Omar Alama

Résumé

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EDUCATION

Carnegie Mellon University - CMU — Pittsburgh, PA

PhD in Electrical and Computer Engineering – Airlab Robotics Institute. — Aug 2024 - Present

Advised by Prof. Sebastian Scherer.

Master of Electrical and Computer Engineering. — Aug 2022 - May 2024

Coursework: Computer Vision, Visual Learning & Recognition, Embedded DL, Optimization, Medical Image Analysis, Pattern Recognition Theory, Systems and Toolchains for AI, Digital Signal Processing, Applied Stochastic Learning.

Advised by Prof. Marios Savvides.

GPA: 4.0/4.0

King Abdulaziz University - KAU — Jeddah, Saudi Arabia

Bachelor of Science in Electrical and Computer Engineering. — Aug 2015 – May 2020

Valedictorian, awarded commercialization agreement for automated attendance with face recognition capstone project.

GPA: 5.0/5.0

SKILLS & INTERESTS

Interest Areas: Computer Vision, Perception and mapping for UAVs/UGVs, Software Engineering, MLOps, Embedded AI.

Software Skills: Python (PyTorch, Sklearn…), C++, CUDA, Java, C#, Git, Docker, Blender, Cinema4D, Adobe creative cloud.

Hardware Skills: IoT (Arduino, Raspberry Pi, NVIDIA Jetson), Computer System Integration, Digital Design/Verilog.

Languages: English (Proficient, TOEFL iBT 118/120), Arabic (Native)

SELECTED PUBLICATIONS

[0] **O. Alama***, D. Jariwala*, A. Bhattacharya*, W. Wang, S. Scherer "RADSeg: Unleashing Parameter and Compute Efficient Zero-Shot Open-Vocabulary Segmentation Using Agglomerative Models", 2026.

[1] S. Kim, **O. Alama**, D. Kurdydyk, J. Keller, W. Wang, Y. Bisc, S. Scherer "RAVEN: Resilient Aerial Navigation via Open-Set Semantic Memory and Behavior Adaptation" under review in (**ICRA**), 2026.

[2] **O. Alama**, A. Bhattacharya, H. He, S. Kim, Y. Qiu, W. Wang, C. Ho, N. Keetha, S. Scherer "RayFronts: Open-Set Semantic Ray Frontiers for Online Scene Understanding and Exploration" In (**IROS**), 2025

[3] C. Ho*, J. Zou*, **O. Alama***, S. Kumar, B. Chiang, T. Gupta, C. Wang, N. Keetha, K. Sycara, S. Scherer "Map It Anywhere: Empowering BEV Map Prediction using Large-scale Public Datasets" In (**Neurips**), 2024.

[4] Y. Yuan, **O. Alama**, J. Fei, J. Nelson, D. Ports, A. Sapio, M. Canini, N. Kim "Unlocking the Power of Inline Floating-Point Operations on Programmable Switches" In (**NSDI**), 2022.

PROFESSIONAL EXPERIENCE

Carnegie Mellon University - CMU — Pittsburgh, PA

Graduate Research Assistant- Airlab — Jan 2024 – Present

- Researching real time semantic scene representations for UAVs/UGVs in unstructured environments [0,2,3] and efficient ways of conducting scene-LLM integration for better reasoning and spatial understanding.
- Developing and testing mapping and navigation algorithms for multi-drone search and rescue systems [1].

Graduate Research Assistant- Artificial Intelligence Biometrics Center — Jan 2023 – May 2024

- Led the design of a proprietary multi-camera auto-checkout system solving product tracking and ReID.
- Led a proprietary produce detection and fine-grained classification project in which I created a semiautomated 3D scanning workflow that triggers DSLR cameras, segments items and performs 3D reconstruction. Wrote a Blender script to randomize reconstructed produce placement, lighting, and environment to synthesize a large (100K+) segmentation and detection dataset for produce. Used dataset to train a robust produce detection model.
- Upgraded the lab's computing infrastructure by custom building a GPU computing cluster with 48 RTX4090 GPUs saving the lab $100Ks of dollars by avoiding the purchase of commercially ready workstations/servers.

King Abdulaziz University – KAU Jeddah, Saudi Arabia
Lecturer Dec 2021 - July 2022

- Taught Structured Computer Programming in Matlab for 90 students.
- Conducted lab sessions for 23 students in Data Structures and Algorithms in Java.

Saudi Company for Artificial Intelligence – SCAI Riyadh, Saudi Arabia
Software Engineer Oct 2021 – Dec 2021

- Led a team of 3 to integrate breast cancer detection models into existing radiologist flow using DICOM.
- Designed and implemented a DICOM python server that collected mammograms directly from hospital modalities, fed them to the AI model, and sent a DICOM report back to the modalities.

King Abdullah University for Science and Technology – KAUST Thuwal, Saudi Arabia
Research Software Engineer Sep 2020 – Oct 2021

- Performed the consolidation, refactoring, and documentation, of more than 4 separately developed repositories into one coherent unit for the public release of SwitchML (Published in NSDI'21) resulting in further speedups and bug fixes. (10K+ LoC in C++)
- Wrote C++ CPU and CUDA GPU kernels tightly integrated with PyTorch distributed training code to evaluate the training speedup of inline floating-point operations on programmable switches [3].

Research Intern May 2019 – Aug 2019

- Designed and developed a deep learning communication simulator using SimPy to test various all-reduce scheduling techniques. (2K+ LoC in Python)
- Wrote layer-wise profilers to measure backward and forward pass times for models in PyTorch and Tensorflow

CERTIFICATES

- Blender 3 Essential Training – LinkedIn Learning Aug 2023
- Introduction to Machine Learning in Production – Coursera Apr 2022
- Fundamentals of Accelerated Computing with CUDA/C++ – NVIDIA Deep Learning Institute Oct 2020
- Machine Learning Engineer Nanodegree – Udacity Feb 2019

SELECTED ACADEMIC PROJECTS

Aug3D - Augmenting Large Scale Outdoor Datasets for Generalizable Novel View Synthesis
Carnegie Mellon University – CMU Spring 2024

- Improved generalizable novel view synthesis (PixelNeRF in particular) performance on outdoor scenes by reconstructing city wide meshes using traditional slow photogrammetry pipelines then creating new training samples by rendering different close ups of areas of interest (Individual buildings, blocks…).
- Tested methods of grouping aerial scans into coherent training samples for PixelNeRF showing that cross feature matching between the hundreds of images in a large aerial scan yields the best grouping.

Hadir – Automated Attendance Taking Using Face Recognition – Bachelor's Capstone
King Abdulaziz University – KAU Fall - Spring 2020

- Led a team of 3 to create a platform with a web interface that automates attendance taking in the university by utilizing frontal classroom cameras and face recognition using CNNs.
- Designed and implemented the MariaDB database, designed the website, trained the CNNs for face recognition, and setup the system on a RaspberryPi4.
- Awarded commercialization agreement by the university administration.

PillO – Smart Modular Pill Dispenser
King Abdulaziz University – KAU Fall 2019

- Led a team of 3 to design, program, and build a smart modular pill dispenser.
- Programmed an Arduino using C++ with 1.7K+ LoC to control the dispenser motors and its LCD + keypad interface.
- Designed the pill dispenser in Solid Works, tested the dispensing mechanism in a Cinema4D simulation, and finally 3D printed and assembled the pill dispenser stackable containers.