

Mahdi Morafah

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🎓 Google Scholar

EDUCATION



University of California San Diego *September 2021 - Present*
Ph.D. in Electrical and Computer Engineering *GPA: 4.0/4.0*
Major: Machine Learning and Data Science
Advisor: Professor Bill Lin

University of California San Diego *September 2019 - September 2021*
M.S. in Electrical and Computer Engineering *GPA: 4.0/4.0*
Major: Machine Learning and Data Science

Amirkabir University of Technology *September 2015 - September 2019*
B.S. in Electrical and Computer Engineering *Ranked 1st*

EXPERIENCE

Qualcomm *June 2023 - September 2023*
AI Research Intern

- Led pioneering research on large pre-trained language and vision models (LVM) in federated learning, with a focus on generative AI. This work, accepted to FL@FM-TheWebConf'24, contributes to advancing the integration of generative AI into decentralized AI systems. [ [paper](#) |  [Website](#)]

Tesla *January 2021 - May 2021*
AI Research Intern

- Developed advanced AI tracking and detection algorithms to enhance self-driving cars' performance in complex real-world environments, contributing to safer and more reliable autonomous systems.

OPAL AI Inc. *August 2020 - September 2020*
Computer Vision Research Intern

- Developed a cutting-edge generative AI algorithm for creating floor plans by integrating RGB camera images with depth point cloud data, advancing AI-driven architectural design and spatial modeling.

Statistical Visual Computing Laboratory at UCSD *March 2020 - September 2020*
AI Research Assistant

- Conducted research in autonomous driving 3D object detection, leveraging the fusion of RGB camera images and Radar sensors as an alternative to LiDAR. Developed a novel data fusion method, achieving state-of-the-art results and advancing the capabilities of autonomous vehicle perception systems.

RESEARCH INTERESTS

- Artificial Intelligence, Generative AI, Business, Economics, and Decentralized and Federated AI.







Preprints and Working papers


- P5. **M. Morafah**, K. Xu, O. Sheng, “*Leveraging GPT for Robust Causal Treatment Effect Estimation in Limited Experimental Settings*”, **Working Paper**, 2024.
- P4. **M. Morafah**, V. Kungurtsev, “*Data Acquisition via Experimental Design for Decentralized Data Markets*”, **Working Paper**, 2024.
- P3. **M. Morafah**, V. Kungurtsev, “*Decentralized Minimax Estimation of Conditional Moment Models*”, **Working Paper**, 2024.
- P2. Z. Hao, **M. Morafah**, K. Xu, and T. Zhou, “*Optimal Ranking Algorithm on Online Health Forum*”, **Working Paper** (draft available upon request), 2024.
- P1. **M. Morafah***, E. Bakhitov*, A. Singh, and J. Zhang, “*Deep Causal Inequalities: Demand Estimation in Differentiated Products Markets*”, **Working Paper** (draft available upon request), 2024.

Conference








- C4. **M. Morafah**, V. Kungurtsev, H. Chang, C. Chen, and B. Lin, “*Towards Diverse Device Heterogeneous Federated Learning via Task Arithmetic Knowledge Integration*”, **Advances in Neural Information Processing Systems (NeurIPS)**, Dec 2024. [ [paper](#) |  [Website](#) |  [code](#)]
- C3. **M. Morafah**, H. Chang, and B. Lin, “*Invited Paper: Large Scale Delocalized Federated Learning Over a Huge Diversity of Devices in Emerging Next-Generation Edge Intelligence Environments*”, **ACM/IEEE International Conference on Computer-Aided Design (ICCAD)**, October 2024. [ [Talk Website](#)]
- C2. S. Vahidian*, **M. Morafah***, W. Wang, C. Chen, M. Shah and B. Lin., “*Efficient Distribution Similarity Identification in Clustered Federated Learning via Principal Angles Between Client Data Subspaces*”, **Association for the Advancement of Artificial Intelligence (AAAI)**, Nov 2022. [ [paper](#) |  [code](#)]
- C1. S. Vahidian*, **M. Morafah*** and B. Lin, “*Personalized Federated Learning by Structured and Unstructured Pruning under Data Heterogeneity*”, **IEEE 41st International Conference on Distributed Computing Systems (ICDCS)**, July 2021. [ [paper](#) |  [code](#) |  [video](#)]

Journals

- J5. **M. Morafah**, H. Chang, C. Chen, and B. Lin, “*Federated Learning Client Pruning for Noisy Labels*”, **Under review at ACM Transactions on Modeling and Performance Evaluation of Computing Systems**, October 2024.
- J4. **M. Morafah**, W. Wang and B. Lin, “*FedZoo: A Practical Recipe to Federated Learning With Non-IID Data Experimental Design*”, **IEEE Transactions on Artificial Intelligence (IEEE TAI)**, July 2023. [ [paper](#) |  [code](#)]
- J3. **M. Morafah***, S. Vahidian*, W. Wang* and B. Lin, “*FLIS: Clustered Federated Learning via Inference Similarity for Non-IID Data Distribution*”, **IEEE Open Journal of the Computer Society**, March 2023. [ [paper](#) |  [code](#)]
- J2. **M. Morafah***, S. Vahidian*, C. Chen, M. Shah and B. Lin, “*Rethinking Data Heterogeneity in Federated Learning: Introducing a New Notion and Standard Benchmarks*”, **IEEE Transactions on Artificial Intelligence (IEEE TAI)**, October 2022. [ [paper](#) |  [code](#)]

