Akilesh Badrinaaraayanan
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Education

Université de Montréal / Mila - Quebec AI Institute Sep'18 - present
M.Sc. by research in Artificial Intelligence, GPA: 4.3/4.3
Research Advisor - Prof. Aaron Courville

Indian Institute of Technology, Hyderabad (IIT-Hyderabad), India Aug'13 - May'17
B.Tech(Hons.) in Computer Science and Engineering, CGPA: 9.12/10.0
Research Advisor - Prof. Vineeth N Balasubramanian

Research Interests

Machine Learning, Reinforcement Learning, Lifelong Learning and Computer Vision.

Publications

- **Anonymous title**, First author work under review at ICML 2021.
- **PatchUp: A Regularization Technique for Convolutional Neural Networks**, Under review at a major CV conference. (paper)
- **Towards Jumpy Planning**, **ICML MBRL Workshop 2019 (Spotlight)**. (paper)
- **Attention Based Natural Language Grounding By Navigating Virtual Environment**, **WACV 2019**. Also, at **NeurIPS ViGIL workshop**, 2017. (paper, code)
- **On the Relevance of Very Deep Networks for Diabetic Retinopathy Diagnostics**, 8th IBM Collaborative Academia Research Exchange Conference (I-CARE), 2016. (paper)
- **When Polyhedral Optimizations Meet Deep Learning Kernels**, 24th IEEE International Conference on High Performance Computing, Data and Analytics, HiPC, 2017. (paper, code)
- **TRAFAN: Road traffic analysis using social media web pages**, COMSNETS, 2018. (paper)
- **A Novel Scheduling Algorithm to Maximize the D2D Spatial Reuse in LTE Networks**, IEEE ANTS, 2016. (paper)
- **A NS-3 Module for LTE UE Energy Consumption**, IEEE ANTS, 2016. (paper)
- **A Novel Resource Allocation and Power Control Mechanism for Hybrid Access Femtocells**, Elsevier Computer Communications, Sept. 2017. (paper)

(* = equal contribution)

Experience

- **Research Assistant, Mila - Quebec AI Institute** Sept 2018-present
  Advisor: Prof. Aaron Courville
  - **Lifelong Hanabi**
    A multi-agent lifelong learning testbed based on the game Hanabi, that has a large strategy space making it suitable for exploring lifelong learning algorithms.
  - **Jumpy Planning**
    Developed a model-based planner with a goal-conditioned policy trained with model-free learning, i.e dynamical models that jump between decision states; resulting in ICML-Workshop 2019 publication.
  - **Gradient-based learning methods in differentiable games**
    How cooperative behaviour emerges with learning methods like LOLA on Iterated Prisoner's Dilemma and further apply these in more challenging board games.
- **Research Engineer, Adobe Systems, Noida, India** June 2017-August 2018
  Manager: Mr. Balaji Krishnamurthy

  Applied ML research for business use-cases concerning creative professionals. Fundamental ML research on language grounding, published at WACV 2019.
- **Research Intern, Bosch Research, Bengaluru, India** May-July 2016
  Mentor: Dr. Kumar Rajamani

  R&D on early-stage detection of DR using DL on real-world dataset acquired by Bosch. Work resulted in publication at IBM I-CARE and has since been deployed for clinical trials by Bosch.
- **Research Intern, Networked Wireless Systems Lab, IIT-Hyderabad** Jan-Dec 2015
  Advisor: Dr. Bheemarjuna Reddy

Research on Scheduling algorithms for D2D communication that resulted in multiple publications (IEEE ANTS, Elsevier Computer Communications).

- **Software Developer Intern, Aerospike, Bengaluru, India** May-July 2015
  Manager: Mr. Sunil Sayyaparaju

  Performance benchmarking of secondary indexes in Aerospike DB, server-side optimizations of secondary index and prototyped range-queries on strings (Link).

Other Academic Projects

- **Using IAF for faster music generation with SampleRNN** Nov-Dec 2018
  Report
  An effort towards unconditional generation of music at real-time speed using the inverse auto-regressive flow (IAF) to parallelize the generation of samples in SampleRNN model.
- **Understanding effect of depth in DL models** Nov-Dec 2018
  Report
  Understand the impact of depth in DL by experimenting with different model architectures and input representations for image classification and sentiment analysis.
- **Motion deblurring using GAN** Jan-Apr 2017
  PPT
  Explored approaches to improve the quality of video prediction through deblurring using custom loss functions and multiple discriminators.

Teaching Experience

- **Université de Montréal**
  - Representation Learning - Instructor: Dr. Aaron Courville Winter 2020
- **IIT-Hyderabad**
  - Deep Learning for Vision - Instructor: Dr. Vineeth Balasubramanian Spring 2017
  - Applied Machine Learning - Instructor: Dr. Vineeth Balasubramanian Fall 2016
  - Principles of Programming Languages - Instructor: Dr. Ramakrishna Upadrasta Spring 2016
  - Introduction to Programming in Python - Instructor: Dr. Subruk Fall 2015

Achievements

- Université de Montréal / Mila graduate fellowship that includes a 100% tuition fee waiver and stipend during the period of master's. Sept 2018 - present
- Received Travel Award, NeurIPS 2019. Oct 2019
- Selected to attend the DLRL Summer School in University of Alberta, Edmonton. July 2019
- Research Excellence Award, IIT-Hyderabad. Apr 2017
- Academic Excellence Award, IIT-Hyderabad. Apr 2014
- Received merit certificate from C.B.S.E for being among top 0.1% in India. May 2013
- Was among the top 40 all over India selected to write Indian National Mathematics Olympiad. Feb 2013

Academic Service

- Reviewer - AAAI (2021,2020), AI for Social Good workshop, NeurIPS 2018.
- Sub-reviewer - ICCV 2019, ICCV 2017, ECML 2019.
- Student volunteer at NeurIPS 2018, ICRA 2019.

Relevant Coursework

- At Université de Montréal: Fundamentals of Machine Learning, Probabilistic Graphical Models, Representation Learning(Deep Learning), Reinforcement Learning.
- At IIT-Hyderabad: Optimization Methods in Machine Learning, Information Retrieval, Bayesian Data Analysis, Computer Vision, Analysis of functions of single variables, Linear Algebra and Vector Calculus.

Technical Skills

- **Programming Languages** - Python, C/C++.
- **Libraries** - PyTorch, TensorFlow, OpenCV.