

Akshay DHARMAVARAM

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EDUCATION

Carnegie Mellon University (CMU), Pittsburgh, USA

CGPA: 4.22/4.00

> M.S. in Robotics [2022]

Thesis: Learning Latent Graphs in Multi-Agent Teams

Birla Institute of Technology and Science, Pilani (BITS), Goa, India

CGPA: 9.10/10.00

> B.E. (Hons.) Computer Science [2020]

Thesis: Convergence of Hierarchical Policy Gradients

> B.E. (Hons.) Electrical and Electronics Engineering [2020]

Thesis: Continuous Control using Continuous Options

PUBLICATIONS

Dharmavaram, A.; Riemer, M.; Bhatnagar, S. "Hierarchical Average Reward Policy Gradient Algorithms (Student Abstract)" AAAI 2020: In Proceedings of the Thirty-Fourth AAAI Conference on Artificial Intelligence

SELECTED RESEARCH EXPERIENCE

Indian Institute of Science(IISc), Bangalore | Stochastic Systems Laboratory

MAY 2019 - MAY 2020

Research Assistant | Advisor: Prof. Shalabh Bhatnagar, Chairman of the Dept. of Computer Science and Automation

> CS thesis: Hierarchical Natural Option-Critic Algorithms

- > Proved the convergence of hierarchical average reward policy gradient algorithms, which learn long term temporal abstractions for achieving the globally optimal sequence of rewards, using the ODE based approach
- > Increased the sample-efficiency by 2.8x by incorporating natural gradients using K-FAC
- > Increased throughput by over 100x by parallelizing the sampling procedure over 128 processors
- > Created 3 specialized environments with "traps" to illustrate our framework's enhanced credit-assignment capabilities

> EEE thesis: Continuous Control using Continuous Option Spaces

- > Derived the deterministic hierarchical policy gradient for continuous action spaces and discrete option spaces
- > Developed a novel framework that alleviates the option-collapse issue by using continuous option spaces

Birla Institute of Technology and Science, Pilani

MAY 2018 - MAY 2019

Research Assistant | Advisor: Prof. Bharat M. Deshpande, Associate Dean of Academic Graduate Studies & Research Division

- > Formulated a novel mapping from the policy space of Reinforcement Learning (RL) algorithms to the space of hierarchical cluster trees in order to learn a clustering policy that can dynamically conform to accommodate an influx of new data points
- > Created a customized environment that can interface any RL algorithm with any clustering dataset
- > Used the DDPG algorithm to obtain for the first time the ground truth clustering strategy for an adapting synthetic dataset

Central Electronics Engineering Research Institute (CEERI), Pilani | Control and Automation

MAY 2017 - JULY 2017

Research Intern | Advisor: Dr. Jagdish Lal Raheja, Chief Scientist and Head of Control and Automation

> 1st Project: Real-time human detection and distance estimation using a Xilinx ZC702 board

- > Reduced the time taken for humanoid detection by 16x by employing support vector machines, histogram of oriented gradients, and epipolar geometric principles.

> 2nd Project: Image segmentation using Hidden Markov Models (HMM)

- > Employed Markov Chain Monte Carlo Algorithms for learning a Hidden Markov Model (HMM) for image segmentation
- > Pipelined the HMM into the principal image-stitching code-base, which was used for image stitching in VR

LEADERSHIP AND PROFESSIONAL DEVELOPMENT

International Institute of Information Technology (IIIT), Hyderabad, India

JULY 2018

Computer Vision and Machine Learning Summer School Scholar

- > Handpicked for a graduate summer school taken by researchers from labs such as Facebook AI and Microsoft Research.

EEE F313 Analog and Digital VLSI Design | CS F111 Computer Programming

AUGUST 2018 - MAY 2019

Senior Teaching Assistant, managed 5 Junior TA's and was responsible for 70 students

- > Conducted both theoretical and practical recitation sessions for 3 hrs every week and also graded the final design projects

HONORS AND AWARDS

[2019] Summer Research Scholarship for top 3 students | BITS Alumni Affairs

[2018] Excellency in Teaching Assistantship awarded to the top 1% of TA's | BITS, Pilani

[2017] Probabilistic Graphical Models Honors Specialization [certificate] (completed as a sophomore) | Coursera

[2016] Merit-based 50% Fee Waiver for top 2% academically proficient freshmen | BITS, Pilani