil, Alan Karthikesalingam, Balaji Lakshminarayanan, and Jim Winkens. Does Your Dermatology Classifier Know What It Doesn't Know? Detecting the Long-Tail of Unseen Conditions. *arXiv preprint arXiv:2104.03829*, 2021.

[3] **Nick Pawlowski***, Daniel C Castro*, and Ben Glocker. Deep structural causal models for tractable counterfactual inference. In *Advances in Neural Information Processing Systems*, 2020.

[4] Miguel Monteiro, Loïc Le Folgoc, Daniel Coelho de Castro, **Nick Pawlowski**, Bernardo Marques, Konstantinos Kamnitsas, Mark van der Wilk, and Ben Glocker. Stochastic segmentation networks: Modelling spatially correlated aleatoric uncertainty. *Advances in Neural Information Processing*, 2020.

[5] Xiaoran Chen, **Nick Pawlowski**, Ben Glocker, and Ender Konukoglu. Unsupervised Lesion Detection with Locally Gaussian Approximation. In *International Workshop on Machine Learning in Medical Imaging*, 2019.

[6] Qingjie Meng, **Nick Pawlowski**, Daniel Rueckert, and Bernhard Kainz. Representation disentanglement for multi-task learning with application to fetal ultrasound. *arXiv preprint arXiv:1908.07885*, 2019.

[7] **Nick Pawlowski**, Suvrat Bhooshan, Nicolas Ballas, Francesco Ciompi, Ben Glocker, and Michal Drozdzal. Needles in haystacks: On classifying tiny objects in large images. *arXiv preprint arXiv:1908.06037*, 2019.

[8] **Nick Pawlowski** and Ben Glocker. Is Texture Predictive for Age and Sex in Brain MRI? *Medical Imaging with Deep Learning Abstract track*, 2019.

[9] Matthew CH Lee, Kersten Petersen, **Nick Pawlowski**, Ben Glocker, and Michiel Schaap. Template transformer networks for image segmentation. *Medical Imaging with Deep Learning Abstract track*, 2019.

[10] Nat Dilokthanakul, **Nick Pawlowski**, and Murray Shanahan. Explicit information placement on latent variables using auxiliary generative modelling task, 2019.

[11] Spyridon Bakas, Mauricio Reyes, Andras Jakab, Stefan Bauer, Markus Rempfler, Alessandro Crimi, Russell Takeshi Shinohara, Christoph Berger, Sung Min Ha, Martin Rozycki, et al. Identifying the best machine learning algorithms for brain tumor segmentation, progression assessment, and overall survival prediction in the brats challenge. *arXiv preprint arXiv:1811.02629*, 2018.

[12] **Nick Pawlowski***, Xiaoran Chen*, Martin Rajchl, Ben Glocker, and Ender Konukoglu. Deep Generative Models in the Real-World: An Open Challenge from Medical Imaging. *arXiv preprint arXiv:1806.05452*, 2018.

[13] **Nick Pawlowski**, Matthew CH Lee, Martin Rajchl, Steven McDonagh, Enzo Ferrante, Konstantinos Kamnitsas, Sam Cooke, Susan Stevenson, Aneesh Khetani, Tom Newman, et al. Unsupervised Lesion Detection in Brain CT using Bayesian Convolutional Autoencoders. *Medical Imaging with Deep Learning Abstract track*, 2018.

[14] Martin Rajchl, **Nick Pawlowski**, Daniel Rueckert, Paul M Matthews, and Ben Glocker. NeuroNet: Fast and Robust Reproduction of Multiple Brain Image Segmentation Pipelines. *Medical Imaging with Deep Learning*, 2018.

[15] Vanya V Valindria, **Nick Pawlowski**, Martin Rajchl, Ioannis Lavdas, Eric O Aboagye, Andrea G Rockall, Daniel Rueckert, and Ben Glocker. Multi-Modal Learning from Unpaired Images: Application to Multi-Organ Segmentation in CT and MRI. In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2018.

[16] **Nick Pawlowski**, Andrew Brock, Matthew CH Lee, Martin Rajchl, and Ben Glocker. Implicit Weight Uncertainty in Neural Networks. *NIPS Workshop on Bayesian Deep Learning*, 2017.

[17] **Nick Pawlowski**, Sofia Ira Ktena, Matthew CH Lee, Bernhard Kainz, Daniel Rueckert, Ben Glocker, and Martin Rajchl. DLTK: State of the Art Reference Implementations for Deep Learning on Medical Images. *NIPS Workshop on Medical Imaging meets NIPS*, 2017.

[18] Konstantinos Kamnitsas, Wenjia Bai, Enzo Ferrante, Steven McDonagh, Matthew Sinclair, **Nick Pawlowski**, Martin Rajchl, Matthew Lee, Bernhard Kainz, Daniel Rueckert, and Ben Glocker. Ensembles of Multiple Models and Architectures for Robust Brain Tumour Segmentation. *MICCAI Multimodal Brain Tumor Segmentation Challenge 2017*, 2017.

[19] Peter Goldsborough, **Nick Pawlowski**, Juan C Caicedo, Shantanu Singh, and Anne E Carpenter. CytoGAN: Generative Modeling of Cell Images. *NIPS Workshop on Machine Learning for Computational Biology*, 2017.

[20] Tom Bocklisch, Joey Faulker, **Nick Pawlowski**, and Alan Nichol. Rasa: Open source language understanding and dialogue management. *arXiv preprint arXiv:1712.05181*, 2017.

[21] Nat Dilokthanakul, Christos Kaplanis, **Nick Pawlowski**, and Murray Shanahan. Feature control as intrinsic motivation for hierarchical reinforcement learning. *IEEE Transactions on Neural Networks and Learning Systems*, 2019.

[22] **Nick Pawlowski**, Miguel Jaques, and Ben Glocker. Efficient variational Bayesian neural network ensembles for outlier detection. *ICLR Workshop Track*, 2017.

[23] **Nick Pawlowski**, Juan C Caicedo, Shantanu Singh, Anne E Carpenter, and Amos Storkey. Automating Morphological Profiling with Generic Deep Convolutional Networks. *NIPS Workshop on Machine Learning in Computational Biology*, 2016.