Pouya Shaeri

School of Computing and Augmented Intelligence
Arizona State University, Tempe, Arizona, USA

Email: pshaeri@asu.edu
Phone: +1 (602) 818-1409
Website | Scholar

Research Interests

- Machine Learning and Data Mining
- Computer Vision and Computer Graphics
- LLMs and VLMs
- Deep Learning
- Reinforcement Learning
- Software Development

Education

Arizona State University — Tempe, AZ, USA
Ph.D. in Computer Science — *Fall 2023 – Present*

- GPA: 4.0 / 4.0

Shahid Beheshti University — Tehran, Iran
M.Sc. in Computer Science — *2021 – 2023*

- **Thesis:** Development of a Semi-Supervised Approach for Fake News Detection
- GPA: 4.0 / 4.0

University of Tehran — Tehran, Iran
B.Sc. in Mathematics and Applications — *2013 – 2020*

- **Thesis:** Galois Groups, Irreducible Polynomials and Diophantine Equations

Research Experience

Research Associate, Arizona State University — Tempe, AZ
Under supervision of Dr. Ariane Middel — *Fall 2023 – Present*

- Built MNIST-Gen, a modular dataset generation framework combining CLIP, DQN, and category-theoretic composition, producing MNIST-style benchmarks with 85% auto-labeling accuracy and 80% faster annotation.
- Developed a multimodal physics-informed neural network (PINN) fusing six-directional imagery with environmental data to predict Mean Radiant Temperature (MRT), achieving RMSE 3.41.
- Designed an explainable human-in-the-loop segmentation framework integrating SegFormer, Mask2Former, and SAM, improving mIoU by 9 points and reducing annotation time by 3–4×.
- Built WebMRT, an interactive web tool for real-time urban microclimate simulation using fisheye imagery, achieving MRT prediction RMSE 3.43.
- Implemented OpenMRT, a 3D shadow mapping and temperature rendering framework with physically grounded radiation modeling, reducing MRT error by 4%.
- Improved MaRTiny real-time sensing reliability by 14% and performance by 10% through robust microprocessor communication and fault detection.
- Designed a retrieval-augmented multimodal fact-checking system (LRQ-Fact) using LLMs and VLMs, increasing misinformation detection accuracy by 6%.

Research Assistant, Shahid Beheshti University — Tehran, Iran
Under supervision of Dr. Ali Katanforoush — *Fall 2021- Spring 2023*

- Built a semi-supervised LSTM-based model for fake news detection, integrating sentiment encoding and self-attention, achieving 89% accuracy.
- Implemented a self-supervised reinforcement learning system for recommendation systems, leveraging Self-Supervised Q-Networks (SQN) and Actor-Critic (SAC), improving the accuracy by 3%.

Publications

- **Pouya Shaeri**, Saud R. AlKhaled, Ariane Middel. *A Multimodal Physics-Informed Neural Network Approach for Mean Radiant Temperature Modeling.* In *IEEE/CVF International Conference on Computer Vision (ICCV) Workshops Reliable and Interpretable Weather Models (RIWM)*, 2025. arXiv:2503.08482.
- Alimohammad Beigi, Bohan Jiang, Dawei Li, Zhen Tan, **Pouya Shaeri**, Tharindu Kumarage, Amrita Bhattacharjee, Huan Liu. *Can LLMs Improve Multimodal Fact-Checking by Asking Relevant Questions?* In *IEEE International Conference on Big Data (IEEE BigData)*, 2025. arXiv:2410.04616.
- **Pouya Shaeri**, Yasaman Mohammadpour, Alimohammad Beigi, Ariane Middel, Huan Liu. *Sentiment and Social Signals in the Climate Crisis: A Survey on Analyzing Social Media Responses to Extreme Weather Events.* In *International Conference on Social Computing, Behavioral-Cultural Modeling, and Prediction (SBP-BRiMS)*, 2025. arXiv:2504.18837.
- **Pouya Shaeri**, Ariane Middel. *MID-L: Matrix-Interpolated Dropout Layer with Layer-wise Neuron Selection.* In *NeurIPS 2025 Workshop on Scalable Optimization (ScaleOPT).* arXiv:2505.11416.
- **Pouya Shaeri**, Ali Katanforoush. *A Semi-Supervised Fake News Detection Using Sentiment Encoding and LSTM with Self-Attention.* In *Proceedings of the 13th International Conference on Computer and Knowledge Engineering (ICCKE)*, IEEE, 2023.
- Saud R. AlKhaled, Ariane Middel, **Pouya Shaeri**, Isaac Buo, Florian A. Schneider. *WebMRT: An Online Tool to Predict Summertime Mean Radiant Temperature Using Machine Learning. Sustainable Cities and Society*, Vol. 115, 105861, Elsevier, 2024.
- **Pouya Shaeri**, Arash Karimi, Ariane Middel. *MNIST-Gen: A Modular MNIST-Style Dataset Generation Using Hierarchical Semantics, Reinforcement Learning, and Category Theory.* In *IEEE International Conference on Future Machine Learning and Data Science (FMLDS)*, 2025.
- Ariane Middel, **Pouya Shaeri**, Ryan Woo, Elisabeth S. Krayenhoff. *OpenMRT: Outdoor Thermal Exposure and Comfort Modeling Using Street View Imagery.* In *106th AMS Annual Meeting*, 2026.
- **Pouya Shaeri**, Ryan T. Woo, Yasaman Mohammadpour, Ariane Middel. *Explainable Human-in-the-Loop Segmentation via Critic Feedback Signals.* arXiv preprint, arXiv:2510.09945, 2025.
- Mehrdad Sheibanian, **Pouya Shaeri**, Alimohammad Beigi, Ryan T. Woo, Ameet Keluskar. *Tri-Accel: Curvature-Aware Precision-Adaptive and Memory-Elastic Optimization for Efficient GPU Usage.* arXiv preprint, arXiv:2508.16905, 2025.

