Zahra Atashgahi
Ph.D. Candidate in Machine Learning

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💼 WORK EXPERIENCE

Present **October 2019**	### Ph.D. Candidate in Machine Learning (May. 2020 - Apr. 2024) University of Twente, Enschede, The Netherlands (Oct. 2019 - Apr. 2020) Eindhoven University of Technology, Eindhoven, The Netherlands ➤ **Project.** As a part of my PhD, I collaborate within the EDIC (Exceptional and Deep Intelligent Coach) project; we aim to develop an intelligent coach to support users in maintaining a healthy lifestyle. In this project, I mainly focus on feature Selection from high-dimensional data, event detection from multi-dimensional time series, and learning from heterogeneous data of diabetes patients. `Python` `PyTorch` `Tensorflow` `Keras` `R`
September 2023 **July 2023**	### Machine Learning Scientist Intern Booking.com, Amsterdam, The Netherlands ➤ **Project :** Personalized Marketing : Exploring the Integration of Behavioral User Features to Enhance Decision-Making in Marketing. `Python` `PySpark` `PyTorch`
April 2023 **January 2023**	### Research Visitor Department of Applied Mathematics and Theoretical Physics, University of Cambridge, van der Schaar Lab, Cambridge, United Kingdom ➤ **Topic :** Study of sparse neural networks for tabular data ➤ **Supervisor :** Prof. Dr. Mihaela van der Schaar (University of Cambridge) `Python` `PyTorch`

🎓 EDUCATION

April 2024 **(Expected)** **October 2019**	### Ph.D. Candidate in Machine Learning (May. 2020 - Present) University of Twente, Enschede, The Netherlands (Oct. 2019 - Apr. 2020) Eindhoven University of Technology, Eindhoven, The Netherlands ➤ **Thesis :** Advancing Efficiency in Neural Networks through Sparsity and Feature Selection ➤ **Supervisors :** Dr. Decebal Mocanu (University of Luxembourg, University of Twente, Eindhoven University of Technology), Prof. Dr. Raymond Veldhuis (University of Twente), and Prof. Dr. Mykola Pechenizkiy (Eindhoven University of Technology)
September 2019 **September 2017**	### M.Sc. in Computer Science (Artificial Intelligence) Amirkabir University of Technology, Tehran, Iran ➤ **Thesis :** Abnormal Activity Detection for the Elderly People Living in Smart Homes
August 2017 **September 2013**	### B.Sc. in Computer Engineering University of Twente, Enschede, The Netherlands ➤ **Thesis :** Design and Implementation of an IoT-Based Health Monitoring System

🏆 HONORS & AWARDS

2022-2024	Exceptional and Deep Intelligent Coach, Sponsored by Dutch Research Council : NWO Grants for Computing Time on the National Computer Facilities, 90,000.
2022	Accepted as a student volunteer | *IJCAI 2022*
2021	Accepted at the Oxford Machine Learning Summer School (acceptance rate : 15%) | *OxML2021*
2021	Accepted as a student volunteer | *IJCAI 2021*
2021	Scholarship recipient for the 8th ACM Celebration of Women in Computing | *womENcourage 2021*
2012	Ranked **3rd** out of 45 in Artificial Intelligence Students | *Amirkabir University of Technology*
2017	Direct admission to Graduate Program (M.Sc.) in Artificial Intelligence | *Amirkabir University of Technology*
2017	Ranked **4th** out of 25 in Computer Hardware Engineering Students | *Amirkabir University of Technology*
2013	Ranked in top 0.8% in the National Entrance Exam among approximately $230k$ students | *Iran*
2011	Semi-finalist at Student National Mathematics Olympiad among high school Iranian students | *Iran*
2011	Semi-finalist at Student National Computer Olympiad among high school Iranian students | *Iran*

💬 ORGANIZATION

IJCAI 2023 (Tutorial)	*Sparse Training for Supervised, Unsupervised, Continual, and Deep Reinforcement Learning with Deep Neural Networks*, IJCAI 2023, Macao. [Website]. **Organizers :** Elena Mocanu (*University of Twente*), Zahra Atashgahi (*University of Twente*), Ghada Sokar (*Eindhoven University of Technology*), Boqian Wu (*University of Twente*), Qiao Xiao (*Eindhoven University of Technology*), Bram Grooten (*Eindhoven University of Technology*), Shiwei Liu (*University of Texas*), Decebal C. Mocanu (*University of Twente*).
ICLR 2023 (Workshop)	*Sparsity in Neural Networks On practical limitations and tradeoffs between sustainability and efficiency*, ICLR 2023, Kigali, Rwanda. [Website]. **Organizers :** Baharan Mirzasoleiman (*University of California*), Atlas Wang (*University of Texas*), Elena Mocanu (*University of Twente*), Decebal C. Mocanu (*University of Twente*), Ghada Sokar (*Eindhoven University of Technology*), Trevor Gale (*Google DeepMind*), Aleksandra Nowak (*Jagiellonian University*), Zahra Atashgahi (*University of Twente*), Utku Evci (*Google DeepMind*).
ECML-PKDD 2022 (Tutorial)	*Sparse Neural Networks Training*, ECML-PKDD 2022, Grenoble, France. [Website]. **Organizers :** Shiwei Liu (*Eindhoven University of Technology*), Ghada Sokar (*Eindhoven University of Technology*), Zahra Atashgahi (*University of Twente*), Decebal C. Mocanu (*University of Twente*), Elena Mocanu (*University of Twente*)

