KARTHIK GARIMELLA

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EDUCATION

Washington University in St. Louis *Aug 2018 - Present*
Master of Science in Computer Engineering (expected May 2020)

Hendrix College, Conway AR *Aug 2013 - May 2017*
Bachelor of Arts in Physics (major) and Computer Science (minor)
GPA: 3.97, *summa cum laude*

RESEARCH

Energy Efficiency Optimization in Multi/Many-core Systems
MSc Thesis: Advised by Dr. Xuan 'Silvia' Zhang *Aug 2019 - Present*

- Examining both offline and online methods to create a policy mapping the state of a many/multi-core system (through hardware counters, etc) to a voltage/frequency value of each core while remaining within an allocated energy budget
- Building a pipeline within the SNIPER simulator environment to evaluate the efficacy of various RL methods using the SPLASH-2 and PARSEC benchmarks

Adversarial Machine Learning in Autonomous Vehicles
Drs. Yevgeniy Vorobeychik, Xuan Zhang, Ayan Chakrabarti, Chris Gill *Jan 2019 - Present*

- Discovered physically realizable attacks on end-to-end imitation learning agents within the CARLA simulator at both intersections and curved roads which caused the agent to incur infractions
- Built an automated testing environment to sweep the attack space efficiently using Bayesian optimization (grid search would take on the order of years)
- Github repository and arXiv preprint

PROJECTS

CARLA 2019 Autonomous Driving Challenge
Drs. Yevgeniy Vorobeychik, Xuan Zhang, Ayan Chakrabarti, Chris Gill *April 2019 - July 2019*

- Built an ensemble self-driving agent for the CARLA AD challenge whose inputs were front-facing camera image, high level command, and current speed to predict steering angle, throttle, and brake
- Placed top three in the challenge and invited to **CVPR 2019** to present our agent

Multi-Agent Pacman: Depth-Limited Expectimax
CSE 511A: Introduction to Artificial Intelligence *Fall 2018*

- Developed an evaluation function for the state of a Pacman game with active Ghost agents. Evaluated the state using distance to food pellets, distance to all ghosts, and number of scared ghosts (plus time remaining in scared state)
- Placed 3/125 students in a competition to build a robust evaluation function of Pacman states

WORK

NASA Jet Propulsion Laboratory - Pasadena, CA *May 2019 - Aug 2019*
Summer Intern

- Implemented an Elastic stack for the Physical Oceanography Distributed Active Archive Center (DAAC) within Docker containers for portability

- Developed in-house analysis of log distribution metrics to predict data pattern usage across users and datasets

Oak Ridge National Laboratory - Oak Ridge, TN *Sep 2017 - May 2018*
Post Bachelor Research Associate

- Re-implemented and optimized the Daymet Single Pixel Tool using Python's netcdf-4 package to reduce overhead of data retrieval.
- Produced data visualization tutorials and demonstrations for the DAAC. (work can be seen here: https://github.com/ornldaac/daymet-normals-anomalies-tiles)

NASA Goddard Space Flight Center - Greenbelt, MD *May 2017 - Aug 2017*
Summer Intern

- Built annotated Jupyter Notebooks from the Goddard Earth Sciences Data and Information Services Center (GES DISC) DAAC to demonstrate analysis of satellite data
- Containerized the Jupyter Notebooks using Docker, and deployed Docker container using Google Cloud Platform. (work can be seen here: http://github.com/karthenjamin/data_recipes)

National Radio Astronomy Observatory - Socorro, NM *May 2016 - Aug 2016*
REU: Summer Intern

- Implemented detection algorithms for excising Radio Frequency Interference (RFI) from the Very Large Array Telescope by locating RFI using gradients, localized statistics, and radial-fitting algorithms
- Incorporated these algorithms into the Common Astronomy Software Applications (CASA)

TEACHING

Engineering Undergraduate Student Services Tutor *Jan 2019 - May 2019*
Introduction to Machine Learning (Washington University)

- Assisted students in learning VC theory, bias-variance tradeoff, generalization, and overfitting

General Physics Teaching Assistant *Aug 2015 - Dec 2016*
General Physics I and II (Hendrix College)

- TA for students learning general physics in a workshop/lab environment. Assisted students with the physics problem of the day, discussed concepts of physics, and helped students write code for simulating physics experiments (python). Wrote the solutions and graded the assigned homework

SKILLS

languages	Python, bash, working knowledge of C++/C, x86-64 assembly, R, Java, Rust, Haskell
packages	numpy, pytorch, tensorflow, keras, matplotlib, cv2, sklearn

HONORS

Barry M. Goldwater Scholarship - Honorable Mention 2016
Captain of Hendrix Tennis Team (All-Tournament, All-Sportsmanship Team Honors, ITA Scholar)
Recipient of the Arkansas Governors Distinguished Scholarship
Richard Rolleigh Undergraduate Research Award 2017
Member of Phi Beta Kappa (Arkansas Chapter)
Society of Physics Students Outstanding Presentation Award 2017
Honorable Mention in Mathematical Contest in Modeling 2016 (top 25% international)
Joe G. Robbins Physics Award for Outstanding Students 2015