Ahmad Amirivojdan

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Summary

I am an enthusiastic Ph.D. candidate in Biosystems Engineering, with a strong foundation in robotics, artificial intelligence, and machine learning. My journey began with developing award-winning robotics projects, and now I am focused on integrating advanced technologies like computer vision and IoT to tackle critical challenges in agriculture. My diverse experience ranges from building autonomous systems to innovating in data science, always with a focus on practical, real-world applications. I am eager to apply my skills in a dynamic internship setting where I can contribute to cutting-edge projects and continue to grow as a technology leader.

Education

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

- **GPA:** 3.9
- **Courseworks:** Deep Learning, Machine Learning, Bio-Inspired Computation, Reinforcement Learning, Natural Language Processing, Embedded Systems, Data Mining and Analytic, Regression Modeling, Statistics for Research, Electronic Systems, Mathematical Modeling, Geographic Information Science (GIS)
- **Research:** Integrating computer vision, machine learning, and IoT advancements to address various challenges in agriculture sector.

M.S. **Shahr-e Qods Azad University**, Artificial Intelligence & Robotics — Sept 2016 to Jan 2020

- **GPA:** 18/20
- **Courseworks:** Mobile Robotics, Image Processing, Pattern Recognition, Fuzzy Logic, Swarm Intelligence, Machine Learning
- **Research:** Developed a fast and accurate in-field vision system to detect saffron flowers under diurnal illumination fluctuations using Histogram of Gradients (HOG) features and an SVM classifier. Github ⬈

B.S. **Parand Azad University**, Computer Engineering — Sept 2010 to Jan 2016

- **Research:** Contributed in development of an autonomous humanoid soccer robot to compete in the RoboCup soccer competitions. Github ⬈

Experience

UT Smart Agriculture Lab, Graduate Research Assistant — TN, USA / Feb 2022 - Dec 2026 (Expected)

- Customized the Mask-RCNN instance segmentation model to estimate chickens weight and classify their posture from RGB-D recordings.
- Collected 3D recording using an automated data acquisition system and transferred the recordings to the server.
- Curated a dataset containing 1500 images with labeled instances for segmentation purposes using CVAT annotation software.
- Trained a U-Net semantic segmentation model on the curated dataset to study broiler chickens flock mobility level.
- Designed and developed a low-cost deep learning-based solution for real-time poultry feed intake monitoring using sound technology. The proposed method in this research paved the way for a solution to commercial scale feed intake monitoring by improving the estimation accuracy and reducing the overall cost comparing to the previous works.

- Designed a data acquisition system and collected 19-days consecutive audio recording from a piezoelectric sensor attached to a feeder along with scale data as the ground truth measure.
- Curated a dataset of audio samples with their corresponding event label using Label-Studio annotation tool.
- Developed a VGG16-based deep learning model to classify pecking events using the audio envelop and the spectrogram as input.
- Conducted statistical analysis to compare the estimated results with the ground truth data.
- **Skills**: Computer Vision, Deep Learning, Internet of Things (IoT), Data Science, Data Curation, Precision Agriculture, PyTorch, Keras, Scikit-Learn, PySpark, Neural Networks, Audio Classification, Instance Segmentation, Semantic Segmentation, Statistical Analysis, Time Series Analysis, Data Visualization, Python, Pandas, Seaborn, Label-Studio, CVAT, Data Annotation, Python, Arduino, FreeRTOS, Linux, Git

Kimia Motor, Research and Development Engineer
Tehran, Iran
Aug 2021 - Feb 2022

- Conducted an overview of the production processes and reported the bottlenecks with possible solutions to improve production efficiency.
- Designed and built an automated wire feeder for the brake production line and replaced it with an old feeder. The newly built feeder showed a higher precision, which led to a decrease in defective product rates. Grabcad ☑
- Designed a two-axis linear motion system for the company's car gear shifting system test bed. Grabcad ☑
- Developed a joystick controller Python software interfacing with the PLC device using the Modbus protocol.
- Developed the control software on a Delta DVP-SA2 PLC using ladder logic.
- **Skills**: Computer Aided Design (CAD), PLC Programming,Modbus, Python Ladder Logic, Catia

Pars Ertebat, Fullstack Software Engineer
Tehran, Iran
May 2016 - Aug 2021

- Contributed to the development of a horse racing betting solution, achieving an annual revenue of $32 million for the Equestrian Federation of Iran, with over 70k users.
- Developed the back-end of a social media app containig authentication, user management, report generation, etc.
- Designed and developed the web version of a social media app.
- **Skills**: Object-Relational Mapping (ORM), WinForms, LINQ to SQL, SQL, JavaScript, Object-Oriented Programming (OOP), C#, ASP.NET MVC, .NET Framework, AngularJS, Visual Studio, Bootstrap, Microsoft SQL Server, Entity Framework, HTML, Cascading Style Sheets (CSS), ASP.NET Web API, JSON Web Token (JWT)