👥 PRESENTATIONS

Invited Talk	*Learning Efficiently from Data using Sparse Neural Networks* [link 🔗], TrustML Young Scientist Seminars organized by RIKEN-AIP center, Japan, Virtual.
Poster & oral presentation	*Quick and robust feature selection : The strength of energy-efficient sparse training for autoencoders*, ECML-PKDD 2022, Grenoble, France
Poster & oral presentation	*A brain-inspired algorithm for training highly sparse neural networks*, ECML-PKDD 2022, Grenoble, France
Oral presentation	*A Brain-inspired Algorithm for Training Highly Sparse Neural Networks*, ICLR 2022 local, Eindhoven University of Technology (TU/e), Eindhoven, The Netherlands.
Poster	*Feature selection with neuron evolution in sparse neural networks*, ICLR 2023 Workshop on Sparsity in Neural Networks : On practical limitations and tradeoffs between sustainability and efficiency, Kigali, Rwanda, 2023.
Poster	*A brain-inspired algorithm for training highly sparse neural networks*. Workshop on Sparsity in Neural Networks : Advancing Understanding and Practice, 2022.
Poster	*Quick and robust feature selection : The strength of energy-efficient sparse training for autoencoders*. Workshop on Sparsity in Neural Networks : Advancing Understanding and Practice, 2021.

💻 ACTIVITIES

2024	**[Program committee member]** *ICML 2024*.
2023	**[Program committee member]** *NeurIPS 2023*, *ICML 2023*, *ICLR 2023 SNN workshop*.
2023	**[Organization]** Admin in *Sparse Neural Networks* reading group, *Google Sparsity Reading Group*.
2023	**[Organization]** Co-chairing panel session with Utku Evci (Researcher @Google DeepMind) (panelists : Jeff Dean (Google Senior Fellow and SVP for Google Research), Nir Shavit (Prof @MIT), Aakanksha Chowdhery (Staff Research Scientist Google DeepMind), Pavlo Molchanov (principal research scientist and research lead at NVIDIA))
2022 - 2023	**[Project management]** *EDIC* (Exceptional and Deep Intelligent Coach) Project.
2022	**[Summer school]** AI and Machine Learning in Healthcare, *Virtual*.
2022	**[Program committee member]** *NeurIPS 2022*, *ICML 2022*, AAAI 2023, *SNN 2022*.
2021	**[Summer school]** Oxford Machine Learning (OxML2021), *Virtual*.
2021	**[Program committee member]** *ICBINB @NeurIPS 2021*, *SNN 2021*, *CLEATED @ICDM 2021*.
2021 - 2022	**[Organization]** Co-organizing *Sparse Neural Networks* discussion group, *University of Twente*.
2020 - 2022	**[Organization]** Organizing study group on *Mathematics for Machine Learning* book, *University of Twente*.

✏️ TEACHING & SUPERVISION

Supervision	Together with Dr. Decebal Mocanu
	❯ **M.Sc. Student Supervision [Eindhoven University of Technology | Dec. 2022 – Oct. 2023]** ❯ Kaiting Liu, *Supervised Feature Selection via Ensemble Gradient Information from Sparse Neural Networks* (**Cum Laude**) ❯ Matthijs Keep, *Supervised feature selection* ❯ **B.Sc. Student Supervision [University of Twente | Apr. 2021 – Jul. 2021]** ❯ Neil Kichler, *Robustness of sparse MLPs for supervised feature selection* (**Best thesis award**) ❯ Xuhao Zhang, *Supervised feature selection using sparse neural networks* ❯ Karolis Girdziunas, *Supervised Feature Selection using Sparse Training and Neuron Strength*
Teaching	Amirkabir University of Technology, Tehran, Iran. ❯ Teaching Assistant : Internet Engineering (Fall 2017) ❯ Teaching Assistant : Computer Networks (Spring 2017) ❯ Teaching Assistant : Electrical Circuits (Spring 2017)

⯑ TECHNICAL SKILLS

Programming Languages	Python, Matlab, R, C/C++, Java
Machine Learning Libraries	PyTorch, Tensorflow, Keras, Scikit-Learn, Pandas, NumPy
Database Systems	PySpark, MySQL, SQL Server
Hardware Design Languages	Verilog, VHDL, 8086 Assembly, AVR Assembly
Web Development	HTML5, CSS, XML, XSLT, JavaScript, Jqueri, AJAX, PHP

