Joe Pappas

Agricultural and Biological Engineering
Graduate Student
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GitHub Profile
LinkedIn Profile

Education

•Purdue University *2022 - Present*
M.S. in ABE. USDA Fellow, Focus on fast databases for IoT, drones, and serverless computing. GPA: 4.0

•Ohio State University *2013-2017*
B.S. Computer Science and Engineering, focus in AI GPA: 3.5

Experience

•Department of Defense, Army Research Lab *June - August 2023*
Research Intern Aberdeen Proving Ground, MD

- Use ROS to implement SOTA detection algorithms to existing autonomous driving stack
- Train SOTA Deep Learning perception models using distributed training nodes
- Deploy perception models to be used on embedded devices using autonomous driving stack.
- Develop a contention aware framework for switching between perception algorithms to optimize between latency and accuracy with the available resources on the GPU.

•Purdue University *2022 - Present*
Research Assistant West Lafayette, IN

- Working as a US Department of Agriculture (USDA) Fellow in Dr. Somali Chaterji's ICAN lab, housed in the Department of Agricultural and Biological Engineering (ABE) and the Elmore Family School of Electrical and Computer Engineering (ECE). Click for more info.
- Hardening Redis as a cloud-hosted database for OPTIMUSCLOUD: Heterogeneous Configuration Optimization for Distributed Databases in the Cloud by hardening Redis for use as an in-memory database (on the cloud).
- Designing trajectories for UAVs for optimizing object detection for varying UAV height and varying target appearance rate. Leveraging Reinforcement Learning for finding optimal reward policy where the reward structure varies over time, such as to alleviate traffic congestion and improve traffic patterns.

•Prompt.io *2018-Present*
Technical Service Engineer, Manager Seattle

- Build custom implementations of the platform for current and prospective customers
- Performed duties of a Product Manager by handling product enhancement requests from all of prospective customers, existing customers, and internal sales team.
- Started up and manage the Support department to be a new, standalone business unit, that helps measure the effectiveness of our platform.
- Help at all points of the customer journey, from custom demos, to onboarding, to support in post signing.
- Started at the company as the ∼10th employee and helped grow the company to currently at 45 employees with primarily Angel funding.

•Liberty Mutual Insurance *2016-2018*
Software Engineer Seattle

- Evaluated and presented the migration process for integrating AWS Connect into the current on premise system to Leadership team.
- Integrate AWS Connect into the existing Contact Center solution with scalability as a main focus.
- Volunteer member of the PAL Improvements Committee (duties include conducting focus groups and using feedback to improve the hiring process for new hires).

Publications

- Akhil Bandarupalli, Sarthak Jain, Akash Melachuri, **Joseph Pappas**, Somali Chaterji. Drone-based Multi-Altitude Target Detection for Autonomous Surveillance, *DCOSS-IoT*, Accepted 2023; https://schaterji.io/publications/2023/vega/.
- **Joseph Pappas** Billy Geerhart, David Alexander, Peng Wang, Venkateswara Dasari, Somali Chaterji. Adaptive object detection algorithms for resource constrained autonomous robotic systems, *SPIE Defense and Commercial Sensing*, Accepted 2024.

Relevant Projects

•Contention aware framework of perception algorithms for the Army Research Lab *Summer 2023*

Summer 2023 Project with ARL

- ARL was interested in my colleague's paper Virtuoso (click for paper). I was tasked with implementing it into their existing autonomous driving stack.
- With no prior experience in ROS, I was able to take Virtuoso from a paper state to deployment ready in my three month term.
- Required benchmarking the ARL hardware to be able to work with the algorithm. This means profiling the performance of 4 object detection algorithms, with different algorithm parameters, with each setting of the GPU.

•EfficientNet Reimplementation *Fall 2022*

Demonstrates interest and aptitude in running computer vision algorithms on edge devices

- Reimplement and draw observations on the effectiveness of the EfficientNet Paper
- Findings include evaluating the effectiveness of finding and using scaling coefficients to scale up any neural net architecture
- project link

•Basic Transformer Implementation *Spring 2024*

Deep Learning class project

- Implement a small transformer model that can be trained with a single GPU for the NLP task
- Gain understanding in Cross-Attention and the K,Q,V matrices utilized in the Transformer architecture
- Compare this model with a BERT model using F1 score.

Technical Skills and Interests

Machine Learning/Deep Learning: Extensive experience with theory and practice of Deep Learning systems
Embedded Systems: ESP32 Feather Board, Semester-long investigation into embedded systems implications
Cloud technologies: AWS, Redis
Soft Skills: Team management
Areas of Interest: Machine Learning, Computer Vision, Reinforcement Learning, UAV Applications, Robotics, Sustainable Agriculture, IoT devices

Volunteer

•Microsoft TEALS, Taught Intro to Computer Science at Osborn High School in Detroit. *2021-2022*

•Ohio State University, Computational Memory Lab
developed and implemented neuroscience experiments in a lab headed by Per Sederberg. *2015-2016*

Achievements and Certifications

•Ironman 70.3 St. George, Utah Improved previous year's time by 48 minutes *Spring 2023*

•FAA Part 107 sUAS Certified Certified to fly UAVs in the United States *Fall 2022*

•Fundamentals of Reinforcement Learning Offered by University of Alberta, Coursera *Fall 2022*

•Ironman 70.3 Blue Ridge, Virginia Completed first Ironman 70.3 race *Summer 2022*