

# Zahra Atashgahi

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## RESEARCH INTERESTS

- Machine Learning • Sparse Neural Networks • Deep Learning • Cost-efficient Neural Networks
- Self-supervised Learning • Online Learning • Time Series Analysis • Anomaly Detection • Healthcare

## EDUCATION

- Ph.D. in Artificial Intelligence**, University of Twente Oct. 2019 – Apr. 2024 (Expected)  
• Faculty of Electrical Engineering, Mathematics and Computer Science, Data Management & Biometrics Group
- M.Sc. in Computer Science (Artificial Intelligence)**, Amirkabir University of Technology Sep. 2017 – Sep. 2019  
• **Thesis:** Abnormal Activity Detection for the Elderly People Living in Smart Homes
- B.Sc. in Computer Engineering**, Amirkabir University of Technology (Tehran Polytechnic) Sep. 2013 – Aug. 2017  
• **Thesis:** Design and Implementing IoT-Based Health Monitoring System

## WORK EXPERIENCE

- PhD Candidate in Artificial Intelligence** Oct. 2019 – Apr. 2024 (Expected)  
University of Twente, The Netherlands (May. 2020 – Present)  
Eindhoven University of Technology, The Netherlands (Oct. 2019 – Apr. 2020)
- **Topic:** Cost-effective artificial neural networks. In my Ph.D. research, I seek to develop algorithms for artificial neural networks to solve various machine learning tasks efficiently while considering the optimal trade-off between computational costs, data requirements, and performance.
  - **Supervisors:** Dr. Decebal Mocanu (University of Twente/ Eindhoven University of Technology), Prof. Dr. Raymond Veldhuis (University of Twente), and Prof. Dr. Mykola Pechenizkiy (Eindhoven University of Technology).
  - **Project.** As a part of my PhD, I collaborate in 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
- (Accepted) Student Visitor**, University of Cambridge Sep. 2022 – Nov. 2022  
Department of Applied Mathematics and Theoretical Physics, van der Schaar Lab
- **Supervisor:** Prof. Dr. Mihaela van der Schaar (University of Cambridge)

## HONORS & AWARDS

- Accepted at the Oxford Machine Learning Summer School (acceptance rate: 15%) | *OxML2021* 2021
- Accepted as an student volunteer | *IJCAI 2021* 2021
- Scholarship recipient for the 8th ACM Celebration of Women in Computing | *womENCourage 2021* 2021
- Ranked **3rd** out of 45 in Artificial Intelligence Students | *Amirkabir University of Technology* 2019
- 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* 2017
- Ranked in top 0.8% in the National Entrance Exam among approximately 230k students | *Iran* 2012
- 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* 2011

## TECHNICAL SKILLS

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

## ACTIVITIES

- Program committee member at ICML conference | *ICML 2022* Apr. 2022
- Program committee member at ICBINB workshop | *NeurIPS 2021* Oct. 2021
- Program committee member at CLEATED workshop | *ICDM 2021* Sep. 2021
- Organizing *Sparse Neural Networks* discussion group | *University of Twente* Dec. 2020 – Present
- Organizing study group on *Mathematics for Machine Learning* book | *University of Twente* Nov. 2020 – Present
- Neural Networks and Deep Learning | *Coursera* Aug. 2018

## PERSONAL AND PROFESSIONAL DEVELOPMENT

Science writing   <i>University of Twente</i>	Nov. 2021
Oxford Machine Learning Summer School (OxML2021)   <i>Virtual</i>	Aug. 2021
Academic presentations bootcamp   <i>University of Twente</i>	Aug. 2021
Scientific information bootcamp   <i>University of Twente</i>	Apr. 2021
Academic publishing bootcamp   <i>University of Twente</i>	Feb. 2021
Neural Networks and Deep Learning   <i>Coursera</i>	Aug. 2018

## TEACHING & SUPERVISION

B.Sc. Student Supervision (Together with Dr. Decebal Mocanu)   <i>University of Twente</i>	Apr. 2021 – Jul. 2021
<ul style="list-style-type: none"><li>• Neil Kichler, "Robustness of sparse MLPs for supervised feature selection" (<i>best thesis award</i>)</li><li>• Xuhao Zhang, "Supervised feature selection using sparse neural networks"</li><li>• Karolis Girdziunas, "Supervised Feature Selection using Sparse Evolutionary Training and Neuron Strength"</li></ul>	
Teaching Assistant   <i>Amirkabir University of Technology</i>	2017
<ul style="list-style-type: none"><li>• Internet Engineering (Fall 2017)</li><li>• Computer Networks (Spring 2017)</li><li>• Electrical Circuits (Spring 2017)</li></ul>	

