

SUMMARY

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Parisa is a highly accomplished ML/DL and computer vision scientist with expertise in processing both structured and unstructured data. During her Ph.D., she focused on developing an image generation algorithm based on VQ-GAN, aimed at improving feature extraction while achieving higher compression efficiency, and submitted the work to CVPR 2026. She also explored multimodal AI (image-text), diffusion models, and LLMs. In addition, she developed an end-to-end ML pipeline for modeling spatiotemporal dynamics in large-scale imaging data, including segmentation, feature extraction, and regression-based temporal modeling, resulting in two publications. During her Merck internship, she applied supervised DL for large-scale classification and segmentation tasks on CODEX multiplex imaging, achieving measurable performance improvements. Her research papers have received over 234 citations. Apart from her scientific achievements, Parisa possesses strong communication and collaborative skills to work across multidisciplinary teams. Her proficiency in design and programming further enhances her ability to develop comprehensive ML/DL solutions effectively.

EXPERIENCE

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- **Merck & Co., Inc.** South San Francisco, CA  
*Computer Vision and AI Research Intern* Summer 2025
  - Conducted in-depth analysis of large-scale, high-resolution multichannel imaging datasets, identifying significant class imbalance issues that adversely affected class-wise model performance.
  - Designed and applied a domain-specific data augmentation pipeline and fine-tuned a U-Net deep learning architecture using PyTorch, resulting in improved classification performance.
  - Compared the classification accuracy of a fine-tuned model against the recently released self-supervised foundation model for spatial proteomics (KRONOS, Harvard Medical School), demonstrating superior performance.
- **University of Texas at Arlington** Arlington, TX  
*Graduate Research Assistant* Aug 2022 - Present
  - Developed Dual Codebook VQ, a novel vector quantization framework that leverages a transformer to optimize a global codebook, achieving state-of-the-art performance with 50% fewer code vectors compared to prior CLIP-token-based models. Integrated the method into a VQGAN architecture with a ResNet encoder and conducted large-scale training from scratch on MS-COCO, ADE20K, and CelebA-HQ. Achieved up to 57% improvement in reconstruction quality, measured by FID computed using ImageNet-pretrained InceptionV3 features. The training objective combined reconstruction loss, perceptual loss (LPIPS with VGG-16 pretrained on ImageNet), and adversarial loss. Built fully reproducible training pipelines using PyTorch Lightning and submitted the resulting paper to CVPR 2026.
  - Developed an end-to-end machine learning pipeline for modeling temporal dynamics in live imaging data, encompassing data preprocessing (denoising), cell segmentation using Cellpose 2.0, feature extraction, and regression modeling with XGBoost. The pipeline was designed as a robust and reusable workflow, enabling consistent analysis across multiple large-scale imaging datasets.
  - Applied supervised linear regression models to high-dimensional genetic and clinical data from over 12,000 participants in the ABCD dataset, using PLINK 1.9 for large-scale feature screening and covariate-adjusted modeling. Performed statistical feature selection across thousands of candidate variables to identify predictive signals and designed a polygenic risk score model based on 23 selected features. The resulting model achieved up to a 22% improvement in AUC compared to existing UK Biobank-based baselines.

EDUCATION

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- **University of Texas at Arlington (UTA)** Arlington, TX  
*Ph.D. in Computer Science* 2022 – 2026
- **Iran University of Science and Technology (IUST)** Tehran, Iran  
*Master of Electrical Engineering* 2018–2021
- **Babol Noshirvani University of Technology (NIT)** Babol, Iran  
*Bachelor of Electrical Engineering* 2012–2017

## SKILLS AND ACTIVITIES

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- **Programming Languages:** Python, MATLAB, familiar with C++ and SQL
- **Python Packages:** NumPy, Pandas, Matplotlib, Scikit-learn, SciPy, Seaborn, OpenCV
- **Deep Learning Frameworks:** PyTorch (PyTorch Lightning), Keras, TensorFlow
- **Software and IDEs:** Jupyter, Google Colab, PyCharm
- **Generative and Multimodal AI:** Autoencoders (e.g. VAE, VQ-VAE, VQ-GAN), Diffusion models, Multimodal Transformers (e.g. CLIP), Vision Transformers, U-Net
- **Computer Vision Applications:** Classification, Semantic Segmentation, Object Detection
- **Domain Expertise:** Digital Pathology, Medical Image Analysis (H&E, multiplex CODEX), QuPath, Biomarker Discovery, Single-Cell Phenotyping, Computational Biology, Computational Genomics
- **Data Handling:** Data Cleaning, Visualization, Augmentation
- **Language Proficiency:** English (Fluent), Farsi (Native)

## SOCIAL MEDIA

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- **Personal Website:** <https://parisa-boodaghi.github.io>
- **LinkedIn:** <https://www.linkedin.com/in/Parisa-Boodaghi>
- **Google Scholar:** <https://www.scholar.google.com/in/Parisa-Boodaghi>