

Ghada Sokar

Curriculum Vitae

Eindhoven, The Netherlands

+31 625 261 676

✉ g.a.z.n.sokar@tue.nl

🌐 GhadaSokar

📷 Ghada Sokar

Research Interests

- Lifelong/Continual Learning, Sparse Neural Networks, Reinforcement Learning, Unsupervised Learning, and Few-shot Learning.

Education

- 2019–present **PhD in Computer Science**, Eindhoven University of Technology, The Netherlands
- The thesis aims at developing novel continual learning methods for neural networks to enable intelligent agents to learn multiple tasks sequentially while addressing the stability-plasticity dilemma optimally and ensuring minimal computational requirements.
- 2014–2016 **Master of Science in Computer Engineering**, GPA: 3.9/4, Cairo university, Egypt
- **Thesis:** *Enhancing Arabic OCR using deep neural networks and one-shot learning applied to Egyptian license plates*. A robust Arabic OCR system for noisy environments.
- 2009–2014 **Bachelor of Science in Computer Engineering**, GPA: 3.96/4 (*Ranked 1st of the class*), Cairo university, Egypt
- **Thesis:** *Brain Gates*, sponsored by Microsoft. A PC game for increasing concentration. The game is controlled only by brain signals and based on the Neurofeedback concept.

Work Experience

- 2019–present **PhD-TA**, Department of Mathematics and Computer Science, Eindhoven University of Technology, The Netherlands
- Doing research on machine learning mainly continual lifelong learning.
 - Teaching assistant, Fall, 2020. Q1: Foundation of data mining (master course, 305 students). Q2: Data mining and machine learning (bachelor course, 265 students).
 - Teaching assistant, Fall, 2019. Q1: Foundation of data mining (master course, 311 students). Q2: Data mining and machine learning (bachelor course, 207 students).
- 2018–2019 **Research Scientist**, Siemens Digital Industries Software
- Developed a tool for automatic generation of the fix of hotspots in the layout of integrated circuits (ICs) using deep learning techniques.
 - Developed a debugging tool to find non-hotspot layouts that are very close to hotspot layouts in ICs for big data using approximation nearest neighbor algorithm.
- Summer 2017 **Research Intern**, Technical University of Munich
- Built a tool, in a 3D reconstruction project in collaboration with Google, that preprocesses data captured by a Tango phone into the format required by the reconstruction system.
 - Built a triplet neural network for key points matching in 3D reconstruction.
- 2014–2017 **Research Scientist**, AvidBeam
- Built Arabic character recognition system for license plates using deep learning.
 - Built age and gender classification system using deep neural networks.
 - Built real-time object detection module using YOLO network.
- 2014–2019 **Teaching assistant**, Computer Engineering Department, Cairo University, Egypt

- Bachelor courses: Pattern Recognition, Software Engineering, Computer Architecture, Microprocessor, and Logic Design (70 students).

Summer 2013 **Software Engineering Intern**, Federal Institute for Materials Research and Testing, BAM, Berlin

- Worked in the development of meshing routines for finite element software using Gmsh and Netgen tools.
- Developed an interface for matrix representation in python (Numpy) and C++ (Eigen).

Awards & Scholarships

- **Travel Grant:** 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2021.
- **2nd place** in Microsoft Imagine Cup (national finals), citizenship track, 2014.
- **1st place** in IBTIECAR2014 competition, multimedia understanding track, 2014.

Publications

Journal Articles

- [1] Z. Atashgahi, G. Sokar, D.C. Mocanu, and M. Pechenizkiy. *Quick and robust feature selection: the strength of energy-efficient sparse training for autoencoders* (Accepted/In-press), **Machine Learning** (ECMLPKDD 2022, Journal track).
- [2] G. Sokar, D.C. Mocanu, and M. Pechenizkiy. [*Spacenet: make free space for continual learning*](#). **Neurocomputing**, 439, 1–11, 2021.

