EDUCATION

UNIVERSITY OF ALBERTA

M.Sc (Thesis) in Computing Science

Thesis Advisor: Dr. Patrick M. Pilarski | Sep 2017 | Edmonton, AB, Canada • Cum. GPA: 3.90/4.0

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

B.Tech in Instrumentation and Control Engineering

Project Advisor: Dr. V. Sankaranarayanan | First Class | May 2015 | Tiruchirappalli, TN, India • Cum. GPA: 8.40/10.0

EXPERIENCE

MACHINE LEARNING RESEARCHER | KINDRED SYSTEMS INC

Artificial Intelligence Research Team | Toronto, Canada | Sep 2017 to Present

- Designed, implemented and evaluated learning algorithms and robot infrastructure as a part of the research and publication efforts at Kindred.
- Implemented AI and control methods for SORT, a piece-picking robot that grasps, scans and stows items.
- Developed Deep Reinforcement Learning (RL) techniques to SORT's improve scans per hour (a key performance indicator) and overall throughput at e-commerce fulfillment centres.
- Supported design and development of SenseAct, an open-source computational framework for physical robot learning tasks.

RESEARCH VOLUNTEER | THE HOSPITAL FOR SICK CHILDREN (SICKKIDS)

Computer Vision Research | Toronto, Canada | May 2019 to Present

• Developing neural network models capable of segmenting and calculating Wilm's tumor volume from CT scan images.

RESEARCH ASSISTANT | BLINC AND RLAI LAB

Labs headed by Dr. Patrick M. Pilarski and Dr. Richard S. Sutton, University of Alberta | May 2016 to Aug 2017

- Developed Actor-Critic Reinforcement Learning (ACRL) 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. This study included 3 able-bodied subjects and 1 trans-radial amputee.
- Developed interfaces for human robot interaction using Delsys Trigno, Thalmic Myo, CyberGlove and the Bento Arm.
- 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.

TEACHING ASSISTANT | CMPUT 174: Introduction to the Foundations of Computation I

Instructors: Dr. Duane Szafron, Dr. Sadaf Ahmed and Dr. Jorg Sander, University of Alberta | Sept 2015 to April 2016

• A problem-based intro to computing science to focus on expressing problems precisely, solving them algorithmically by showing how to construct a solution, and then implementing that solution by writing a program using python.

ACHIEVEMENTS

- Winner of the 2017 M.Sc Outstanding Thesis Award in Computing Science at the University of Alberta.
- Fully funded M.Sc (Thesis) 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.
- 99th percentile in the Joint Entrance Examination (JEE) and All India Engineering Entrance Examination (AIEEE) 2011 among 1.5 million candidates

PUBLICATIONS

- Dmytro Korenkevych, A. Rupam Mahmood, <u>Gautham Vasan</u>, James Bergstra, **AUTOREGRESSIVE POLICIES FOR CONTINUOUS CONTROL DEEP REINFORCEMENT LEARNING**, In Proceedings of the 28th International Joint Conference on Artificial Intelligence, 2019.
- A. Rupam Mahmood, Dmytro Korenkevych, <u>Gautham Vasan</u>, William Ma, James Bergstra, **Benchmarking Reinforcement Learning Algorithms on Real-World Robots**, In Proceedings of the 2nd Annual Conference on Robot Learning 2018.
- <u>Gautham Vasan</u>, Patrick M. Pilarski, **Context-Aware Learning From Demonstration: Using Camera Data to Support the Synergistic Control of a Multi-Joint Prosthetic Arm**, 7th IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob), August 26-29, Enschede, The Netherlands, 2018. 8 pages.
- <u>Gautham Vasan</u>, Patrick M. Pilarski, **Learning from Demonstration: Teaching a Myoelectric PROSTHESIS WITH AN INTACT LIMB VIA REINFORCEMENT LEARNING**, Proc. of the 2017 IEEE International Conference on Rehabilitation Robotics (ICORR). London, United Kingdom, 2017.

[Highlights] - Selected among the top 29 out of 257 accepted papers for oral presentation.

- Kenny Young, <u>Gautham Vasan</u>, Ryan Hayward, **NeuroHex**: A **Deep Q-Learning Hex Agent**, Computer Games Workshop at IJCAI 2016, New York City, NY, USA, July 9th, 2016.
- Juhi Ajmera, Siddharthan P Rajasekaran, Ramaravind K. M., <u>Gautham Vasan</u>, Naresh Balaji Ravichandran and V. Sankaranarayanan, <u>Autonomous visual tracking and landing of a quadrotor on a moving Platform</u>, 2015 Third International Conference on Image Information Processing (ICIIP), Waknaghat, 2015, pp. 342-347.
- <u>Gautham Vasan</u>, 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, Texas Instruments India Educators Conference, IEEE Xplore, Bangalore, India, April 4th, 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, 2017 Multi-disciplinary Conference on Reinforcement Learning and Decision Making, Ann Arbor, MI, United States, 2017.

[Highlights] - Selected among the top 16 out of 200+ accepted papers for oral presentation.

• Craig Sherstan, Marlos C. Machado, Jaden Travnik, Adam White, <u>Gautham Vasan</u>, Patrick M. Pilarski, **CONFIDENT DECISION MAKING WITH GENERAL VALUE FUNCTIONS**, 2017 Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM). Ann Arbor, MI, United States, 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.

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%

LANGUAGES, TOOLS & LIBRARIES

Most familiar:

Python • Pytorch • C++ • ROS • Matlab • Tensorflow • Keras

Over 2000 lines: Embedded C • Go • Assembly • Theano

RELEVANT COURSEWORK

GRADUATE: Reinforcement Learning in Artificial Intelligence | Introduction to Machine Learning | Convolutional Neural Nets for Image Processing | Applications of Reinforcement Learning: Actor-Critic Algorithms | Medical Robotics and Computer Assisted Surgery

UNDERGRADUATE: Linear Algebra and Probability Theory | Control Systems | Logic and Distributed Control | Numerical Methods | Signals and Systems | Digital Signal Processing | Biomedical Instrumentation | Process Control | Sensors and Transducers | Circuit Theory | Linear Integrated Circuits | Data Structures and Algorithms | Computer Networks | Neural Networks and Fuzzy Logic

LEADERSHIP EXPERIENCE

- 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.