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.
  - Produced empirical evidence that the learned group representations can be used as a fully unsupervised method for classification.
  - 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

- **B-cos Nets Robustness**, a quick look at B-cos nets' adversarial robustness, blog post. - 2023
- **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 extensions of my master's thesis. 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