

Gautham Vasan

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<https://gauthamvasan.github.io>

EDUCATION

UNIVERSITY OF ALBERTA

PH.D IN STATISTICAL MACHINE LEARNING

Committee: Dr. A. Rupam Mahmood (advisor), Dr. Richard S. Sutton, Dr. Matthew E. Taylor
Sept 2020 to Present | Edmonton, AB, Canada

M.Sc (THESIS) IN COMPUTING SCIENCE

Thesis Advisor: Dr. Patrick M. Pilarski | Sept 2015 to Sept 2017 | Edmonton, AB, Canada

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

B.TECH IN INSTRUMENTATION AND CONTROL ENGINEERING

Project Advisors: Dr. V. Sankaranarayanan, Dr. G. Saravana Ilango | July 2011 to June 2015 | Tiruchirappalli, TN, India

EMPLOYMENT

VISITING RESEARCHER | ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG

Neurobotics lab, Hosted by Dr. Joschka Boedecker | DAAD Scholar | Freiburg, Germany | March 2023 to June 2023

- Deep Reinforcement Learning (RL) research for integrating very noisy electroencephalogram (EEG) signals decoded from a patient's brain, which includes preference and failure information into a framework for skill learning on assistive robots.
- Developed a novel learning algorithm called Composite Soft Actor Critic that can better handle noisy reward signals.

MACHINE LEARNING RESEARCHER | KINDRED AI, PART OF OCADO GROUP

Artificial Intelligence Research Team | Toronto, Canada | Sep 2017 to Aug 2020

- Designed, implemented and evaluated learning algorithms and robot infrastructure as part of Kindred's research and publication efforts.
- Devised Artificial Intelligence (AI) techniques for SORT, a piece-picking robot that grasps, scans and stows items in warehouses for clothing stores like GAP and American Eagle.
- Supported design and development of **SenseAct**, an open-source computational framework for physical robot learning tasks. SenseAct facilitates the easy, systematic design of robotic tasks and reproducible real-world reinforcement learning.
- Developed **RLScan**, which uses deep reinforcement learning to learn a closed-loop control scanning policy conditioned on a real-time video feed. It was trained end-to-end in production, learning from a fleet of robots across multiple warehouses.
- RLScan achieved optimal barcode scanning behavior for handling complex product assortments. This is among the **first successful demonstrations of vision-based deep RL in warehouse automation**.

ACHIEVEMENTS

- **AAMAS Scholarship** to present at the Doctoral Consortium (2024).
- Awarded the **DAAD-Stiftung UNICORE Scholarship (2022)** for a three-month research visit to the University of Freiburg.
- Awarded the **DAAD AINet Postdoctoral Networking Fellowship (2022)** to visit and foster collaborations with research labs in Germany.
- Awarded the **University of Alberta Doctoral Recruitment Scholarship** Fall 2020/21.
- Winner of the **2017 M.Sc Outstanding Thesis Award** in Computing Science at the University of Alberta.
- **Phase - 1 Winners and Finalist** at the **Texas Instruments Innovation Challenge India Design Contest - 2014** for the project titled 'A Control Strategy for an Autonomous Robotic Vacuum Cleaner for Solar Panels'.
- Certificates of distinction in International and National Math, Science and Cyber Olympiads.

ACADEMIC EXPERIENCE

GRADUATE RESEARCH ASSISTANT FELLOW | UNIVERSITY OF ALBERTA

RLAI Lab, University of Alberta | 2016-2017, Sept 2020 to Present

- Design and development of Reinforcement Learning (RL) algorithms and continual learning systems for real-world robots.
- Developed learning methods that would allow an amputee to use their non-amputated arm to teach their prosthetic arm how to move through a wide range of coordinated motions and grasp patterns.
- Collaborated on a medical study to assess functional gain with the use of assistive robots in patients affected by stroke or spasticity. Built tools to analyze the recorded sensory information and set up a robot interface for 12 patients.

TECHNICAL ADVISEMENT - CLIENT COACHING | AMII

Work Integrated Learning Opportunity | Alberta Machine Intelligence Institute (Amii), Canada | 2023

- Attended client coaching sessions with Amii research scientists to provide coaching support for various start-ups.
- Conducted independent research and consultant report writing tasks within the scope of the project.

TEACHING EXPERIENCE

- CMPUT 340: Introduction to Numerical Methods (Winter 2024)
- CMPUT 653: Real-Time Policy Learning (Fall 2023)
- CMPUT 365: An Introduction to Reinforcement Learning (Winter 2021, Winter 2022, Fall 2022)
- CMPUT 174: Introduction to the Foundations of Computation I (Fall 2015, Winter 2016, Fall 2020)

