# Mahmoud Aslan

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## Education

- **MSc Computer Science for Autonomous Systems,** Eötvös Loránd University
  *2020 - 2023, Budapest, Hungary*
  - Grade: 4.93/5.0 (Excellent with honors)
  - Thesis (distinction): Extending Sparse Dictionary Learning for Adversarial Robustness (repository), Advisors: András Lörincz & Dávid Szeghy.
  - Key Courses: 3D Computer Vision, Reinforcement Learning, Data Mining, Optimization Methods, Control Theory, Deep Learning.
- **BSc Informatics Engineering,** Al-Baath University
  *2013 - 2018, Homs, Syria*
  - Grade: 81.437% (Very Good)
  - Thesis: Improving Network Intrusion Detection using a Denoising Autoencoder with Dropout (repository), Advisor: Suhel Hammoud.
  - Key Courses: Algorithms & Data Structures, Software Engineering, Database Systems, Artificial Intelligence, Information Theory.

## Experience

- **Student Research Assistant,** Neural Information Processing Group, Eötvös Loránd University
  *May 2021 - Jul. 2023, Budapest, Hungary*
  - Research focus: Structured and Convolutional Sparse Coding, Iterative Optimization, Dictionary Learning, Adversarial Robustness in Object Recognition. Advisor: András Lörincz.
  - Implemented FISTA based sparse networks, studying their behavior under various regularizations to increase the discriminative power of the representation while bridging the gap to theory.
  - Tested different architectural variations by including reconstruction shortcuts between layers to remedy vanishing gradients.
  - Performed extensive empirical studies on Soft Thresholding using sparse, group sparse, and pooled group sparse representations evaluating their robustness against adversarial attacks.
  - Published the results in DeLTA 2022 and contributed the implementations to the group's codebase using Pytorch.
- **Python Developer,** Aylan
  *Jan. - Jul. 2019, Remote, Jordan*
  - Collected a dataset of 10,000 Arabic news articles annotated into two classes.
  - Implemented a data preprocessing pipeline to deal with the particularities of the Arabic language.
  - Experimented with different NLP classification models using Tensorflow, the final deployed model reached an accuracy of 88%.
- **Web Developer,** IT Advice
  *2017 - 2018, Homs, Syria*
  - Worked on three projects using vanilla web technologies focusing on performance. Got recognized by Awwwards.com (merit).

## Publications

- **Structural Extensions of Basis Pursuit: Guarantees on Adversarial Robustness,** *Dávid Szeghy, Mahmoud Aslan, Áron Fóthi, Balázs Mészáros, Zoltán Milacski, and András Lőrincz.* Proceedings of the 3rd International Conference on Deep Learning Theory and Applications - DeLTA, INSTICC. SciTePress, 2022.

## Select Projects

- **Arabic Font Classification**, synthesizing data and addressing domain mismatch challenges, blog post. - 2020
- **Cocat**, a collaborative computer-assisted translation tool, project preview. - 2019
- **Cyclic Learning Rate**, an implementation of the CLR paper, repository. - 2019
- **SubX**, an application to display subtitles over presentations and control them independently, project page. - 2017

## Awards & Fellowships

- **Nokia Young Scientist Award**, Nokia Bell Labs, Jul. 2023
  Received recognition for our research on Extending Sparse Methods for Robustness presented at the 36th OTDK; presented our work to Nokia Bell Labs research community in Budapest, awarded 400,000 HUF.
- **Scientific Students' Association Conference (TDK) - 1st place**, Eötvös Loránd University, Dec. 2022
  Awarded for extending my master's thesis to include Hard Thresholding with deeper networks and mutual coherence regularization. Our work was nominated to the national conference (36th OTDK), to be submitted for a journal publication.
- **Graduate Research Fellowships**, Eötvös Loránd University, May 2021 - Jul. 2023
  My work with the Neural Information Processing Group was funded under the following projects: ELTE-Bosch Scholarship, MOBOT, MILAB, and the Thematic Excellence Programme: 1 and 2.
- **Stipendium Hungaricum Scholarship**, Tempus Public Foundation, Sep. 2020 - 2022
  Full, 4-semester, MSc degree scholarship.
- **Digital Arabic Content Competition - 2nd place**, Syrian Virtual University, 2019
  Developed a startup business plan and a prototype of a collaborative computer-assisted translation tool using Django, Git, and Docker. Monetary award: $2000.
- **Competitive Programming Contestant**, Syrian Collegiate Programming Contest, 2014 - 2015
  Third place and Solid Programmer awards in the local 2014 contest, for more details please check my ICPC ID.

## Technical Skills

- **Proficient:** Python, Pytorch, Scikit-learn, NumPy, Pandas, Matplotlib, SQL, Docker, Git, LaTeX.
- **Familiar:** Kubernetes, Kubeflow, MLflow, Seldon, TensorFlow.js.
- **Prior Experience:** Javascript, C++, Java, Django, HTML, CSS.

## Languages

- **English**, C1 CEFR, IELTS overall score: 7.5 (issued Jun. 2019)
- **Arabic**, Native

## Extracurricular & Volunteering Activities

- **Startup Weekend Homs**, co-Organizer, 2018
- **TEDxMimasStreet**, Technical Team Member, 2017
- **Al-Baath Collegiate Programming Contest**, System Team Member, 2017
- **Syrian Collegiate Programming Contest**, Site Volunteer, 2016