## CONFERENCE TUTORIALS CO-ORGANIZATION

1. (Accepted tutorial) Liu, S., Sokar, G., **Atashgahi, Z.**, Mocanu, D. C., & Mocanu, E. (2022). Sparse neural networks training. *ECML-PKDD 2022 (Grenoble, France)* [Website]

## LANGUAGE SKILLS

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

## PUBLICATIONS

1. **Atashgahi, Z.**, Sokar, G., van der Lee, T., Mocanu, E., Mocanu, D. C., Veldhuis, R., & Pechenizkiy, M. (2022). Quick and robust feature selection: The strength of energy-efficient sparse training for autoencoders. *Machine Learning (ECML-PKDD 2022 journal track)*, 1–38. [code]
2. Liu, S., Chen, T., **Atashgahi, Z.**, Chen, X., Sokar, G., Mocanu, E., Pechenizkiy, M., Wang, Z., & Mocanu, D. C. (2022). Deep ensembling with no overhead for either training or testing: The all-round blessings of dynamic sparsity. *International Conference on Learning Representations (ICLR 2022)*. [code]
3. Liu, S., Chen, T., Chen, X., **Atashgahi, Z.**, Yin, L., Kou, H., Shen, L., Pechenizkiy, M., Wang, Z., & Mocanu, D. C. (2021). Sparse training via boosting pruning plasticity with neuroregeneration. *Advances in Neural Information Processing Systems (NeurIPS 2021)*. [code]
4. **Atashgahi, Z.**, Mocanu, D. C., Veldhuis, R., & Pechenizkiy, M. (2021). Unsupervised online memory-free change-point detection using an ensemble of lstm-autoencoder-based neural networks (extended abstract). *8th ACM Celebration of Women in Computing womENCourage*.
5. **Atashgahi, Z.**, Sokar, G., van der Lee, T., Mocanu, E., Mocanu, D. C., Veldhuis, R., & Pechenizkiy, M. (2021a). Quick and robust feature selection: The strength of energy-efficient sparse training for autoencoders [extended abstract]. *Proceedings of BNAIC/BENELEARN 2021*.
6. Liu, S., van der Lee, T., Yaman, A., **Atashgahi, Z.**, Ferraro, D., Sokar, G., Pechenizkiy, M., & Mocanu, D. C. (2020). Topological insights into sparse neural networks. *Proceedings of ECML-PKDD*. [code]

## PREPRINTS

1. (To be submitted to ACM Transactions on Autonomous and Adaptive Systems) **Atashgahi, Z.**, Mocanu, D. C., Veldhuis, R., & Pechenizkiy, M. (2022). Memory-free online change-point detection: A novel neural network approach
2. (To be submitted to ICDM 2022) **Atashgahi, Z.**, Zhang, X., Kichler, N., Liu, S., Yin, L., Pechenizkiy, M., Veldhuis, R., & Mocanu, D. C. (2022). Feature selection with neuron evolution in sparse neural networks
3. (Minor revision) **Atashgahi, Z.**, Pieterse, J., Liu, S., Mocanu, D. C., Veldhuis, R., & Pechenizkiy, M. (2019). A brain-inspired algorithm for training highly sparse neural networks. *arXiv e-prints (Under review at Machine Learning Journal - ECML PKDD 2022 Journal track)*, arXiv-1903. [code]
4. (Under review) Nazerfard, E., **Atashgahi, Z.**, & Nadali, A. (2021). Abnormal activity detection for the elderly people using convlstm autoencoder

1. **Atashgahi, Z.** (2021). Cost-effective artificial neural networks [IJCAI 2021 (virtual), doctoral consortium workshop]
2. **Atashgahi, Z.**, Sokar, G., van der Lee, T., Mocanu, E., Mocanu, D., Veldhuis, R., & Pechenizkiy, M. (2021b). Quick and robust feature selection: The strength of energy-efficient sparse training for autoencoders (poster) [Sparsity in Neural Networks: Advancing Understanding and Practice 2021, SNN Workshop 2021]
3. Kichler, N., **Atashgahi, Z.**, & Mocanu, D. (2021). Robustness of sparse mlps for supervised feature selection (poster) [Sparsity in Neural Networks: Advancing Understanding and Practice 2021, SNN Workshop 2021]
4. Liu, S., Chen, T., **Atashgahi, Z.**, Chen, X., Sokar, G., Mocanu, E., Pechenizkiy, M., Wang, Z., & Mocanu, D. (2021). Freetickets: Accurate, robust and efficient deep ensemble by training with dynamic sparsity (poster) [Sparsity in Neural Networks: Advancing Understanding and Practice 2021, SNN Workshop 2021]