Aydin Ayanzadeh

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Professional Summary

Ph.D. Student in Computer Science specializing in Medical Image Analysis and AI-driven healthcare solutions. Experienced researcher and engineer with 6+ years developing autoencoder architectures, applying knowledge distillation techniques, and building production-ready machine learning systems. Current research focuses on integrating Vision-Language Models with computer vision for assistive technologies, particularly supporting individuals with vision impairments through edge computing optimization.

Research Interests

Computer Vision, Medical Image Analysis, Multimodal Learning, Natural Language Processing, Large Language Models, Knowledge Distillation, Edge Computing, Assistive Technologies

Education

- **Ph.D. in Computer Science** **Feb 2022 - Present (Expected May 2027)**
  University of Maryland, Baltimore County *GPA: 3.78/4.00*
  - *Advisor:* Dr. Tim Oates
  - *Research Focus:* Multimodal AI systems for assistive technologies
- **M.S. in Computer Science** **Feb 2022 - May 2025**
  University of Maryland, Baltimore County *GPA: 3.78/4.00*
  - *Relevant Coursework:* Advanced Algorithms, Knowledge Graphs, Machine Learning, Computer Vision, Data Privacy
- **M.S. in Applied Informatics** **July 2018 - Sept 2020**
  Istanbul Technical University, Turkey *GPA: 3.75/4.00*
  - *Relevant Coursework:* Data Science, Image Processing, Applied Informatics in Structural Biology, Fuzzy Logic
- **B.S. in Computer Science** **Sept 2011 - Apr 2016**
  University of Tabriz, Iran
  - *Relevant Coursework:* Computer Architecture, Compiler Design

Technical Skills

- **Programming Languages:** Python, MATLAB, C/C++, SQL, CUDA, JavaScript
- **Machine Learning Frameworks:** PyTorch, TensorFlow, Keras, HuggingFace Transformers, PyTorch Lightning, ONNX
- **Computer Vision Libraries:** OpenCV, MediaPipe, PIL/Pillow, ImageJ/Fiji
- **Data Science Tools:** NumPy, Pandas, Scikit-Learn, Matplotlib, Seaborn
- **Cloud Platforms & Tools:** Google Cloud Platform, AWS, Docker, Linux servers

- **Development Tools:** Git, GitHub, Jupyter Notebooks, IDEs (PyCharm, VSCode)
- **Optimization Tools:** Intel OpenVINO, Model Quantization, Knowledge Distillation

Research Experience

CORAL LAB, University of Maryland, Baltimore County *Dec 2022 - Present*
Researcher (Advisor: Dr. Tim Oates) Baltimore, MD

- **Project:** Multimodal Large Language Model-Based Assistive System for Safe Navigation
  - Developed an assistive system incorporating Vision-Language Models (VLM) with human-guided machine learning
  - Leveraged large language models alongside computer vision to enhance safe navigation for individuals with blindness or low vision, achieving 92% navigation accuracy
  - Optimized models for edge computing deployment, reducing inference time by 60% while maintaining high accuracy

Vodafone FutureLab *May 2019 - Jan 2022*
Research Fellow (Supervisor: Mehmet Basaran) Istanbul, Turkey

- **Project:** Social Context Analysis in Telecommunications
- Proposed Res-VGAE, a variational graph auto-encoder with residual connections, improving deep graph auto-encoder accuracy by 18%
- Developed a dynamic Word2Vec model to analyze Vodafone customers' social structure efficiently
- Engineered a scalable system processing 1M+ daily transactions and generating \$5 $5M annual revenue through improved recommendations

TÜBİTAK (Turkish National Science Foundation) *Oct 2020 - Jan 2022*
Research Assistant (Supervisor: Dr. Devrim Unay) Izmir, Turkey

- **Project:** Image Processing and ML Tools for Phase-Contrast Microscopy (Grant #119E578)
  - Performed qualitative and quantitative analyses of cell morphology and movement from time series images
  - Improved cell tracking pipeline achieving 94% accuracy, accelerating drug discovery timelines by 6 months
  - Designed novel auto-encoder architecture, improving training efficiency and reducing overfitting

Arcelik Global Co. *Dec 2019 - Dec 2020*
Researcher (Supervisor: Dr. Nazim Kemal Ure) Istanbul, Turkey

- **Project:** Multi-Task Network Optimization for Surveillance Cameras
  - Designed multi-task network for people monitoring across 500+ retail locations processing 10TB+ video data daily
  - Optimized architecture using quantization with Intel OpenVINO toolkit, achieving 9x performance improvement (2 fps to 18 fps)
  - Reduced model size by 75% and hardware costs by \$1.2M annually while maintaining accuracy

SP4CING Lab, Istanbul Technical University *Sept 2018 - Dec 2021*
Research Assistant (Advisor: Dr. B.U. Toreyin) Istanbul, Turkey

- **Project:** Deep Learning-Based Segmentation for Label-Free Phase-Contrast Microscopy

- Introduced novel auto-encoder architecture using modified ResNet-18 as encoding module
- Improved medical image segmentation accuracy by 15% for challenging microscopic images

SiMiT Lab, Istanbul Technical University *Apr 2017 - June 2018*
Researcher (Supervisor: Dr. Hazim Kemal Ekenel) Istanbul, Turkey

- **Projects:** Kaggle Dog Breeds Identification & YouTube-8M Video Understanding Challenge
  - Achieved top 5% ranking in Kaggle competitions using state-of-the-art transfer learning approaches
  - Developed deep neural networks with skip connections for video understanding, processing 8M+ video samples

Teaching Experience

Teaching Assistant - University of Maryland, Baltimore County *Spring 2022 - Present*

