Nishanth Jay Kumar

Personal Website: nishanthjkumar.com
Email: njk@csail.mit.edu
LinkedIn: nishanth-kumar
Google Scholar: Nishanth Kumar
GitHub: github.com/NishanthJKumar

Education

Massachusetts Institute of Technology — Cambridge, MA
Doctor of Philosophy in Electrical Engineering and Computer Science, GPA: 5.00/5.00 — 2021 - 2027 (expected)
Master of Science in Electrical Engineering and Computer Science

- Selected Coursework: Computational Sensorimotor Learning, Robotic Manipulation.
- Activities: Graduate Application Assistance Program (GAAP) mentor.

Brown University — Providence, RI
Bachelor of Science in Computer Engineering with Honors, GPA: 3.96/4.00 — 2017 - 2021

- Honors Thesis Title: "You Only Need What's in Scope: Generating Task-Specific Abstractions for Efficient AI Planning".
- Activities: Brown Space Engineering, Brown STEAM Club, Brown CS Meta-Undergrad Research Assistant (MURA).

The Indian Public School — Coimbatore, India
IB Diploma Programme, Final Score: 45/45 — 2015–2016

- Valedictorian, first student in school history to achieve a perfect score in the IB Diploma Programme.
- Activities: Robotics Team, MUN Team, School Newsletter, Basketball Team.

Academic Experience

MIT Computer Science and Artificial Intelligence Laboratory — Cambridge, MA
Graduate Research Assistant — 2021 - Present

- Advised by Professors Leslie Kaelbling and Tomás Lozano-Pérez within the Learning and Intelligent Systems (LIS) group.
- Research topics include Neuro-symbolic methods, Task and Motion Planning, Reinforcement Learning, and Imitation Learning for robotics and decision-making.

Brown University Department of Computer Science — Providence, RI
Undergraduate Research Assistant — 2017 - 2021

- Worked with Professors Stefanie Tellex, George Konidaris and Michael Littman within the bigAI initiative
- Research topics included Imitation Learning, Reinforcement Learning, Classical Planning, Model-Based Reasoning, Planning under Uncertainty, and Mixed Reality, among others.

Brown University Department of Computer Science — Providence, RI
Meta Undergraduate Research Assistant (MURA) — 2020 - 2021

- Responsible for cultivating and promoting Undergraduate Research within the Brown CS Department.
- Held "Research Office Hours", co-ordinate with faculty to host educational events and increase research opportunities for undergrads.

Industry Experience

Vicarious AI Remote
Research Intern May - August 2021

- Research Project on building a toolkit for Probabilistic Graphical Models (PGM's) with Stannis Zhou and Miguel Lázaro-Gredilla.
- First-author journal paper in preparation. Open-source project code release can be found here [link].

Uber Advanced Technologies Group Remote
Summer Research Intern May - August 2020

- Research Project on Active Learning under Chief Scientist Prof. Raquel Urtasun.
- First-author conference publication accepted to the Conference on Robot Learning (CoRL) 2021.

Paragon.school Providence, RI
Co-Founder February 2020 - Present

- Paragon.school was a mentorship and college-consulting company for high-performance high school students.

Teaching

- **Head Teaching Assistant**, Brown CS Fall 2019
  Learning and Sequential Decision Making [Grad Level] (CSCI 2951-F)
- **Teaching Assistant** at Brown School of Engineering Fall 2018
  Honors Introduction to Engineering (ENGN 0031)

Honors and Awards

- Qualcomm Innovation Fellowship Finalist 2022
- NSF Graduate Research Fellowship 2021
- Berkeley Fellowship (declined) 2021
- Brown Outstanding Computer Engineering Senior Award 2021
- CRA Outstanding Undergraduate Researcher Award Finalist 2021
- Barry M. Goldwater Scholarship 2020
- Member of Tau Beta Pi Engineering Honors Society 2020
- Heidelberg Laureate 2020
- CRA Outstanding Undergraduate Researcher Award Honorable Mention 2020
- 'Best Plenary Presenter', Ivy-League Undergrad Research Symposium (ILURS) 2019
- Undergraduate Teaching and Research Award, Brown University 2019
- Hack@Brown "Best Hardware Hack" 2018
- YHack "Best Finance Hack" 2017
- Google Global Science Fair Regional Finalist 2015
- FIRST Tech Challenge World Championships, Special Judges' "Enabler" Award 2015

