Darshan Patil

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Research Interests

Deep Learning, Optimization, Reinforcement Learning, Lifelong Learning, Reset-Free Reinforcement Learning

Education

Mila/Université de Montréal, Montréal   September 2020 - Present
PhD, Fastracked from MS, Computer Science
Advisor: Sarath Chandar
Current GPA: 4.13

Carnegie Mellon University, Pittsburgh   August 2016 - May 2018
Bachelor of Science, Computer Science; Minor in Machine Learning
GPA: 3.65, University Honors

UC San Diego, La Jolla   September 2014 - June 2016
Computer Science; Transfer to CMU in 2016
GPA: 3.83

Publications

[1] **Toward Debugging Deep Reinforcement Learning Programs with RLExplorer**
Rached Bouchoucha, Ahmed Haj Yahmed, Darshan Patil, Janarthanan Rajendran, Amin Nikanjam, Sarath Chandar, Foutse Khomh
International Conference on Software Maintenance and Evolution (ICSME), 2024.

[2] **Exploring the Plasticity of Neural Network for NLP Tasks in Continual Learning**
Maryam Hashemzadeh, Pranshu Malviya*, Darshan Patil*, and Sarath Chandar
Conference on Lifelong Learning Agents (CoLLAs) Workshop Track, 2024.

[3] **Intelligent Switching for Reset-Free RL**
Darshan Patil, Janarthanan Rajendran, Glen Berseth, Sarath Chandar
International Conference on Learning Representations (ICLR), 2024.

[4] **An Empirical Investigation of the Role of Pre-training in Lifelong Learning**
Sanket Vaibhav Mehta, Darshan Patil, Sarath Chandar, Emma Strubell
Journal of Machine Learning Research (JMLR), 2023.
Presented at Neural Information Processing Systems (Neurips), 2023.

[5] **Disentangling 3D Prototypical Networks for Few-Shot Concept Learning**
Mihir Prabhudesai*, Shamit Lal*, Darshan Patil*(equal contribution), Hsiao-Yu Tung, Adam W Harley, Katerina Fragkiadaki
International Conference on Learning Representations (ICLR), 2021.
Initial version appeared in Neurips 2020 Object Representations for Learning and Reasoning Workshop (Spotlight).

[6] **Towards modular and programmable architecture search**
Renato Negrinho, Darshan Patil, Nghia Le, Daniel Ferreira, Matthew Gormley, Geoffrey Gordon
Neural Information Processing Systems (Neurips), 2019.

Manuscripts in Progress/Under Review

[1] **CoPeP: Benchmarking Continual Pretraining for Protein Language Models**
Darshan Patil, Pranshu Malviya, Mathieu Reymond, Quentin Fournier, and Sarath Chandar

[2] **Experimental Design for Nonstationary Optimization**
Darshan Patil, Pranshu Malviya, Maryam Hashemzadeh, and Sarath Chandar

Open Source Projects

RLHive
Advisor: Sarath Chandar

A reinforcement learning framework that is designed for research. Emphasizes readability and the ability to implement research ideas quickly. Contains benchmarked implementations of popular RL algorithms as well as support for single agent, multi-agent, parallel environment, and recurrent methods.
Repo: `https://github.com/chandar-lab/RLHive`

DeepArchitect
Advisor: Matt Gormley

A framework to allow for writing modular, reusable components for neural architecture search experiments. Contains several state-of-the-art architecture search spaces and searchers. Also allows for distributed computation with Kubernetes to run experiments at large scale.
Repo: `https://github.com/negrinho/deep_architect`

Research Experience

Carnegie Mellon University – *Research Associate*   August 2019 - August 2020
Advisor: Katerina Fragkiadaki

Worked on language grounding of concepts in images and videos using 3D feature tensors, causal learning, and program induction/search. Showed 3D geometry based representations that were disentangled improved performance on one shot concept learning.

Carnegie Mellon University – *Research Associate*   August 2018 - May 2019
Advisor: Tom Mitchell

Iterated on previous version of Learning from Instruction Agent (LIA). Developed methods to teach compositional concepts to arbitrary classes of parametric models using context based parameter generation.

Teaching Assistantships

[**INF 6953PE**] Deep Learning Dynamics   École Polytechnique de Montréal – Winter 2025
[**IFT 6163**] Reinforcement Learning for Real-World Agents   Université de Montréal – Winter 2024
[**INF8250AE**] Reinforcement Learning   École Polytechnique de Montréal – Fall 2023
[**CSE 11**] Introduction to Computer Science and Object-Oriented Programming   UC San Diego – Spring 2015

Work Experience

Facebook – *Software Engineering Intern*   June 2016 - August 2016
Created several features to increase engagement on the Facebook iOS app and ran experiments to determine public viability and future iterations of said features.

Applovin – *Software Engineering Intern*   June 2015 - September 2015
Designed and implemented in Java a replacement for a system handling incoming requests from Applovin SDK, resulting in a 25% improvement in performance.

Service

Reviewing: Neurips (2021, 2022, 2023, 2025 (top reviewer)), ICLR (2022, 2023, 2025, 2026), ICML (2024), CoLLAs (2022, 2023, 2024, 2025), EMNLP NILLI Workshop (2022)
CRL Graduate Studies Application Assistance Program for Underrepresented Students in AI (2023, 2024, 2025)
CRL High School Internship Program Instructor (2025)

Relevant Coursework

Introduction to Machine Learning (PhD), Deep Learning, Architectures for Never Ending Learning, Algorithms in the Real World, Topics in Theoretical Cryptography, Probabalistic Graphical Models, Self-supervised Learning, Continual Learning, Brain-Inspired AI, Reinforcement Learning, Robot Learning

Technical Skills

Languages:
Python, C/C++, Java, SML, OCaml, Objective-C, Matlab, R, OCaml.
Frameworks and Tools:
Jax, Pytorch, Tensorflow, RLHive, DeepArchitect, Kubernetes, MPI, Docker

Awards and Scholarships

University of Montreal AI Scholarship (2024)

University of Montreal Excellence Scholarship (2023, 2024 (declined))

University of Montreal Bourse A Scholarship for Accelerated Passage to PhD (2021)

CMU School of Computer Science University Honors (2018)

Dean's List (CMU, Spring 2017)

Provost Honors (UCSD, all quarters)

ACM Southern California Regional 2015 (Top 15 finish)

UCSD ACM Programming Team Tryout Contest (Top 10 finish)

ACM Southern California Regional 2014 (Top 10 finish)

Winter 2015 WIC Programming Competition (1st place)