

- Autonomous toy-drones: suggested systems for running real-time deep learning tasks on weak micro-computers, such as the Raspberry Pi Zero v2 (whose price was \$15) attached to a toy-drone.
- Understanding and designing efficient neural network architectures.

- Researching compression methods for deep learning systems with and without fine-tuning.
- Developing a framework for boosting the performance of existing Least-Mean-Squares solvers, improving their widely used solvers from the famous sickit-learn python library.
- Suggesting coresets (provable data summarization) for a variety of machine learning problems, such as Dimensionality Reduction, Regression, Clustering, and more.
- Investigating novel provable sampling-based techniques for boosting motion (path) planning models of robots and space exploration algorithms.

Runway Project (Samsung Research Israel)

2018-2020

On-Device deep learning for speech recognition.

Chip Design - R&D Tools, Automations, and Methodology (Mellanox Technologies, Nvidia today)

2015 - 2019

- 2015-2016: Chip Design Student.
- 2017-2019: Chip Design Engineer.

Teaching Experience (University of Haifa)

- 2021-2022: Machine Learning course teaching assistant.
- 2021-2022: Deep Learning course teaching assistant.
- 2019-2020: Learning Big Data in the Cloud course teaching assistant.
- 2018-2019: Deep Learning course teaching assistant.
- 2018-2021: Robotics Lab Advisor.

Invited Talks

- Efficient Machine Learning - Reading Group: “AutoCoreset: An Automatic Practical Coreset Construction Framework” (11.09.23).
- Department of the Air Force-MIT AI Accelerator: “Constructing Efficient Machine/Deep Learning Systems via Data and Model Compression” (23.06.23).
- Distributed Robotic Lab, CSAIL, MIT: “Efficient Deep Learning: From Theory to Practic” (21.03.23).
- University of Massachusetts Amherst: “Fast and Accurate Least-Mean-Squares Solvers” (07.3.23).
- DataHeroes Ltd: “Efficiency in Training and Deploying Machine Learning Models” (16.6.22).
- University of Haifa, Department of Computer Science, CS Colloquium: “Compressing Neural Networks: Towards Determining the Optimal Layer-wise Decomposition” (28.4.22).
- Lightricks, Israel: “Towards Efficient Neural Networks” (3.3.22).
- Neural Information Processing Systems 2021, Israel version: “Compressing Neural Networks: Towards Determining the Optimal Layer-wise Decomposition” (NeurIPS’21 24.11.21).
- Duke University, Department of Mathematics: “Fast and Accurate Least-Mean-Squares Solvers” (29.4.21).
- Harvard CMSA Seminar: “Fast and Accurate Least-Mean-Squares Solvers” (3.11.20).
- Knowledge Discovery and Data Mining Conference: “Tight Sensitivity Bounds For Smaller Coresets” (KDD 2020).
- Technion, pixel club: “Fast and Accurate Least-Mean-Squares Solvers” (21.1.20).

- Alibaba Group, Tel Aviv, Israel: “Coresets and Their Applications in Machine Learning” (6.1.20).
- Neural Information Processing Systems 2019 (oral presentation): “Fast and Accurate Least-Mean-Squares Solvers” (NeurIPS19, 11.12.19).
- Neural Information Processing Systems 2019, Israel version: “Fast and Accurate Least-Mean-Squares Solvers” (NeurIPS’19 28.11.19).
- University of Haifa, Robotics and Big Data (RBD) labs: “Streaming PCA” (7.11.19).

Awards

- Honorable Mention for the Outstanding Paper Award, Neurips 2019 (the paper was part of my M.sc. thesis).
- M.Sc. - summa cum laude, advised by Prof. Dan Feldman, the Computer Science Department, Haifa University.
- Received the “Exceeded expectation” ranking twice, as a student and engineer at Mellanox technologies (Nvidia today).
- Received recognition for "highest level of professionalism and dedication" in 2017 at Mellanox technologies, chip design - design tools group.
- Won second place in the chip design Hackathon held at Mellanox technologies in 2018.

Academic Service: Program Committee (PC) Member/Reviewer

- Conference on Neural Information Processing Systems (NeurIPS) 2022.
- The International Conference on Machine Learning (ICML) 2022.
- Machine Learning Journal (Springer) 2022.
- Conference on Neural Information Processing Systems (NeurIPS) 2021.
- Conference on Computer Vision and Pattern Recognition (CVPR) 2021.
- Association for the Advancement of Artificial Intelligence (AAAI) 2021.
- Association for the Advancement of Artificial Intelligence (AAAI) 2020.