Conference Papers

- [3] G. Sokar, D.C. Mocanu, and M. Pechenizkiy. [*Self-attention meta-learner for continual learning*](#). In Proceedings of the 20th International Conference on Autonomous Agents and Multiagent Systems (**AAMAS**), 2021.
- [4] G. Sokar. [*Continual Lifelong Learning for Intelligent Agents*](#). In Proceedings of the 30th International Joint Conference on Artificial Intelligence, **IJCAI-21**, pp. 4919–4920, 2021. Doctoral Consortium.
- [5] G. Sokar, D.C. Mocanu, and M. Pechenizkiy. *Spacenet: make free space for continual learning (Extended Abstract)*. In 33rd Benelux Conference on Artificial Intelligence and 30th Belgian Dutch Conference on Machine Learning (**BNAIC/BENELEARN**), 2021.
- [6] Z. Atashgahi, G. Sokar, D.C. Mocanu, and M. Pechenizkiy. *Quick and robust feature selection: the strength of energy-efficient sparse training for autoencoders (Extended Abstract)*. In 33rd Benelux Conference on Artificial Intelligence and 30th Belgian Dutch Conference on Machine Learning (**BNAIC/BENELEARN**), 2021.
- [7] S. Liu, T.T. van der Lee, A. Yaman, Z. Atashgahi, D. Ferraro, G. Sokar, M. Pechenizkiy, and D.C. Mocanu. [*Topological insights into sparse neural networks*](#). In Proceedings of the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (**ECMLPKDD**), 2020.
- [8] G. Sokar, Y. Zakaria, A. Rabie, K. Madkour, I. Leventhal, J. Rivoir, X. Gu, H. Stratigopoulos. *IP session on machine learning applications in IC test-related tasks*. In IEEE 37th VLSI Test Symposium (**VTS**), **IEEE**, 2019.
- [9] G. Sokar, E. Hemayed, and M. Rehan. *A generic ocr using deep siamese convolution neural networks*. In IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (**IEMCON**), **IEEE**, 2018.

Workshop papers

- [10] G. Sokar, D.C. Mocanu, and M. Pechenizkiy. *Learning invariant representation for continual learning*. In Meta-Learning for Computer Vision Workshop at the 35th AAAI Conference on Artificial Intelligence (**AAAI21**), 2021.

Pre-prints

- [11] G. Sokar, D.C. Mocanu, and M. Pechenizkiy. *Addressing the Stability-Plasticity Dilemma via Knowledge-Aware Continual Learning*. ArXiv, 2021.
- [12] G. Sokar, E. Mocanu, D.C. Mocanu, M. Pechenizkiy, P. Stone. *Dynamic Sparse Training for Deep Reinforcement Learning*. ArXiv, 2021.
- [13] S. Liu, T. Chen, Z. Atashgahi, X. Chen, G. Sokar, E. Mocanu, M. Pechenizkiy, Z. Wang, D.C. Mocanu. *FreeTickets: Accurate, Robust and Efficient Deep Ensemble by Training with Dynamic Sparsity*. ArXiv, 2021.

Funding and Grant Acquisitions

Personal Grant: PhD-TA research project, TU/e departmental call

- Title: Learning through Adaptation, Replaying, and Generalization.
- Amount: 250000 Euro (5 years funding for my PhD position).

Personal Grant: 4TU.NIRICT-2021 call

- Target: A research visit to University of Pisa, Italy; hosted by Vincenzo Lomonaco.
- Amount: 2500 Euro.

Invited Talks

- Google Brain: *Dynamic sparse training for deep reinforcement learning*, Online, 2021.
- ContinualAI Meetup: *Rehearsal-Free continual learning*, [Online](#), 2021.

Summer Schools

- Eastern European Machine Learning Summer School (EEML), 2021
- 6th International Summer school on AI and Big Data by ScaDS.AI Dresden/Leipzig Center for Scalable Data Analytics and Artificial Intelligence, 2021.

Organization

- 2021 ICDM Workshop on Continual Learning and Adaptation for Time Evolving Data ([CLEATED](#))

Reviewing

- 2021 **Conferences:** ECMLPKDD, ICLR, AAMAS.
- 2021 **Journals:** Elsevier Knowledge-Based System.

Service

- 2021 **AAMAS-2021**, *Volunteer*
 - Helped in moderating the sessions of the AAMAS workshop on EXplainable TRansparent and Autonomous Agents and Multi-Agent Systems (EXTRAAMAS).
- 2021 **ContinualAI**, *A Non-profit Research Organization on Continual Learning for AI*
 - A member in the inclusion and diversity committee.

Personal and Professional Development

- 2020-2021 **University Teaching Qualification (UTQ)**
 - Participated in the following courses: Teaching and Learning in Higher Education (2020), Assessment (2020), and Teaching Skills (2021).