Nishanth Anand

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NishanthVAnand

Education

2019-Present **Ph.D. in Computer Science**, *McGill University, Montreal, Canada*, CGPA: **4.0/4.0**.

2017-2019 **M.Sc. in Computer Science**, *McGill University, Montreal, Canada*, CGPA: **3.92/4.0**.

2011-2015 **B.E. in Telecommunications Engineering**, *PESIT (now PES University), Bengaluru, India*, CGPA: **9.0/10.0**.

Publications

ICML 2021 **Nishanth Anand**, Doina Precup, *Preferential Temporal Difference Learning*. [PDF]

2019 **Nishanth Anand**, *Temporal Credit Assignment via Traces in RL, M.Sc. thesis*. [PDF]

RLDM 2019 Pierre Thodoroff*, **Nishanth Anand***, Lucas-Page Caccia, Doina Precup, Joelle Precup, *Recurrent Value Functions*. [PDF] (Also accepted at SPiRL workshop, ICLR 2019).

ADCOM 2016 HS Karthik, **Nishanth Anand**, J. Manikandan, *Stock Market Prediction using Optimum Threshold based Relevance Vector Machines*. [PDF]

INDICON 2015 **Nishanth Anand**, J. Manikandan, *Sparse representation using optimum threshold based relevance vector machine*. [PDF]

INDICON 2015 **Nishanth Anand**, J. Manikandan, *SAR image compression using Relevance Vector Machines*. [PDF]

Academic Research Experience

Sept 2019 -Present **Ph.D. Thesis**, *McGill University and Mila*, Montreal, Canada.
- Advised by Prof. Doina Precup.
- Developed Preferential Temporal Difference Learning, a method to estimate value function in the presence of state preferences.
- Researching and developing a novel value-based method for continual reinforcement learning.

Jan 2018 - Aug 2019 **Master's Thesis**, *McGill University and Mila*, Montreal, Canada.
- Developed Recurrent Learning for Reinforcement Learning, a novel deep reinforcement learning method to compute value function.
- Unified various eligibility traces in reinforcement learning as Infinite Impulse Response (IIR) filters and demonstrated its advantages empirically.

Sept 2013 - May 2015 **Bachelor's degree project**, *CORI lab and PES University*, Bengaluru, India.
- Introduced an optimum threshold based pruning for relevance vector machines and applied it on image and stock market datasets.

Industry Experience

July 2015 - June 2017 **Data Scientist**, *Fractal Analytics*, Bengaluru, India.
- Researched and developed AI based solutions to solve client's business problems.
- Successfully completed several POC projects and applied the solution methods on the real world problems.

Skills & Abilities

Languages Python

Technologies Pytorch, Numpy, Git

Selected Projects

Feb 2020 - April 2020 **Matrix Splitting Methods for Prediction in RL**, *Course project*, Excursions in Reinforcement Learning.
- Developed sample-based counterparts of Gauss-Seidel, Successive Over-Relaxation, and Richardson's matrix splitting methods.
- Some of these methods had better empirical properties than the traditional temporal difference learning.

Feb 2019 - April 2020 **IIR Filters as a General Framework for Eligibility Traces**, *Course project*, Deep Learning Theory.
- Generalized several versions of eligibility traces in reinforcement learning using the IIR filters framework.
- Demonstrated the empirical benefits of this framework on toy tasks in control setting.

Dec 2015 - April 2017 **Optimizing Campaign Management**, *Fractal Analytics*, Bengaluru, India.
- Developed a reinforcement learning based solution for a financial firm which assisted in targeted campaigning.
- With this technique, customers received personalized offers which increased the sales up to 10%.

Mar 2016 - Sept 2016 **Inventory Management**, *Fractal Analytics*, Bengaluru, India.
- Implemented a forecasting model for inventory replenishment using artificial neural networks.
- The algorithm ensured that the inventory was never out of stock while accounting for the storage costs.

Academic Activities

June-July 2019/2020 **Teaching Assistant at AI4Good Summer Lab**, *Mila*, Montreal.
- Assisted summer school attendees on various topics in machine learning, deep learning, and reinforcement learning.
- Supervised a team of 3 students during the project phase.

2017-2020 **Teaching assistant at McGill University**.
- Applied Machine Learning (Fall 2021), Introduction to Reinforcement Learning (Winter 2020), Introduction to Machine Learning (Fall 2018), Computers and Society (Winter 2021), Algorithms and Data Structures (Winter 2018), and Introduction to Operating Systems (Fall 2017)

May 2020 - present Co-organizer of **the RL sofa meeting**, a weekly meeting to present ongoing projects in reinforcement learning at Mila, Montreal.

July 2019 Attended **DLRL Summer School 2019** at Edmonton, Canada.

- **Reviewer**, *Mila Paper swap*, Mila, Montreal.

Talks

July 2020 *TD(λ) Convergence Proof with Function Approximator*, RL theory reading group, Mila.

July 2020 *Q-learning and Deep Q-learning*, Lecture, AI for good summer school.

June 2020 *Preferential Temporal Difference Learning*, RL sofa meeting, Mila.

April 2020 *Introduction to Deep Reinforcement Learning*, Guest Lecture, PES University.

Jan 2020 *Dynamic Programming in Reinforcement Learning*, Lecture, COMP-767, McGill University.

Nov 2019 *Additive Approach to Lambda Returns*, RL sofa meeting, Mila.

Oct 2019 *Meta Gradient Reinforcement Learning*, RL theory reading group, Mila.

May 2019 *Advances in Deep Reinforcement Learning*, Lecture, MMA, McGill University.

March 2019 *Recurrent Value Functions*, RL sofa meeting, Mila.

Relevant Coursework

Graduate Reinforcement Learning, Excursions in Reinforcement Learning, Machine Learning, Probabilistic Graphical Models, Mathematical Foundations for Machine Learning, Theoretical Principles of Deep Learning, Probabilistic Analysis of Algorithms, Matrix Computation.

Undergrad (selected) Information theory, Signals and Systems, VHDL, Wireless Communications, Micro Controllers, Control Systems, Linear Algebra, Calculus, Probability.

Honors and Awards

2019 -	Graduate award to pursue Ph.D., McGill University.
2018-2019	Graduate award to pursue M.Sc., McGill University.
2012-2015	Recipient of MHRD scholarship for excellent academic performance.
2011-2015	Recipient of distinction award in all the 8 terms during undergraduate studies.

Test Scores

Mar 2016	Scored **316/340** in GRE General test with **170/170** in Quantitative Reasoning and 146/170 in Verbal Reasoning.
2011	Secured a rank of **1595 out of** $\sim$**100k** in Karnataka CET, a state-level engineering entrance exam.
2011	Secured a rank of **985 out of** $\sim$**50k** in COMED-K, a state-level engineering entrance exam.
2011	Scored **100/100** in Physics, Chemistry and **99/100** in Mathematics in the state-level class 12 exam.

Personal Information

Languages	English, Kannada, Hindi, Telugu
Hobbies	Reading, Board games