Parand Robotics Research Center, Undergraduate Research Assistant
Tehran, Iran
Jan 2012 - Apr 2016

- Led the software development team and mentored the new members through the process.
- Developed a 4-phase pre-defined walking engine which was used in early versions of the robot.
- Developed a ball tracking system based on contour segmentation and a PID-controlled pan-tilt mechanism.
- Improved robot's walking speed by implementing an online omni-directional parametric bipedal walking trajectory generator with an PID stabilization and balancing module based on an integrated IMU sensor.
- Developed a multi-threaded modular software based on SOLID and object ori-

ented (OOP) design principles.

- Developed a GUI-based key-frame motion editor software to design predefined motions.
- Implemented the low-level IO module to control servo actuators and read IMU sensor data.
- Developed an open source IMU based on Atmega32 microcontroller, containing a firmware, class libraries, configuration software ,and 3D simulator completely compatible with Dynamixel communication protocol. Github ↗
- Implemented a FSM-based module to control high-level robot behavior in orchestration with other modules.
- **Skills**: Teamwork, Research, Communication, Computer Vision, Machine Learning, Robotics, C, C#, .Net Framework, Embedded System Development, Software Engineering, Image Processing, OpenCV, Visual Studio

Publications

ChickenSense: A Low-cost Deep Learning-based Solution for Poultry Feed Consumption Monitoring Using Sound Technology Github ↗   July 2024

Ahmad Amirivojdan, Amin Nasiri, Shengyu Zhou, Yang Zhao, Hao Gan
10.3390/agriengineering6030124 ↗

An automated video action recognition-based system for drinking time estimation of individual broilers   March 2024

Amin Nasiri, *Ahmad Amirivojdan*, Yang Zhao, Hao Gan
10.1016/j.atech.2024.100409 ↗

Estimating the Feeding Time of Individual Broilers via Convolutional Neural Network and Image Processing   July 2023

Amin Nasiri, *Ahmad Amirivojdan*, Yang Zhao, Hao Gan
10.3390/ani13152428 ↗

Projects

Humanoid Soccer Robot Github ↗ Video ↗   2016

- A fully autonomous humanoid soccer robot consisting of several modules like locomotion, vision, low-level IO, balancing, and behavior working in harmony to compete in Robocup soccer competitions.
- **Skills**: C#, OpenCV, Robotic, Teamwork, Research

Shekar.io - Persian is Sugar! shekar.io ↗   2016

- Shekar is an interactive platform designed to make learning Persian both enjoyable and effective. Through personalized lessons, quizzes, and real-life conversation practice, it helps learners build a strong foundation in the language.
- **Skills**: Python, FastApi, Vuejs, Tailwind CSS, MongoDb, Motor

Pro-IMU Github ↗   2015

- An open source IMU containing Atmega32 Firmware Class Libraries and a 3D simulator.
- **Skills**: C#, C, Embedded System Development, Atmel Studio

ChickenSim Github ↗   2024

- An agent-based model of feeding behavior in a poultry farm.
- **Skills**: Agent-Based Modeling, NetLogo

Awards and Honors

1st Place - Robocup Humanoid Soccer Teen-Size Robot League — Aug 2015 - China
3rd Place - Robocup Humanoid Soccer Teen-Size Robot League — Aug 2014 - Brazil
2nd Place - IranOpen International - Humanoid Soccer Kid-Size Robot League — Apr 2016 - Tehran, Iran
1st Place - IranOpen International - Humanoid Soccer Kid-Size Robot League — Apr 2015 - Tehran, Iran
1st Place - IranOpen International - Humanoid Soccer Teen-Size Robot League — Apr 2015 - Tehran, Iran
1st Place - IranOpen International - Humanoid Soccer Teen-Size Robot League — Apr 2013 - Tehran, Iran
Persian Language Facilitator Organized and facilitated a weekly Persian language practice at the UT International House for non-native speakers. — Feb 2024 - Knoxville, TN

Certifications

Machine learning in Python with Scikit-Learn - France Université Numérique — Jan 2023
Machine Learning - Coursera — Nov 2020
The Power of Statistics - Coursera — Aug 2023
Academy for LoRaWAN - Semtech — Nov 2023
Autodesk Inventor Essential Training - LinkedIn — Mar 2022
Fundamentals of GIS - Coursera — Jul 2023
Experimental Design Basics - Coursera — Dec 2023
Robot Localization with Python and Particle Filters - Coursera — Feb 2024