

Ahmad Amirivojdan

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Summary

Applied Machine Learning Scientist and Ph.D. candidate with 5+ years of software engineering experience developing machine learning systems across computer vision, audio processing, and natural language processing. Experienced in building large-scale datasets, training and evaluating deep learning models, and developing production-ready tools using Python, PyTorch, Docker, and AWS. Creator of open-source AI software and datasets used by researchers and developers.

Technical Skills

Programming: Python, C++, C, SQL, Bash

Machine Learning: Deep learning, supervised learning, self-supervised learning, representation learning, transfer learning, model benchmarking, hyperparameter optimization, ablation studies, error analysis

Computer Vision: Object detection, instance segmentation, image classification, video action recognition, multi-object tracking, Vision Transformers, CNNs, YOLO, RT-DETR, Mask R-CNN, V-JEPA, SAM 2, OpenCV

NLP and Speech: Text normalization, tokenization, named entity recognition, part-of-speech tagging, low-resource NLP, Persian language processing, ASR and speech-dataset development

Frameworks and Data Tools: PyTorch, Scikit-learn, Hugging Face, NumPy, Pandas, ONNX

Deployment and MLOps: Docker, FastAPI, REST APIs, Git, GitHub Actions, CI/CD, Linux, AWS S3, SQL Server

Research and Data Engineering: Experimental design, statistical evaluation, dataset curation, annotation pipelines, data quality analysis, reproducible research

Experience

UT Smart Agriculture Lab — Graduate Research Assistant (Feb 2022 – Present)

Knoxville, TN

- Led the development of **ChickenVerse**, an open computer vision benchmark built from imagery and video collected across five research and commercial poultry farms, covering object detection, instance segmentation, and video action recognition.
- Developed **ChickenDet**, a COCO-format detection and instance-segmentation dataset containing 6,539 images and 153,764 bird instances; designed frame sampling, SAM 2-assisted annotation, quality-control, and source-based data splits to evaluate generalization to a held-out commercial farm.
- Trained and benchmarked RT-DETR, YOLO, Mask R-CNN, and YOLO-seg models on ChickenDet, achieving 83.7% bounding-box AP with RT-DETR-L and approximately 77% mask AP with Mask R-CNN while analyzing accuracy, throughput, object density, and cross-farm performance.
- Developed **ChickenAct**, a video action-recognition dataset containing 15,250 single-bird clips across 15 poultry behavior classes; built pipelines for bird detection, tracking, clip extraction, filtering, annotation, and reproducible train, validation, and test partitioning.
- Benchmarked CNN, Vision Transformer, and self-supervised video models on ChickenAct, achieving 88.7% macro-F1 with V-JEPA 2 and evaluating model performance under class imbalance and visually similar behavior categories.
- Designed **ChickenSense**, an end-to-end feed-intake monitoring system combining low-cost piezoelectric sensors, continuous audio acquisition, signal denoising, temporal and spectral feature extraction, and a dual-branch 1D/2D CNN; achieved 92% accuracy and 91% F1 for feed-pecking classification.
- Validated ChickenSense against scale-based measurements over 19 consecutive days, achieving an $8 \pm 7\%$ mean error for daily feed-intake estimation, a $0.71 R^2$, and an 85% Pearson correlation for hourly intake estimates.
- Developed **ChickenSim**, a configurable NetLogo agent-based simulator modeling individual bird movement, feeding, resting, and digestion to generate hourly and daily feed-consumption profiles for behavioral and welfare studies. [GitHub](#)

Kimia Motor — Research and Development Engineer (Aug 2021 – Feb 2022)

- Designed an automated wire feeder for a brake production line, reducing defect rates by 10%. [Grabcad](#)
- Built a two-axis linear motion system for a gear-shifting test bed with a Python joystick controller interfacing a Delta DVP-SA2 PLC over Modbus. [Grabcad](#)

Pars Ertebat — Full-Stack Software Engineer (May 2016 – Aug 2021)

- Contributed to a nationwide horse-racing wagering platform for the Equestrian Federation of Iran, processing \$32 million in annual transactions.
- Developed a social media back end with authentication, user management, and reporting.

Parand Robotics Research Center — Undergraduate Research Assistant (Jan 2012 – Apr 2016)

- Led the humanoid robotics software team using Agile development practices, coordinating feature planning, implementation, testing, and system integration for international RoboCup competitions.
- Increased the robot's walking speed by approximately 30% by designing and implementing a trajectory-based gait-generation engine for omnidirectional bipedal locomotion.
- Improved locomotion stability by integrating IMU-based feedback with PID control to stabilize the robot's center of mass, reducing falls by approximately 50% during walking and dynamic maneuvers.
- Designed and implemented a modular software architecture using object-oriented principles, including a low-level communication layer for reliable real-time interaction among sensors, actuators, and control modules.

Selected Projects

ChickenVerse: Open Multi-Task Poultry Vision Dataset (Jun 2026) [GitHub](#)

Built a large-scale dataset for chicken detection, instance segmentation, and behavior recognition, with 153,764 instance-level boxes and masks across 6,539 images.

Neyshekar: Large-Scale Open Persian Speech Dataset (May 2026) [GitHub](#)

Curated 40,000+ recordings spanning 63+ hours and 456K tokens for Persian ASR and TTS research; released under CC0 with versioned data.

Shekar: Python Toolkit for Persian Natural Language Processing (Oct 2025) [GitHub](#)

Developed an open-source Persian NLP toolkit with normalization, tokenization, embeddings, NER, and POS tagging; achieved 35K+ PyPI downloads and 95%+ test coverage.

ChickenSense: Poultry Feed-Intake Monitoring System (Jul 2024) [GitHub](#)

Built a dual-branch CNN that classified feed-pecking events from low-cost piezoelectric sensor signals with 92% accuracy and 91% F1.

Humanoid Soccer Robot: Autonomous Robotics Software Framework (2012 – 2016) [GitHub](#)

Developed a modular framework for an autonomous humanoid soccer robot, integrating real-time vision-based ball tracking, omnidirectional locomotion, IMU-based stabilization, and finite-state behavior control.

PRO-IMU: Open-Source Inertial Measurement Unit (2012 – 2016) [GitHub](#)

Built an open-source IMU platform with ATmega32 firmware compatible with the Dynamixel communication protocol, client libraries and a 3D simulator.

Education

Ph.D. in Biosystems Engineering — University of Tennessee, Knoxville (Feb 2022 – Dec 2026, Expected)

M.S. in Artificial Intelligence & Robotics — Islamic Azad University, Qods Branch (Sep 2016 – Jan 2020)

B.S. in Computer Hardware Engineering — Islamic Azad University, Parand Branch (Sep 2010 – Jan 2016)

Awards and Honors

1st Place, RoboCup Humanoid Soccer Teen-Size League (China, 2015)

3rd Place, RoboCup Humanoid Soccer Teen-Size League (Brazil, 2014)

Certifications

Generative Adversarial Networks (GANs) Specialization (Coursera, Jan 2025)

Natural Language Processing Specialization (Coursera, Apr 2025)

AWS Cloud Practitioner Essentials (Amazon Web Services, Oct 2024)