Academic Service & Peer Review

- **Reviewer**, *Climate Policy* (Taylor & Francis), 2025.
  Verified reviewer recognition via Web of Science.
- **Reviewer**, *Frontiers in Public Health* (Disaster and Emergency Medicine), 2025.
- **Reviewer**, *Sustainable Cities and Society* (Elsevier), 2025.
- **Reviewer**, *Economic Research - Ekonomska istraivanja*, 2025.
- **Program Committee Reviewer**, *FMLDS 2025* (IEEE International Conference on Future Machine Learning and Data Science), reviewed 7 papers.

Activities & Leadership

- Tech Officer, Software Developer Association (SoDA): Organized and led bootcamps and workshops for undergraduate and graduate students, mentoring in full-stack development using React.js, Next.js, and backend integration.
- Coach, Sunhacks Hackathon 2025: Guided student teams in designing and implementing software projects using React and Gemini API.
- Judge, Sunhacks Hackathon 2025: Evaluated student projects on innovation, technical implementation, and impact.

Teaching Experience

Teaching Assistant, Shahid Beheshti University — Tehran, Iran
Advanced Programming: Dr. Ali Katanforoush — *Spring 2022 and 2023*

Teaching Assistant, Shahid Beheshti University — Tehran, Iran
Design and Analysis of Algorithms: Dr. Ali Katanforoush — *Spring 2022 and 2023*

Teaching Assistant, Shahid Beheshti University — Tehran, Iran
Fundamentals of Programming: Dr. Ali Katanforoush — *Fall 2022*

Teaching Assistant, Shahid Beheshti University — Tehran, Iran
Data Structures: Dr. Ali Katanforoush — *Fall 2022*

Skills

- **Concepts**: Data Mining, Machine Learning, Neural Networks and Deep Learning, Reinforcement Learning, Data Preprocessing, Data Visualization, Dimension Reduction, Multiprocessing, 3D Vision, Shadow Mapping, Computer Graphics, Robotics, Predictive Modeling.
- **Programming Languages**: Python (Proficient), MATLAB (Proficient), C/C++ (Proficient), Java (Proficient), SQL, Dart (Flutter Software Development).
- **Machine Learning and Data Science Packages**: PyTorch, TensorFlow, PySpark, Dask, Hadoop, AI-based APIs, Scikit-Learn, Numpy, Pandas, Matplotlib, Seaborn, Jupyter, SPSS, R program.
- **Computer Graphics and Simulation**: OpenGL, Shadow Mapping, 3D Simulations, Ray-tracing, CubeMaps and Fisheye Image Processing.
- **Web and Software Development**: Flask, JavaScript, HTML, CSS, Flutter, JavaFX, Qt.
- **Hardware and Embedded Systems**: Robotics Microprocessors (ESP32, Arduino).
- **Typesetting and Productivity**: LaTeX, TeX, Microsoft Office, Google Docs.
- **Operating Systems**: Ubuntu, Microsoft Windows.