- **Courses Taught:**
  - Computer Organization and Assembly Language Programming (CMSC 313) - Fall 2024, Spring 2025, Spring 2024, Spring 2022
  - Principles of Artificial Intelligence (CMSC 671) - Fall 2023
  - Introduction to Data Science (CMSC 691) - Fall 2022, Spring 2023
  - Problem Solving & Programming (CMSC 104) - Summer 2024
  - Scripting Languages (CMSC 433) - Summer 2024
  - Social & Ethical Issues in IT (CMSC 304) - Summer 2023
  - Data Structures (CMSC 341) - Summer 2022

Selected Publications

- **Aydin Ayanzadeh**, Prakhar Dixit, Sadia Kamal, Milton Halem. "WildfireVLM: AI-Powered Analysis for Early Wildfire Detection Using Satellite Imagery, (2026)." *(Accepted - IGARSS2026)* [Paper]
- **Aydin Ayanzadeh**, Tim Oates. "AgenticRAG-Driven Floorplan Parsing for Assistive Indoor Navigation for Blind and Low-Vision Users, WP-GRAILV, CVPR 2026 ."
- **Aydin Ayanzadeh**, Tim Oates. "Floorplan2Guide: LLM-Guided Floorplan Parsing for BLV Indoor Navigation, IEEE Big data 2025."
- **Aydin Ayanzadeh**, Tim Oates. "LLM-Based Indoor Navigation System for Individuals with Blindness or Low Vision." *STARS Celebration Conference 2024, CMD-IT/ACM Richard Tapia Conference 2025.* [Poster]
- Reyhan Kevser Keser, **Aydin Ayanzadeh**, et al. "PURSUhInT: Informative Hint Points for Knowledge Distillation." *Expert Systems with Applications* 213 (2023): 119040. [Paper] [Code]
- **Aydin Ayanzadeh**, et al. "Improved Cell Segmentation Using Deep Learning in Label-Free Optical Microscopy." *Turkish Journal of EE&CS* 29, no. 8 (2021): 2855-2868. [Paper]
- Yusuf Sait Erdem, **Aydin Ayanzadeh**, et al. "Automated Analysis of Phase-Contrast Optical Microscopy: Application to Wound Healing." In *Diagnostic Biomedical Signal and Image Processing Applications with Deep Learning*, pp. 137-154. Academic Press, 2023. [Paper]
- **Aydin Ayanzadeh**, et al. "Deep Learning based Segmentation Pipeline for Label-Free Phase-Contrast Microscopy Images." *28th IEEE SIU Conference*, 2020. [Paper]

- Reyhan Kevser Keser, et al. "Graph Embedding For Link Prediction Using Residual Variational Graph Autoencoders." *28th IEEE SIU Conference*, 2020. [Paper]
- **Aydin Ayanzadeh**, et al. "Cell Segmentation of 2D Phase-Contrast Microscopy Images with Deep Learning." *2019 Medical Technologies Congress (TIPTEKNO)*, 2019. [Paper]
- Indrit Nallbani, **Aydin Ayanzadeh**, et al. "Representation Learning Using Graph Autoencoders with Residual Connections." arXiv preprint arXiv:2105.00695 (2021). [Paper]
- **Aydin Ayanzadeh**, et al. "A New Class of Scaling Matrices for Scaled Trust Region Algorithms." arXiv preprint arXiv:1904.09209 (2019). [Paper]
- **Aydin Ayanzadeh**, Sahand Vahidnia. "Modified Deep Neural Networks for Dog Breeds Identification." Preprints (2018). [Paper] [Code]
- **Aydin Ayanzadeh**, Hossein Pourghaemi, Yousef Seyfari. "A Modified Ant Colony Based Approach to Digital Image Edge Detection." *2015 2nd International Conference on Knowledge-Based Engineering and Innovation (KBEI)*, pp. 504-509. IEEE, 2015. [Paper] [Code]

Honors and Awards

- International Alumni Endowed Scholarship, UMBC — May 2025
- Research Fellowship, Vodafone FutureLab — May 2019
- Top 1% ranking among 500,000+ students in nationwide university entrance examination — Sept 2011

Professional Certifications

- **AI for Medicine Specialization (3-course)** - DeepLearning.AI [Certificate]
- **Neural Networks and Deep Learning** - DeepLearning.AI [Certificate]
- **Generative Adversarial Networks (GANs)** - DeepLearning.AI [Certificate]
- **Digital Image and Video Processing** - Northwestern University [Certificate]
- **Image and Video Processing** - Duke University [Certificate]

Professional Service

Journal Reviewer:

- Scientific Reports (Nature)
- Expert Systems with Applications (Elsevier)
- Neurocomputing (Elsevier)
- Multimedia Systems (Springer Nature)
- International Journal of Machine Learning & Cybernetics (Springer Nature)
- Signal Processing: Image Communication (Elsevier)

Professional Memberships:

- IEEE Graduate Student Member (since 2022)
- ACM Graduate Student Member (since 2022)
- AccessComputing Member (since 2023)

Leadership & Organization:

- Orientation Advisor, UMBC (Present)
- Secretary of Scientific Association, University of Tabriz CS Department (2014-2015)
- Executive Secretary for International Symposium on CS & Software Engineering, University of Tabriz (2015)

Languages

English (Fluent), Turkish (Fluent), Persian (Native), Azerbaijani (Native)

Selected Technical Projects

LinkedGuard: Privacy-Aware Company Verification System (May 2023)

Advanced authentication system for LinkedIn company profiles using privacy-preserving techniques. [GitHub Repository]

Advanced Lane Finding System (May 2019)

Computer vision system for autonomous vehicle lane detection using advanced image processing techniques. [GitHub Repository]

Dog Breeds Identification (2018)

Deep learning model using transfer learning for dog breed classification, achieving top performance. [GitHub Repository]