Nishanth J. Kumar

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EDUCATION

Massachusetts Institute of Technology – S.M. and Ph.D. in Electrical Engineering and Computer Science — Cambridge, MA | 2021 –

- **GPA: 5.00/5.00.** Research: Neuro-Symbolic Artificial Intelligence (AI) and Machine Learning (ML) for Robotics and decision making.
- **Relevant Coursework**: Computational Sensorimotor Learning, Robotic Manipulation.

Brown University – Sc.B. in Computer Engineering with Honors — Providence, RI | 2017 – 2021

- **GPA: 3.95/4.00.** Named *Outstanding Senior in Computer Engineering* for graduating as the top student in my concentration.
- **Relevant Coursework**: Machine Learning*, Computer Vision*, Topics in 3D Vis. and Deep Learning*, Learning and Sequential Decision Making*, Topics in Collaborative Robotics*, Image Understanding, Intro. to Computer Systems, Computer Architecture, Probability and Stats., Linear Algebra, Multivariable Calculus. (* indicates Graduate Level course)

EXPERIENCE

Graduate Research Assistant – Learning and Intelligent Systems Group [website] — Cambridge, MA | 2021 – Present

- Supervised by Profs. Leslie Kaelbling and Tomás Lozano-Pérez.
- Working at the intersection of learning and planning to solve long-horizon robotics tasks.

Research Intern – Vicarious AI (now part of DeepMind) [website] — Union City, CA | Summer 2021

- Supervised by Stannis Zhou (Research Scientist) and Miguel Lázaro-Gredilla (VP of Research).
- Led development of an open-source framework [link] for efficient inference on Probabilistic Graphical Models (PGM's) in JAX.
- Paper [link] describing framework to be submitted to the Journal of Machine Learning Research (JMLR).

Undergraduate Research Assistant – Brown University BigAI Initiative [website] — Providence, RI | 2017 – 2021

- Supervised by Profs. Stefanie Tellex, George Konidaris and Michael Littman
- Worked on a variety of projects at the intersection of Robotics, AI and ML.
- Helped author 5 different conference publications and lead collaboration with Mitsubishi Electric Research Labs (MERL).

Research Intern – Uber ATG (now Waabi AI) [website] — Toronto, ON | Summer 2020

- Supervised by Sean Segal (Research Scientist) and Raquel Urtasun (Professor and Chief Scientist).
- Led an independent research project on Active Learning to improve sample-efficiency and reduce data-labelling costs for a neural network model.
- Implemented existing and novel Active Learning algorithms in Python with PyTorch and integrated these into a large codebase.
- Research paper [link] published at the Conference on Robot Learning (CoRL) 2021.

AWARDS AND HONORS

- **Qualcomm Innovation Fellowship Finalist** (1 of 46 teams nationwide) — 2022
- **NSF GRFP Fellow** — 2021
- **Elected to Tau Beta Pi Honors Society** — 2021
- **CRA Outstanding Undergrad Research Award Finalist** (1 of 23 nationwide) — 2021
- **Goldwater Scholarship** (1 of 396 nationwide) — 2020
- **Heidelberg Laureate** — 2020
- **Ivy-League Undergrad Research Symposium 'Best Plenary Presentation'** (top conference honor) — 2018

SELECTED PUBLICATIONS

- **Inventing relational state and action abstractions for effective and efficient bilevel planning**. T. Silver*, R. Chitnis*, **N. Kumar**, W. McClinton, T. Lozano-Pérez, L. Kaelbling, J. Tenenbaum. RLDM, 2022 (Spotlight).
- **PGMax: Factor Graphs for Discrete Probabilistic Graphical Models and Loopy Belief Propagation in JAX.** G. Zhou*, **N. Kumar***, M. Lázaro-Gredilla, S. Kushagra, D. George. arxiv, 2022.
- **Just label what you need: Fine-grained active selection for perception and prediction through partially labelled scenes.** S. Segal*, **N. Kumar***, S. Casas, W. Zeng, M. Ren, J. Wang, and R. Urtasun. CoRL, 2021.
- **Building plannable representations with mixed reality**. E. Rosen, **N. Kumar**, N. Gopalan, D. Ullman, G. Konidaris, and S. Tellex. IEEE IROS, 2020.
- **Learning deep parameterized skills from demonstration for re-targetable visuomotor control**. **N. Kumar***, J. Chang*, S. Hastings, A. Gokaslan, D. Romeres, D. Jha, D. Nikovski, G. Konidaris, and S. Tellex. arXiv, 2019.
  (* indicates equal contribution)

SKILLS & INTERESTS

- **Programming Skills**
  - **Over 5000 lines:** LaTex, Python.
  - **Over 1000 lines:** PyTorch, Bash, JAX, Robot Operating System (ROS), C, Java, MATLAB.
  - **Familiar:** TensorFlow, OpenCV, Verilog, Scala, OCaml, Racket, MySQL.
- **Miscellaneous Skills and Interests:** Fiction Writing, Copywriting, Public Speaking.