⯑ LANGUAGES

English (*Working proficiency*), **Persian** (*Native*), **Dutch** (*Elementary*), **Arabic** (*Elementary*)

⯑ PUBLICATIONS

Journal Publications

1. **Zahra Atashgahi**, Xuhao Zhang, Neil Kichler, Shiwei Liu, Lu Yin, Mykola Pechenizkiy, Raymond Veldhuis, and Decebal Constantin Mocanu. *Supervised feature selection with neuron evolution in sparse neural networks*. Transactions on Machine Learning Research (TMLR), 2023. [🔗 paper] [⭘ code]

2. **Zahra Atashgahi**, Ghada Sokar, Tim van der Lee, Elena Mocanu, Decebal Constantin Mocanu, Raymond Veldhuis, and Mykola Pechenizkiy. *Quick and robust feature selection : the strength of energy-efficient sparse training for autoencoders*. Machine Learning 111, ECML-PKDD journal track, 377–414, 2022. [🔗 paper] [⭘ code]

3. **Zahra Atashgahi**, Joost Pieterse, Shiwei Liu, Decebal Constantin Mocanu, Raymond Veldhuis, and Mykola Pechenizkiy. *A brain-inspired algorithm for training highly sparse neural networks*. Machine Learning 111, ECML-PKDD journal track, 4411-4452, 2022. [🔗 paper] [⭘ code]

Conference Publications

4. **Zahra Atashgahi**, *Cost-effective Artificial Neural Networks*, International Joint Conferences on Artificial Intelligence Organization (IJCAI), Doctoral Consortium, 2023. [🔗 paper]

5. Ghada Sokar, **Zahra Atashgahi**, Mykola Pechenizkiy, and Decebal Constantin Mocanu. *Where to pay attention in sparse training for feature selection ?*. Advances in Neural Information Processing Systems (NeurIPS), 2023. [🔗 paper] [⭘ code]

6. Shiwei Liu, Tianlong Chen, **Zahra Atashgahi**, Xiaohan Chen, Ghada Sokar, Elena Mocanu, Mykola Pechenizkiy, Zhangyang Wang, and Decebal Constantin Mocanu. *Deep ensembling with no overhead for either training or testing : The all-round blessings of dynamic sparsity*. International Conference on Learning Representations (ICLR), 2022. [🔗 paper] [⭘ code]

7. Shiwei Liu, Tianlong Chen, Xiaohan Chen, **Zahra Atashgahi**, Lu Yin, Huanyu Kou, Li Shen, Mykola Pechenizkiy, Zhangyang Wang, and Decebal Constantin Mocanu. *Sparse Training via Boosting Pruning Plasticity with Neuroregeneration*. Advances in Neural Information Processing Systems (NeurIPS), 2021. [🔗 paper] [⭘ code]

8. **Zahra Atashgahi**, Decebal Constantin Mocanu, Raymond Veldhuis, and Mykola Pechenizkiy. *Unsupervised online memory-free change-point detection using an ensemble of LSTM-autoencoder-based neural networks*. In 8th ACM Celebration of Women in Computing womENcourage, 2021. [🔗 paper]

9. **Zahra Atashgahi**, Ghada Sokar, Tim van der Lee, Elena Mocanu, Decebal Constantin Mocanu, Ramond Veldhuis, and Mykola Pechenizkiy. *Quick and Robust Feature Selection : the Strength of Energy-efficient Sparse Training for Autoencoders (Extended Abstract)*. Joint International Scientific Conferences on AI BNAIC/BENELEARN, 2021. [🔗 paper]

10. Shiwei Liu, Tim Van der Lee, Anil Yaman, **Zahra Atashgahi**, Davide Ferraro, Ghada Sokar, Mykola Pechenizkiy, and Decebal Constantin Mocanu. *Topological insights into sparse neural networks*. The European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, (ECML-PKDD), Ghent, Belgium, 2020. [🔗 paper] [⭘ code]

Preprints (under review)

11. **Zahra Atashgahi**, Mykola Pechenizkiy, Raymond Veldhuis, and Decebal Constantin Mocanu. *Adaptive Sparsity Level during Training for Efficient Time Series Forecasting with Transformers*. arXiv preprint arXiv :2305.18382 (under review at AISTATS 2024), 2023. [🔗 paper]

12. Kaiting Liu, **Zahra Atashgahi**, Ghada Sokar, Mykola Pechenizkiy, Decebal Constantin Mocanu. *Supervised Feature Selection via Ensemble Gradient Information from Sparse Neural Networks*. (under review at AISTATS 2024), 2023.

13. **Zahra Atashgahi**, Decebal Constantin Mocanu, Raymond Veldhuis, and Mykola Pechenizkiy. *Memory-free online change-point detection : A novel neural network approach*. arXiv preprint arXiv :2207.03932 (Under review at Neural Computing and Applications journal), 2022. [🔗 paper] [⭘ code]