- J1. V. Kungurtsev, **M. Morafah**, T. Javidi and G. Scutari, “*Decentralized Asynchronous Non-convex Stochastic Optimization on Directed Graphs*”, **IEEE Transactions on Control of Network Systems (TCNS)**, October 2022. [ [paper](#)]

Workshops

- W3. **M. Morafah**, M. Reisser, C. Louizos, and B. Lin, “*Stable Diffusion-based Data Augmentation for Federated Learning with Non-IID Data*”, **International Workshop on Federated Foundation Models for the Web (FL@FM-TheWebConf’24)**, May 2024. [ [paper](#) |  [Website](#)]
- W2. **M. Morafah***, S. Vahidian*, W. Wang* and B. Lin, “*FLIS: Clustered Federated Learning via Inference Similarity for Non-IID Data Distribution*”, **International Workshop on Federated Learning in Conjunction with NeurIPS (FL-NeurIPS’22)**, October 2022. [ [paper](#) |  [code](#)]
- W1. **M. Morafah***, S. Vahidian*, C. Chen, M. Shah and B. Lin, “*Rethinking Data Heterogeneity in Federated Learning: Introducing a New Notion and Standard Benchmarks*”, **International Workshop on Federated Learning in Conjunction with NeurIPS (FL-NeurIPS’22)**, October 2022. [ [paper](#) |  [code](#) |  [Website](#)]

Book Chapters

- B1. S Ahmad, M. Alharbi, M. Morafah, S. Jha, **M. Morafah**, “*Federated Learning - A Systematic Review*”, **Under review at IntechOpen**, October 2024.

* denotes equal contribution

TEACHING EXPERIENCE

University of California San Diego

Developer & Lecturer: Generative AI in Business	Spring 2025
Instructor & Mentor: Business Analytics Capstone Project (MGTA 454)	Spring 2024
Teaching Assistant: Engineering Probability & Statistics (ECE 109)	Spring 2023, Fall 2020
Teaching Assistant: Digital Signal Processing I (ECE 251B)	Winter 2023
Teaching Assistant: Digital Signal Processing I (ECE 251B)	Winter 2023
Teaching Assistant: Deep Learning (CSE 151B)	Winter 2023
Teaching Assistant: Linear Systems Fundamentals (ECE 101)	Winter 2020
Teaching Assistant: Introduction to Digital Signal Processing (ECE 161A)	Fall 2019

Amirkabir University of Technology

Head Teaching Assistant: Discrete-Time Signal Processing	Spring 2019
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PROFESSIONAL SERVICES

Organizing Committee Member

Co-Organizer: CVPR 4th Workshop on Federated Learning for Computer Vision (FedVision’25) 2025

Review Services

Artificial Intelligence and Statistics (AISTAT)	2024
International Conference on Learning Representations (ICLR)	2024
Conference on Computer Vision and Pattern Recognition (CVPR)	2024
IEEE Internet of Things Journal (IoTJ)	2024
IEEE Transactions on Mobile Computing (TMC)	2024
ACM Transactions on Intelligent Systems and Technology (IST)	2024
SIAM Journal on Optimization	2024
Applied Artificial Intelligence	2024
Journal of Computer Science and Technology	2024
IEEE Communications Letter	2024
IEEE Conference on Decision and Control (CDC)	2023, 2024
Neurocomputing Journal	2023
IEEE Transactions on Control of Network Systems (TCNS)	2023

SKILLS

Programming Languages	Python, R, C/C++, MATLAB, Bash
ML Libraries	PyTorch, TensorFlow, JAX
Statistic and Economic Libraries & statsmodels	scikit-learn, causalml, DoubleML, EconML
Cloud Computing	AWS, Docker, Kubernetes
Scripting	Bash, Vim, Nano, Git

AWARDS AND HONORS

- Recipient of **AAAI'23 Student Travel Scholarship**, 2023.
- Recipient of **2021-2022 Dean's Powell Focht Fellowship**.
- Semi-Finalist of **Qualcomm Innovation Fellowship**, 2020.
- **Ranked 1st** in Bachelor's Program at Amirkabir University of Technology, 2019.

INVITED TALKS

- *"Large Scale Delocalized Federated Learning Over a Huge Diversity of Devices in Emerging Next-Generation Edge Intelligence Environments"*, ICCAD'24, New Jersey, UAS, October 2024.
- *"Federated Learning 2.0: From the Classics to Generative AI's Vision"*, Amirkabir University of Technology, Tehran, Iran, December 2023.

REFERENCES

Available upon request.

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