Publications

- (1) Maalouf, A., Tukan, M., Loo, N., Hasani, R., Lechner, M., & Rus, D. (2023). On the size and approximation error of distilled sets. *Proceedings of the 37th International Conference on Neural Information Processing Systems*
- (2) Maalouf, A., Tukan, M., Braverman, V., & Rus, D. (2023). Autocoreset: An automatic practical coreset construction framework. *International Conference on Machine Learning*
- (3) Jatavallabhula, K. M., Kuwajerwala, A., Gu, Q., Omama, M., Chen, T., Maalouf, A., Li, S., Iyer, G., Saryazdi, S., Keetha, N., Tewari, A., et al. (2023). Conceptfusion: Open-set multimodal 3d mapping. *Robotics: Science and Systems*
- (4) Maalouf, A., Gurfinkel, Y., Diker, B., Gal, O., Rus, D., & Feldman, D. (2023). Deep learning on home drone: Searching for the optimal architecture. *2023 International Conference on Robotics and Automation (ICRA)*
- (5) Tukan, M., Zhou, S., Maalouf, A., Rus, D., Braverman, V., & Feldman, D. (2023). Provable data subset selection for efficient neural network training. *International Conference on Machine Learning*
- (6) Maalouf, A., Eini, G., Mussay, B., Feldman, D., & Osadchy, M. (2022). A unified approach to coreset learning. *IEEE Transactions on Neural Networks and Learning Systems*
- (7) Maalouf, A., Jubran, I., & Feldman, D. (2022). Fast and accurate least-mean-squares solvers for high dimensional data. *IEEE Transactions on Pattern Analysis and Machine Intelligence*
- (8) Tukan, M., Muallem, L., & Maalouf, A. (2022). Pruning neural networks via coresets and convex geometry: Towards no assumptions. *Proceedings of the 36th International Conference on Neural Information Processing Systems*

- (9) Maalouf, A., Tukan, M., Price, E., Kane, D. G., & Feldman, D. (2022). Coresets for data discretization and sine wave fitting. *International Conference on Artificial Intelligence and Statistics*
- (10) Tukan, M., Maalouf, A., Feldman, D., & Poranne, R. (2022). Obstacle aware sampling for path planning. *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- (11) Liebenwein, L., Maalouf, A., Feldman, D., & Rus, D. (2021). Compressing neural networks: Towards determining the optimal layer-wise decomposition. *Proceedings of the 35th International Conference on Neural Information Processing Systems*
- (12) Tukan, M., Maalouf, A., Weksler, M., & Feldman, D. (2021). No fine-tuning, no cry: Robust svd for compressing deep networks. *Sensors*, 21(16), 5599
- (13) Maalouf, A., Lang, H., Rus, D., & Feldman, D. (2021). Deep learning meets projective clustering. *International Conference on Learning Representations*
- (14) Maalouf, A., Jubran, I., Tukan, M., & Feldman, D. (2021). Coresets for the average case error for finite query sets. *Sensors*, 21(19), 6689
- (15) Jubran, I., Maalouf, A., & Feldman, D. (2021). Overview of accurate coresets. *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery*, e1429
- (16) Jubran, I., Maalouf, A., Kimmel, R., & Feldman, D. (2021). Provably approximated point cloud registration. *Proceedings of the IEEE/CVF International Conference on Computer Vision*, 13269–13278
- (17) Tukan, M., Maalouf, A., & Feldman, D. (2020). Coresets for near-convex functions. *Advances in Neural Information Processing Systems*, 33
- (18) Maalouf, A., Statman, A., & Feldman, D. (2020). Tight sensitivity bounds for smaller coresets. *Proceedings of the 26th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining*, 2051–2061
- (19) Jubran, I., Tukan, M., Maalouf, A., & Feldman, D. (2020). Sets clustering. *International Conference on Machine Learning*, 4994–5005
- (20) Maalouf, A., Jubran, I., & Feldman, D. (2019). Fast and accurate least-mean-squares solvers. *Proceedings of the 33rd International Conference on Neural Information Processing Systems*, 8307–8318

Papers Under Review

- (1) Maalouf, A., Jadhav, N., Jatavallabhula, K. M., Chahine, M., Vogt, D. M., Wood, R. J., Torralba, A., & Rus, D. (2023). Follow anything: Open-set detection, tracking, and following in real-time. *arXiv preprint arXiv:2308.05737*
- (2) Tukan, M., Maalouf, A., & Osadchy, M. (2023). Dataset distillation meets provable subset selection. *arXiv preprint arXiv:2305.14113*
- (3) Feldman, D., Rosman, G., Volkov, M., Maalouf, A., & Rus, D. (2022). Coresets for k-segmentation of streaming data
- (4) Maalouf, A., Jubran, I., & Feldman, D. (2021). Introduction to coresets: Approximated mean

Skills & Interests

Software:	In general I worked (and can work) with many programming languages such as Java, Java Script, C, C++, C#, Matlab, Csh, Bash, Tcsh, Tcl, etc. But my favorite is Python and its libraries (Numpy, Scipy, Pandas, Sklearn, PyTorch, Tensor-Flow).
Languages:	Arabic (native), Hebrew (fluent), English (fluent).
Interests:	Travelling, sports (soccer, swimming, volleyball, hiking, biking, table tennis), nature, high adrenaline attractions (zip-line, bungee jump, rappelling, plane driving, etc).