Amir Aghdam

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RESEARCH INTERESTS

Computer Vision, Vision-Language Models, Large Language Models, Applied Machine Learning

EDUCATION

Temple University, Philadelphia, USA — Aug. 2023 — Aug. 2025
MSc in Computer Science — GPA: 3.87/4.00

- Research focus: **Vision-language Models, Active Learning**

University of Tabriz, Tabriz, Iran — Sep. 2019 — July 2023
Bachelor of Science in Computer Engineering — GPA: 3.67/4.00

- **Ranked** 1^{st} among the cohort
- Major GPA: 3.93/4

RESEARCH EXPERIENCE

Zero-Shot Fine-Grained Action Recognition using Image-Language Models — Jan. 2025 – Jun. 2025
Research Assistant — Temple University

- Proposed a novel zero-shot framework that integrates LLM-generated sub-action sequences with Dynamic Time Warping to **harness the open-set recognition capabilities of image-language models** for fine-grained video classification.

Active Metric Learning for Finetuning Vision Foundation Models — Jun. 2024 – Jan. 2025
Research Assistant — Temple University

- Proposed a novel active metric learning framework that finetunes vision foundation models using **informative pairwise queries**, without requiring **any prior knowledge of dataset or class structure**.

Resource-Efficient 3D Medical Image Segmentation — Jan. 2023 – July 2023
Research Assistant — University of Tabriz

- Investigated the adaptation of **2D multi-view convolutional modules** for 3D brain tumor segmentation from MRI images, enabling significant reductions in model size.

Real-Time Semantic Segmentation of Common Objects — July 2022 – Dec. 2022
Research Assistant — University of Tabriz

- Accelerated the DDRNet model inference **from 14 to 47 FPS** on the COCO-Stuff dataset by applying model compression techniques for efficient segmentation of indoor objects on edge devices.

PUBLICATIONS

Aghdam, A., Hu, V. T. — **arXiv preprint, 2025**
ActAlign: Zero-Shot Fine-Grained Video Classification via Language-Guided Sequence Alignment — [Link]

SELECTED PROJECTS

Related Work Co-pilot: Human-in-the-Loop Literature Review Assistant — GitHub

- Designed and implemented a **human-in-the-loop workflow** that structures the literature review process into **interactive stages**, placing researchers in control while delegating search and summarization to **LLMs**.
- Integrated **RAG-style querying** over arXiv with support for **OpenAI** and **Gemini** models, enabling iterative paper discovery, section generation, and automated BibTeX export.

Uncertainty Estimation in Image Classification using Evidence Theory — GitHub

- Implemented an evidential loss for uncertainty-aware classification, achieving a **10% absolute improvement in F1 score** over standard cross-entropy baselines.
- Demonstrated how model uncertainty correlates with incorrect predictions and outlier inputs, highlighting its importance in safety-critical applications such as robotics and autonomous vehicles where models must be capable of **withholding confident decisions under ambiguity**.

Image Processing Web App on AWS GitHub

- Deployed a Django-based image filtering app on an **AWS EC2** instance using Gunicorn, Nginx, and systemd, with a **SQLite database** to store user uploads and processed results.

3D Medical Image Segmentation GitHub

- Developed a fully modular PyTorch implementation of **3D UNet** tailored for volumetric medical imaging, with reusable components for preprocessing, augmentation, model architecture, and evaluation.
- Built a custom **data pipeline** for the Decathlon spleen dataset, handling 3D volume loading, normalization, patching, and batching to ensure efficient and scalable training on limited compute resources.

Transfer Learning for Resource-efficient Medical Image Segmentation GitHub

- Adapted the lightweight, pretrained DDRNet model for medical image segmentation using task-specific data augmentation, achieving a **25% increase in AUC** and a **76% reduction in training time** on the DRIVE retinal vessel dataset.

TEACHING EXPERIENCE

Temple University

- *TA*, Program Design and Abstraction — Jan. 2025 – May. 2025
- *TA*, Data Structures — Sept. 2023 – May. 2024
- *TA*, Intro to Problem Solving and Programming in Python — Sept. 2023 – Dec. 2023

University of Tabriz

- *Instructor*, Fundamentals of Computer & Programming Lab — Sept. 2021 – Dec. 2021

SELECTED COURSES

Undergraduate

- Algorithm Design (20/20)
- Data Structures & Algorithms (20/20)
- Fundamentals of Artificial Intelligence (19/20)
- Computational Intelligence (19/20)
- Data Mining (19.25/20)

Graduate

- Neural Computation (A)
- Design & Analysis of Algorithms (A)
- Topics in Computer Science-Graph Learning (A)
- Machine Learning (A-)
- Artificial Intelligence (A-)

EXPERTISE

Skills	Deep Learning, Data Mining, Natural Language Processing, Computer Vision, Large Language Models (LLMs), Retrieval-Augmented Generation (RAG), Model Context Protocol (MCP)
Languages	Python, Java, SQL, JavaScript, C++
Frameworks & Libraries	PyTorch, Pandas, Matplotlib, Scikit-learn, OpenCV, PySpark, PyG, LangChain, LlamaIndex, Hugging Face, Transformers
Tools & Platforms	Git, Docker, Linux, AWS, REST APIs

AWARDS & ACHIEVEMENTS

Ranked 1st in B.Sc. Computer Engineering cohort — 2023

Top 1.5% in National University Entrance Exam (Mathematics) — 2019
Ranked among more than 164,000 participants nationwide

Admitted to the **National Organization for Development of Exceptional Talents (NODET)** — 2013
Selected for gifted education in both middle and high school