PUBLICATIONS

- [Gautham Vasan](#), Yan Wang, Fahim Shahriar, James S. Bergstra, A. Rupam Mahmood, **Revisiting Constant Negative Rewards for Goal-Reaching Tasks in Robot Learning** RLC 2024
- [Gautham Vasan](#). **Autonomous Skill Acquisition for Robots Using Graduated Learning**. AAMAS 2024
- Bram Grooten, Tristan Tomilin, [Gautham Vasan](#), Matthew E. Taylor, A. Rupam Mahmood, Meg Fang, Decibal Mocanu, **MaDi: Learning to Mask Distractions for Generalization in Visual Deep Reinforcement Learning**. AAMAS 2024
- [Gautham Vasan](#), Yan Wang, Fahim Shahriar, James S. Bergstra, A. Rupam Mahmood, **Learning Sparse Reward Tasks on Real Robots From Scratch**, RAP4 Robotics Workshop, ICRA 2023
- Fengdi Che, [Gautham Vasan](#), A. Rupam Mahmood, **Correcting discount-factor mismatch in on-policy policy gradient methods**, ICML 2023
- Yan Wang*, [Gautham Vasan](#)*, A. Rupam Mahmood, **Real-Time Reinforcement Learning for Vision-Based Robotics Utilizing Local and Remote Computers**, ICRA 2023
- Dmytro Korenkevych, A. Rupam Mahmood, [Gautham Vasan](#), James Bergstra, **Autoregressive policies for continuous control deep reinforcement learning**, IJCAI 2019
- A. Rupam Mahmood, Dmytro Korenkevych, [Gautham Vasan](#), William Ma, James Bergstra, **Benchmarking reinforcement learning algorithms on real-world robots**, CoRL 2018
- [Gautham Vasan](#), Patrick M. Pilarski, **Context-Aware Learning from Demonstration: Using Camera Data to Support the Synergistic Control of a Multi-Joint Prosthetic Arm**, IEEE BioRob 2018
- [Gautham Vasan](#), Patrick M. Pilarski, **Learning from Demonstration: Teaching a Myoelectric Prosthesis with an Intact Limb via Reinforcement Learning**, IEEE ICORR 2017
[Highlights] - Selected among the top 29 out of 257 accepted papers for oral presentation
- Kenny Young, [Gautham Vasan](#), Ryan Hayward, **NeuroHex: A Deep Q-learning Hex Agent**, Computer Games Workshop at IJCAI 2016
- Juhi Ajmera, Siddharthan P Rajasekaran, Ramaravind K. M., [Gautham Vasan](#), Naresh Balaji Ravichandran and V. Sankaranarayanan, **Autonomous visual tracking and landing of a quadrotor on a moving platform**, IEEE ICIIP 2015
- [Gautham Vasan](#), Naresh Balaji Ravichandran, Gowtham Kumar T.S.B, Aravind Govindan, G Saravana Ilango **A Control Strategy for an Autonomous Robotic Vacuum Cleaner for Solar Panels**, Conference by Texas Instruments 2014

PEER-REVIEWED ABSTRACTS

- [Gautham Vasan](#), Patrick M. Pilarski, **Mirrored Bilateral Training of a Myoelectric Prosthesis with a Non-Amputated Arm via Actor-Critic Reinforcement Learning**, Reinforcement Learning and Decision Making (RLDM) 2017.
[Highlights] - Selected among the top 16 out of 200+ accepted papers for oral presentation.
- Craig Sherstan, Marlos C. Machado, Jaden Travník, Adam White, [Gautham Vasan](#), Patrick M. Pilarski, **Confident Decision Making with General Value Functions**, Reinforcement Learning and Decision Making (RLDM) 2017.

THESIS

- [Gautham Vasan](#), Examining Committee: Patrick M. Pilarski, Martha White and K Ming Chan, **Teaching a Powered Prosthetic Arm with an Intact Arm Using Reinforcement Learning**, M.Sc Thesis, University of Alberta, Edmonton, AB, Canada, Aug 29th, 2017.
[Highlights] - Won the M.Sc Outstanding Thesis Award in Computing Science.

LANGUAGES, TOOLS & LIBRARIES

Most familiar:

Python • Pytorch • ROS • Matlab

Familiar

C++ • Jax • Embedded C • Go • Tensorflow • Docker

TRAVEL AWARDS & SCHOOLS

- **Attended the 2017 edition of the Deep Learning Summer School** organized by Dr. Graham Taylor, Dr. Aaron Courville and Dr. Yoshua Bengio at the **University of Montreal**, Canada. Acceptance rate: 20%
- Won a travel fellowship and various prizes at **Hack the North 2016**, Canada's biggest hackathon at the University of Waterloo. Acceptance rate: 20%

PROFESSIONAL ACTIVITIES

REVIEWING

IEEE ICDL 2024 | DLRL Summer School 2023 | NeurIPS 2023 | IROS 2023 | IROS 2020 | IEEE BioRob 2018

ADVISING

- Mentored five students (undergraduate and masters) with their robot learning research.

COMMUNITY SERVICE

- **RESEARCH VOLUNTEER**, The Hospital for Sick Children (SickKids) (02/2019 - 08/2019).
- **TREASURER**, Computing Science Graduate Students' Association (CSGSA) at the University of Alberta (04/2016 - 04/2017).
- **HEAD OF TREASURY, FESTEMBER'14** the annual International cultural festival of NIT Trichy. I handled the finances of the festival worth INR 20 Million and executed several key decisions with regards to budget, expenditure, resource management for teams, etc.
- **RESEARCHER AT SPIDER**, The official R&D club of NIT Trichy - We conducted tech talks and workshops focusing on microcontrollers and embedded programming.