SARA SHOOURI

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Education

University of Michigan	**Fall 2025 (anticipated)**
Ph.D. in Electrical and Computer Engineering	*Ann Arbor, USA*

Computer Vision and Machine Learning. GPA:4/4

University of Michigan	**Spring 2021**
M.Sc. in Electrical and Computer Engineering	*Ann Arbor, USA*

Signal and Image Processing and Machine Learning. GPA:4/4

Sharif University of Technology	**Spring 2019**
B.Sc. in Electrical Engineering	*Tehran, Iran*

Communication Systems. GPA: 17/20 (3.70/4)

Technical Skills

Languages: Python, MATLAB, Julia, C.
Machine Learning Libraries: Pytorch, Tensorflow, Scikit-Learn, Pandas.
Relevant courses: (1) Probability and Random Processes, (2) Matrix Methods for Signal Processing and Machine Learning, (3) Optimization Methods in Signal Processing and Machine Learning, (4) Computer Vision, (5) Advanced Computer Vision, (6) Hybrid Control.

Research Interest

Efficient Deep Learning Networks, Low-Cost Computer Vision Models, Multi-Task Learning, Multi-Modality, Real-time Video Processing

Industrial Experience

Meta	**Summer 2024**
ML/CV Research Ph.D. Intern	*NYC, NY*

- Collected multiple rounds of datasets, capturing hours of CSI data by walking around the office using the Quest headset; trajectories were computed using SLAM based on IMU and image data.
- Processed the data to generate Time-of-Flight (TOF) and Angle of Arrival (AOA) measurements and trained a Siamese network on the resulting TOF-AOA heatmaps for deep learning-based fingerprint matching.
- Enhanced CSI data localization accuracy, achieving a **5 cm reduction in localization error** compared to traditional RSSI-based methods, with the trained Siamese network recognized for potential use in **production**.

Advanced Micro Devices (AMD)	**Winter 2024**
AI/ML Data Center Research Ph.D. Tech Intern	*Austin, TX*

- Designed and optimized a robust benchmarking pipeline for Retrieval-Augmented Generation (RAG) and LLaMA (7B, 13B, 70B) models, employing post-quantization to 8-bit weights and activations for superior efficiency.

Commonwealth Scientific and Industrial Research Organization (CSIRO)	**Fall 2018**
Research Intern	*Brisbane, Australia*

- Devised and implemented an advanced processing pipeline for resource-constrained embedded systems to estimate heart rate and detect feeding events in fish using implantable biologgers.

Academic Experience

University of Michigan	**2020 – present**
*Graduate Student Research Assistant	Advisor: Prof. Hun-Seok Kim*	*Ann Arbor, MI*

Efficient multi-modality sensor fusion for 3D object detection

- Conducting research on adaptive LiDAR for 3D object detection.

Efficient Computation Sharing for Multi-Task Visual Scene Understanding

- Introduced a novel framework that efficiently addresses multiple visual tasks by sharing knowledge through computation and parameter sharing among individually trained single-task transformers, outperforming SOTA in accuracy and resource utilization across image and video data. Our model achieves **40.5%** and **65.7%** reduction in FLOPS for the single image and video, respectively.

Siamese Learning-based Monarch Butterfly Localization

- Advocated a GPS-less strategy utilizing deep learning sensor fusion to enhance daily Monarch butterfly tracking accuracy. The model incorporates daylight intensity and temperature data, enabling accurate butterfly localization through the utilization of Siamese networks. This model can achieve a mean absolute error of **1.416°** in latitude and **0.393°** in longitude coordinates outperforming the SOTA.

University of Michigan   2019 − 2020
Graduate Student Research Assistant | Advisor: Prof. Necmiye Ozay   *Ann Arbor, MI*

Falsification of a Vision-based Automatic Landing System

- Performed an exhaustive analysis of automatic landing system reliability for fixed-wing aircraft, utilizing camera-centric sensing. Devised an innovative vision-oriented landing framework, integrating PID control and runway location estimation.

Sharif University of Technology   2017 − 2018
Student Research Assistant   *Tehran, Iran*

- Developed a novel model for the accurate detection of Apnea disease utilizing ECG signals.

Publications

Sara Shoouri, et al. "Efficient Computation Sharing for Multi-Task Visual Scene Understanding." In Proceedings of the IEEE/CVF International Conference on Computer Vision (**ICCV**). 2023.

Fan, Zichen, Qirui Zhang, Pierre Abillama, **Sara Shoouri**, et al. "TaskFusion: An Efficient Transfer Learning Architecture with Dual Delta Sparsity for Multi-Task Natural Language Processing." In Proceedings of the 50th Annual International Symposium on Computer Architecture (**ISCA**), 2023.

Morteza Tavakoli Taba, S. M. Hossein Naghavi, **Sara Shoouri**, et al. "A 53-62 GHz Two-channel Differential 6-bit Active Phase Shifter in 55-nm SiGe Technology." In Proceedings of IEEE 49th European Solid State Circuits Conference (**ESSCIRC**), 2023.

Sara Shoouri, et al. "Siamese Learning-based Monarch Butterfly Localization." In IEEE Data Science and Learning Workshop (DSLW), 2022. | [Code]

Inhee Lee, Roger Hsiao, Gordy Carichner, Mingyu Yang, **Sara Shoouri**, et al. "mSAIL: milligram-scale multi-modal sensor platform for monarch butterfly migration tracking." In Proceedings of the 27th Annual International Conference on Mobile Computing and Networking (**Mobicom**), 2021. | [Code]

Lee, Inhee, Roger Hsiao, Gordy Carichner, Mingyu Yang, **Sara Shoouri**, et al. "Tracking the Migration of the Monarch Butterflies with the World's Smallest Computer." GetMobile: Mobile Computing and Communications, 2021.

Shen, Yiran, Reza Arablouei, Frank De Hoog, Xing Hao, James Sharp, **Sara Shoouri**, et al. "In-situ Fish Heart Rate Estimation and Feeding Event Detection Using an Implantable Biologger." IEEE Transactions on Mobile Computing, 2021.

Shoouri, Sara, et al. "Falsification of a Vision-based Automatic Landing System." In AIAA Scitech 2021 Forum, 2021.

Shen, Yiran, Reza Arablouei, Frank de Hoog, James Sharp, **Sara Shoouri**, et al. "Estimating heart rate and detecting feeding events of fish using an implantable biologger." In 19th ACM/IEEE International Conference on Information Processing in Sensor Networks (**IPSN**), 2020.

Scholarships & Awards

- Audience choice awards for the paper presentation at DSLW 2022. | *May 2022.*
- Full fund PhD offers from UMICH, Purdue University, WISC. | *Fall 2021.*
- Full fund PhD offers from WISC, Rice University, UCSB, NCSU, ND. | *Fall 2019.*
- Ranked 85th (top 0.038 percent) among 222'507 participants in the Iranian Nationwide University Entrance Exam Known as Konkoor. | *Fall 2014.*