Contact

www.linkedin.com/in/wolfgang-m-pauli (LinkedIn)
neurobabel.org (Personal)
scholar.google.com/citations (Portfolio)
learnanalytics.microsoft.com/ (Company)

Top Skills

Experimental Design
computational neuroscience
statistics

Languages

Japanese
English
German

Certifications

June 2022 MLADS Conference Presenter

Patents

An end-to-end optimizable machine learning approach for tracking three-dimensional geometric shapes in space

Adaptive Artificial Intelligence For Three-Dimensional Object Detection Using Synthetic Training Data

Wolfgang Pauli

ML Engineer
United States

Summary

Experienced Applied Machine Learning and Artificial Intelligence Research Scientist, with a Doctor of Philosophy (Ph.D.) in Computational Neuroscience from University of Colorado at Boulder, publications in peer-reviewed scientific journals on Computational Neuroscience, Reinforcement Learning, and Neural Networks. In my current position, I work on co-innovation with customers, discovering and developing new applications for AI in diverse industries.

Experience

Apple
Machine Learning Engineer
July 2023 - Present (5 months)
San Francisco Bay Area

Microsoft
5 years 3 months

Principal AI Developer
March 2021 - July 2023 (2 years 5 months)
Redmond, Washington, United States

Tech lead. Selected projects:
- Semi-supervised 3D object detection for preventing illegal wildlife trafficking in CT scans of passengers' luggage, https://www.youtube.com/watch?v=U3ozr16BS5A
- Mapping chimpanzee populations and social interactions of chimpanzees in the wild, with face recognition and tracking, using machine teaching and self-supervised learning. In collaboration with Oxford University and the Jane Goodall Institute (JGI).

Senior AI Developer
September 2019 - March 2021 (1 year 7 months)
Redmond

- Digital Guide Dog. A smart phone app that German Railway (aka. Deutsche Bahn) customers with impaired vision can use to find doors to train cars. Press

Release: https://customers.microsoft.com/en-us/story/1387428924526820027-db-systel-azure-en
- Using deep regression to estimate the biomass of salmon in underwater stereo camera video. Forbes Magazine: https://www.forbes.com/sites/abb/2020/01/29/deep-thinking-how-ocean-ready-tech-is-changing-the-way-norway-farms-fish/.
- Fine-tuning machine translation models to enable Volkswagen Group in translating corporate language accurately among 40 languages. Press Release: https://customers.microsoft.com/en-us/story/779468-volkswagen-azure-automotive-en

Artificial Intelligence Developer
May 2018 - September 2019 (1 year 5 months)
Redmond

Developed and presented workshops on AI, data science, and machine learning for Microsoft employees and enterprise partners. Selection of scenarios we covered in these workshops: Unsupervised and supervised anomaly detection, online object tracking with Siamese neural networks, data distillation, real-time predictive maintenance.

California Institute of Technology
Postdoctoral Research Fellow
December 2012 - May 2018 (5 years 6 months)
Pasadena

Trained deep reinforcement learning (RL) architecture (DQN) and human participants to play Atari games, used functional magnetic imaging (fMRI) of participants' brain activity, to probe their brains for simulacra of DQN architecture.

Developed and applied machine learning pipelines (including SVM, Elastic Net), to decoded mental states of human participants who were solving non-Markov decision tasks while we acquired fMRI data of their brain activity.

Developed algorithmic models for a higher-order RL task and applied this model to functional magnetic imaging (fMRI) data to identify populations of dopamine neurons that signal prediction errors during appetitive and aversive learning.

Designed and taught computational cognitive psychology course at the California Institute of Technology, incorporating traditional lectures and hands-on assignments with deep neural networks. Students appreciated this

combination and gave the course an above average rating of 4.2 out of 5 points.

Designed and constructed precision eye tracking hardware and software (MrGaze) for use in fMRI experiments. Developed Python GUI (Qt, ctypes) for real-time recording of eye gaze and pupil size in response to sensory events.

Developed software in Python OpenCV (computer vision) that monitors respiration, pulse, and swallowing in research volunteers. Software substantially improved functional MRI signal-to-noise ratio by removing physiological artifacts from functional brain images.

Mentored 6 graduate and 3 undergraduate students in their research projects in computational cognitive neuroscience.

University of Colorado at Boulder
Postdoctoral Research Fellow
September 2011 - December 2012 (1 year 4 months)

Designed biologically-inspired neural network in C++, which simulated the trade-off between search cost and reward value in human decision-making.

Developed mixture of Bayesian experts model in C++, which simulated how the brain hedges its bets by having two parallel and independent brain mechanisms that make different assumptions about the structure of the environment during reward prediction.

Conducted meta-analysis of 5908 scientific studies in Python, each study reporting on the activity of approximately 223,000 brain locations. Through a combination of dimensionality reduction, Bayesian inference, topic modeling, assigned previously unrecognized psychological functions to separable networks of brain regions. The results were published in the Proceedings of the National Academy of Sciences and reached an Altmetric score higher than 97% of its contemporaries.

University of Colorado
Graduate Research Assistant
February 2006 - August 2011 (5 years 7 months)
Boulder, CO

Designed biologically-inspired neural network of human decision-making in C ++, which simulated the interaction between working memory and associative learning in reward learning.

Developed software in Python that allowed rodents to interact with each other through levers in their individual chambers.

Designed, conducted and analyzed experiments to test predictions of computational models. Analyses were done in R.

Mentored two undergraduate honor's students, who graduated with top honors.

Philipps-Universität Marburg
Graduate Research Assistant
September 2002 - February 2005 (2 years 6 months)
Marburg, Germany

Designed and conducted experiments using 128-electrode EEG. Conducted all data analysis
in R.

Bosch Magyarország
Intern
April 2004 - September 2004 (6 months)
Budapest

Developed a Perl-based help desk for the department of system administration and network
security during my 6 week internship.

Brain Science Research Center at the Tamagawa University
Undergraduate Research Assistant
February 2002 - September 2002 (8 months)

We investigated the role of prefrontal cortical neurons in hierarchical decision making tasks.

Education

University of Colorado at Boulder
Doctor of Philosophy (Ph.D.), Computational Neuroscience · (2006 - 2011)

Philipps-Universität Marburg

Master's Degree, Computer Science · (2004 - 2006)

Philipps-Universität Marburg

Master's degree, Psychology · (2002 - 2005)