Selected Course Projects

- **Health Monitoring App**, Developed an Android app for real-time heart rate and respiratory rate detection using video frame and accelerometer analysis, with SQLite-based symptom logging. *Mobile Computing*, Fall 2024.
- **Tic-Tac-Toe Bluetooth Game**, Built a two-player Android Tic-Tac-Toe game with real-time Bluetooth multiplayer and optimized state management. *Mobile Computing*, Fall 2024.
- **Income Prediction Visualization**, Interactive data visualizations to analyze income factors from the U.S. Census dataset, aiding marketing strategies. *Data Visualization*, Spring 2024.
- **FashionMNIST and CIFAR-10 Classification**, Trained multiple models in PyTorch to find optimal architecture for highest accuracy on FashionMNIST and CIFAR-10. *Artificial Neural Networks*, Fall 2022.
- **Transfer Learning for Intel Image Classification**, Applied pretrained models using transfer learning and achieved the highest accuracy in class. *Artificial Neural Networks*, Fall 2022.
- **Image Generation via Autoencoder and GAN**, Designed an autoencoder and a GAN to reconstruct two input images from their average. Implemented in PyTorch and tested on CIFAR-10. *Artificial Neural Networks*, Fall 2022.
- **Data Preprocessing, Feature Engineering Modeling, Gradient Descent Regression, Multiprocessing using Dask and PySpark**, Implemented the regression model from scratch in Python, tested on datasets: Airbnb and Rental Houses in Germany, *Data Mining*, Spring 2022.
- **Time-Series Polynomial and Spline Interpolation using Gregorian and Lunar-Hijri Calendar and Outlier Detection**, Deployed Services using Python platform Flask and Postman, tested on jason dataset samples, *Data Mining*, Spring 2022.

- **Linear and Nonlinear Regression and Classification with Regularization and Hyperparameter Tuning**, Implemented from scratch in Python, tested on datasets: Computers and Heart Disease, plotted the results *Machine Learning*, Fall 2021.
- **Implementing Naive Bayes Classifier, Data Preprocessing and Generating Samples from Probability Distributions**, dataset: Titanic, *Machine Learning*, **Sharif University**, Fall 2021.
- **Polynomial Interpolation (Lagrangian, Hermite, Spline)**, Implemented from scratch in MATLAB, *Fundamentals of Numerical Analysis*, Spring 2019.
- **Games: Minesweeper** Implemented in C++ (using Qt) and **Mastermind** Implemented in Java (Using JavaFX), *Advanced Programming*, Fall 2018.

Honors and Awards

- Awarded **Fulton Fellowship** and 4-year full tuition waiver upon admission to the Ph.D. program in Computer Science at **Arizona State University**.
- Offered a full tuition waiver and Teaching Assistantship at Ohio State University for the 2023–2024 academic year.
- Received full tuition waiver fellowships for both Bachelor's and Master's programs based on academic excellence.
- Admitted to the M.Sc. program in Computer Science at **Shahid Beheshti University**, ranked among top national institutions in Iran.
- Ranked **22nd** in Computer Science Nationwide Graduate Entrance Qualification Exam (Konkour for graduate study) among more than 30,000 participates, Iran, *Fall 2021.*
- Ranked among Top 7% Contestants of the Nationwide University Entrance Qualification Exam (Konkour) among more than 65,000 participates, Iran, *Fall 2012.*
- Ranked **2nd** in "Flutter; Mobile Application Development Framework" Workshop among more than 40 students and Certificated. **Student Scientific Association of Computer Sciences, University of Tehran**, *Spring 2019.*
- Recipient of **Admission** for Bachelor's in Mathematics at **University of Tehran**, Iran, *Fall 2020.*

References

- **Dr. Ariane Middel**, School of Computing and Augmented Intelligence, Arizona State University.
  Email: **amiddel@asu.edu**.
- **Dr. Ali Katanforoush**, Faculty of Mathematical Sciences, Shahid Beheshti University.
  Email: **a_katanforosh@sbu.ac.ir**.
- **Dr. Saud R. AlKhaled**, Department of Architecture, College of Architecture, Kuwait University.
  Email: **saud.alkhaled@ku.edu.kw**.
- **Dr. Mohammadreza Darafsheh**, School of Mathematics, Statistics and Computer Science. University of Tehran.
  Email: **darafsheh@ut.ac.ir**.