Bram Grooten

PhD candidate in Deep Learning

Passionate PhD researcher, working on dynamic sparse training of neural networks, specifically in the field of reinforcement learning, transfer learning. Currently using the continuous control tasks from MuJoCo and OpenAI Gym to benchmark my ideas. Throughout the PhD project I will translate research findings into the application domain of autonomous driving.

github linkedin scholar
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Education

2018 – 2021 **Master Applied Mathematics**, *Eindhoven University of Technology (TU/e)*
Graduated cum laude. Thesis on multi-agent deep reinforcement learning for Hanabi.

2018 – 2021 **Master Science Education**, *Eindhoven University of Technology*
Acquired the official license to teach mathematics in Dutch high schools.

2014 – 2017 **Bachelor Applied Mathematics**, *Wentworth Institute of Technology & TU/e*
Studied abroad in Boston US, after which I continued in the Netherlands.

2008 – 2014 **High school**, *Sint-Joriscollege*, Eindhoven, Graduated cum laude
Bèta award: student with the highest grades in STEM courses.

Recent Projects

2023 **Research Visit**, *Aug - Dec*, UAlberta
I will visit the University of Alberta to join Matthew Taylor's Intelligent Robot Learning (IRL) Lab at the Alberta Machine Intelligence Institute (Amii).

2023 **DLRL at Mila**, *Jul*, dlrl.ca
Accepted at the Deep Learning Reinforcement Learning summer school, which is held at the Mila research institute in Montreal, Canada.

2022 **European Summer Schools**, *Jun - Jul*
Participated in three machine learning summer schools: MLSS, EEML, and M2L. Presented my research there (see poster) and at the Sparse Neural Networks (SNN) workshop.

2022 **Multi-Agent RL Competition**, *Mar - Jun*, AI Arena
Achieved a prize-winning top 10 ranking in this global contest, among universities of Alberta, Melbourne, Toronto, Yale, and others. With 4 graduate students we developed a deep RL agent to compete in their multiplayer online battle arena.

2020 – 2021 **Serpentine AI**, *Sep - Aug*, serpentine.ai
Chairman of the student team which develops AI for e-Sports. Led the team through many international AI programming competitions. Learned to work with PyTorch and TensorFlow, program in Python, Java, C++, and collaborate via Git.

2020 **Angry Birds**, *Jun - Aug*, AI Birds.org
Winning team in this challenging level generation contest.

2020 **AI Snakes**, *Mar - May*, Technical Report
Leader of the Serpentine team that finished in second place.

2020 **MIT Battlecode**, *Jan - Feb*, battlecode.org
Programming competition hosted by MIT where we reached the top 30.

2018 – 2020 **Technology Ambassador**, bramgrooten.nl/gastles
Bringing tech-enthusiasm to children with our guest lecture: Make your own app!

Work experience

Nov 2021 – now **PhD Candidate**, *Eindhoven University of Technology*, Netherlands
Research focussed on dynamic sparse training in continual reinforcement learning, improving the efficiency of neural networks. The project has applications in autonomous driving.

Feb – Dec 2019 **Math Teacher**, *Maaslandcollege & Van Maerlantlyceum*, Oss & Eindhoven
During the Education master I learned the teaching craft in these two internships.

Jul – Oct 2017 **Researcher**, *ThuisBaas*, Amsterdam, Netherlands
I analyzed the sound level of heat pumps and improved their solar energy model.

Jul – Dec 2016 **Promoter**, *Vandebron*, Eindhoven, Netherlands
Convincing people to switch to sustainable energy.

Feb – May 2015 **Tutor**, *Phillips Brooks House Association*, Cambridge, MA, United States
Volunteering as a tutor for children from the rough neighborhood of Mission Hill.

Publications

2023 **B. Grooten**, G. Sokar, S. Dohare, E. Mocanu, M. Taylor, M. Pechenizkiy, D. Mocanu. *Automatic Noise Filtering with Dynamic Sparse Training in Deep Reinforcement Learning*, full-paper at AAMAS'23, arXiv

2023 W. Wesselink, **B. Grooten**, Q. Xiao, C. de Campos, M. Pechenizkiy. *Nerva: a Truly Sparse Implementation of Neural Networks*, poster at SNN'23, sparseneural.net #28

2022 **B. Grooten**, J. Wemmenhove, M. Poot, J. Portegies. *Is Vanilla Policy Gradient Overlooked? Analyzing Deep Reinforcement Learning for Hanabi*, Adaptive and Learning Agents workshop at AAMAS'22, arXiv

2022 **B. Grooten**, G. Sokar, E. Mocanu, S. Dohare, M. Taylor, M. Pechenizkiy, D. Mocanu. *Towards Implementing Truly Sparse Connections in Deep RL Agents*, poster at SNN'22, sparseneural.net #53

2021 **B. Grooten**. *Deep Reinforcement Learning for the cooperative card game Hanabi*, Master Thesis, research.tue.nl

2020 **B. Grooten**, B. Tulkens. *Programming in mathematics and physics classes*, Master Thesis, research.tue.nl

2020 **B. Grooten**, I. Schilstra, W. van der Hert, D. van Genuchten. *AI Snakes Competition*, Technical Report, serpentine.ai

Skills

Technical

Python, Java, C++, Shell scripts
PyTorch, JAX, TensorFlow
Git, Slurm, Linux, HTML, LaTeX

Social

Teamplayer, Educator
Perseverance, Creativity
Leadership, To The Point

Languages

Dutch, English (advanced), Spanish, German (basic)

Awards

2023 Spotlight paper: Sparse Neural Networks workshop at ICLR
2023 AAMAS Scholarship recipient
2021 Cum laude MSc graduation
2014 Bèta award: high school student with highest grades in all STEM courses

Interests

Baseball Started in San Diego at age 5. Selected for the Dutch national team in 2017.
Coding I especially enjoy programming competitions in the field of AI.
Reading Both fiction and non-fiction. I love the blogs of WaitButWhy.
Music I find it relaxing to play guitar in the evening.

References

Alberta **dr. Matthew E. Taylor**, matthew.e.taylor@ualberta.ca, Research visit supervisor
Luxembourg **dr. Decebal Mocanu**, decebal.mocanu@uni.lu, PhD daily supervisor
Eindhoven **prof. dr. Mykola Pechenizkiy**, m.pechenizkiy@tue.nl, PhD supervisor