Invited Talks

Conferences and Symposia

- *Building Intelligent, Collaborative Robots*
  - Invited talk at the second Machine Intelligence Conference (MIC), Boston University. September, 2019
- *Action-Oriented Semantic Maps via Mixed Reality*
  - 1 of 8 Plenary Presenters speakers at the Second Ivy League Undergrad Research Symposium, UPenn. April, 2019

Universities and Research Laboratories

- *Learning Models with Side Effects for Efficient, Generalizable TAMP*
  - Invited talk at the MIT LIS Group Meeting. March, 2022.
- *Task Scoping: Generating Task-Specific Abstractions for Planning*
  - Invited talk at the MIT LIS Group Meeting. February, 2021.
- *What I'm working on now: Task Scoping and Parameterized Imitation Learning*
  - Short talk at Intelligent Robot Lab meeting, Brown University. November, 2019.

Miscellaneous

- *Let's Talk about AI and Robotics*
  - Invited interview for an episode of the interSTEM YouTube channel. November, 2019.l

Academic Service

Conference Reviewing

- *Conference on Robot Learning (CoRL)* (2022)
- *AAAI Conference on Artificial Intelligence* (2022)
- *IEEE International Conference on Robotics and Automation (ICRA)* (2019)

Workshop Reviewing

- *The International Workshop on Virtual, Augmented, and Mixed-Reality for Human-Robot Interactions (VAM-HRI)* (2019)

Academic Publications

[1] T. Silver, R. Chitnis, **N. Kumar**, W. McClinton, T. Lozano-Perez, L. P. Kaelbling, and J. Tenenbaum, "Inventing relational state and action abstractions for effective and efficient bilevel planning", in *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM) [Spotlight Talk]*, 2022.

[2] G. Zhou, **N. Kumar**, M. Lázaro-Gredilla, S. Kushagra, and D. George, "Pgmax: Factor graphs for discrete probabilistic graphical models and loopy belief propagation in jax", *arXiv preprint arXiv:2202.04110*, 2022.

[3] S. Segal*, **N. Kumar***, S. Casas, W. Zeng, M. Ren, J. Wang, and R. Urtasun, "Just label what you need: Fine-grained active selection for p&p through partially labeled scenes", in *5th Annual Conference on Robot Learning*, 2021. [Online]. Available: https://openreview.net/forum?id=xQ8rr3-zpiH.

[4] **N. Kumar***, M. Fishman*, N. Danas, M. Littman, S. Tellex, and G. Konidaris, *Task scoping: Building goal-specific abstractions for planning in complex domains*, 2020. arXiv: 2010.08869 [cs.AI].

[5] **N. Kumar***, J. Chang*, S. Hastings, A. Gokaslan, D. Romeres, D. Jha, D. Nikovski, G. Konidaris, and S. Tellex, *Learning deep parameterized skills from demonstration for re-targetable visuomotor control*, 2019. arXiv: 2010.08869.

[6] **N. Kumar***, E. Rosen*, and S. Tellex, "Knowledge acquisition for robots through mixed reality head-mounted displays", 2018. [Online]. Available: http://cs.brown.edu/people/er35/publications/knowledge.pdf.

[7] A. Wandzel, Y. Oh, M. Fishman, **N. Kumar**, W. L. LS, and S. Tellex, "Multi-object search using object-oriented pomdps", in *International Conference on Robotics and Automation (ICRA)*, IEEE, 2019, pp. 7194–7200. [Online]. Available: https://par.nsf.gov/servlets/purl/10149768.

[8] **N. Kumar***, M. Fishman, N. Danas, S. Tellex, M. Littman, and G. Konidaris, "Task scoping for efficient planning in open worlds (student abstract)", in *Proceedings of the AAAI Conference on Artificial Intelligence*, vol. 34, 2020, pp. 13 845–13 846. [Online]. Available: https://ojs.aaai.org//index.php/AAAI/article/view/7195.

[9] E. Rosen, **N. Kumar**, N. Gopalan, D. Ullman, G. Konidaris, and S. Tellex, "Building plannable representations with mixed reality", in *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2020. [Online]. Available: https://ras.papercept.net/proceedings/IROS20/1772.pdf.