

# Karthik Valmeekam

✉ [kvalmeek@asu.edu](mailto:kvalmeek@asu.edu)  
📁 [karthikv792.github.io](https://github.com/karthikv792)  
🌐 [karthikv792](https://www.linkedin.com/in/karthikv792)  
🎓 Scholar profile

## Research Interests

My current research primarily focuses on the intersection of Large Language Models (LLMs) and reasoning, with a special emphasis on examining the planning capabilities of LLMs. This research involves two key aspects:

- Identifying the inherent limitations of LLMs in generating plans, particularly in classical planning, and
- Demonstrating the constructive applications of LLMs as complementary tools alongside the robust planners developed in the AI Planning community.

## Experience

May 2024 – August 2024 **Amazon Science**, *Applied Scientist Intern*, Palo Alto, CA, United States.

## Education

- Fall 2021 – Spring 2026 **Arizona State University**, Tempe, AZ, United States  
(Expected) **Ph.D. in Computer Science**, Advisor: *Prof. Subbarao Kambhampati*  
*Research:* Large Language Models, Automated Planning, Reinforcement Learning  
*GPA:* 4.0/4.0
- Fall 2019 – Spring 2021 **Arizona State University**, Tempe, AZ, United States  
**M.S. in Computer Science**, Advisor: *Prof. Subbarao Kambhampati*  
*Thesis:* A Study of Explainable Decision Support for Longitudinal Sequential Decision Making  
*GPA:* 4.0/4.0
- Fall 2015 – Spring 2019 **Vellore Institute of Technology**, Vellore, TN, India  
**B.Tech. in Computer Science and Engineering**  
*GPA:* 9.19/10.0

## Selected Publications and Manuscripts

- NeurIPS 2024 Kaya Stechly\*, **Karthik Valmeekam\*** (equal contribution), Subbarao Kambhampati. Chain of thoughtlessness: An analysis of cot in planning. arXiv preprint arXiv:2405.04776, 2024.
- ICML 2024 (Spotlight) Subbarao Kambhampati, **Karthik Valmeekam**, Lin Guan, Kaya Stechly, Mudit Verma, Siddhant Bhambri, Lucas Saldyt, Anil Murthy. LLMs Can't Plan, But Can Help Planning in LLM-Modulo Frameworks. In Forty-first International Conference on Machine Learning, 2024.

- Arxiv Preprint (Under Review) **Karthik Valmeekam\***, Kaya Stechly\* (equal contribution), Subbarao Kambhampati. Planning in Strawberry Fields: Evaluating and Improving the Planning and Scheduling Capabilities of LRM o1. arXiv preprint arXiv:2410.02162, 2024.
- Arxiv Preprint (Under Review) Kaya Stechly\*, **Karthik Valmeekam\*** (equal contribution), Subbarao Kambhampati. On the self-verification limitations of large language models on reasoning and planning tasks. arXiv preprint arXiv:2402.08115, 2024.
- AAAI 2024 Subbarao Kambhampati, **Karthik Valmeekam**, Lin Guan. On the role of large language models in planning. Tutorial at the AAAI Conference on Artificial Intelligence, 2024.
- NeurIPS 2023 **Karthik Valmeekam**, Matthew Marquez, Sarath Sreedharan, Subbarao Kambhampati. On the Planning Abilities of Large Language Models—A Critical Investigation. In Thirty-seventh Conference on Neural Information Processing Systems, 2023.  
**Spotlight paper (Top 3%).**
- NeurIPS 2023 Lin Guan\*, **Karthik Valmeekam\*** (equal contribution), Sarath Sreedharan, Subbarao Kambhampati. Leveraging Pre-trained Large Language Models to Construct and Utilize World Models for Model-based Task Planning. In Thirty-seventh Conference on Neural Information Processing Systems, 2023.
- NeurIPS 2023 **Karthik Valmeekam**, Matthew Marquez, Alberto Olmo, Sarath Sreedharan, Subbarao Kambhampati. PlanBench: An Extensible Benchmark for Evaluating Large Language Models on Planning and Reasoning about Change. In Thirty-seventh Conference on Neural Information Processing Systems Datasets and Benchmarks Track, 2023.
- FMDM @ NeurIPS 2023 **Karthik Valmeekam\***, Matthew Marquez\* (equal contribution), Subbarao Kambhampati. Can Large Language Models Really Improve by Self-critiquing Their Own Plans?. In NeurIPS 2023 Foundation Models for Decision Making Workshop, 2023.
- ICAPS 2023 Subbarao Kambhampati, **Karthik Valmeekam**, Matthew Marquez, Lin Guan. On the role of large language models in planning. Tutorial at the International Conference on Automated Planning and Scheduling (ICAPS), 2023.
- ICLR 2023 Lin Guan, **Karthik Valmeekam**, Subbarao Kambhampati. Relative Behavioral Attributes: Filling the Gap between Symbolic Goal Specification and Reward Learning from Human Preferences. In The Eleventh International Conference on Learning Representations, 2023.
- ICAPS 2022 **Karthik Valmeekam**, Sarath Sreedharan, Sailik Sengupta, Subbarao Kambhampati. RADAR-X: An Interactive Mixed Initiative Planning Interface Pairing Contrastive Explanations and Revised Plan Suggestions. In Proceedings of the International Conference on Automated Planning and Scheduling (Vol. 32, pp. 508-517), 2022.

---

## Projects

- 2021 **Reinforcement Learning for Imperfect Information Games**  
On a two-player imperfect information game (Sequence), an agent was trained offline by *approximation in value and policy space* using neural networks. In the test phase, the agent used one-step look-ahead using the trained network to make a move. This improved win percentage (upto 60%) with more training against a random agent.
- 2020 **High-Speed Autonomous Drifting using Deep Reinforcement Learning**  
An end-to-end drift controller which utilizes a state-of-the-art model-free reinforcement learning algorithm is modelled using *Pytorch*. This RL problem is devised as a trajectory following problem. The resulting agent was able to generate the required behavior.

---

## Teaching & Service

- Teaching Assistant 2021: **CSE471-Intro to Artificial Intelligence** by Prof. Subbarao Kambhampati.
- Reviewer/PCM 2024: **ICLR, NeurIPS, AAAI-Student Program, ICRA.**  
2023: **ICLR, NeurIPS, ICAPS, HAXP@ICAPS, GenPlan@NeurIPS.**  
2022: **XAIP@ICAPS.**
- Student Volunteer 2021: **AAAI, ICAPS.**

---

## Skills

- Programming Python, C++, HTML/CSS, JavaScript, Bash, SAP-ABAP, SQL, PDDL
- Frameworks Pytorch, Transformers (HuggingFace), PyTorch Lightning, Scikit-Learn, Numpy, Pandas, OpenAI gym, Keras, NLTK, Flask, JQuery, Bootstrap
- Misc Adobe Premiere Pro, Lightroom, Photoshop, Git, Latex

---

## Honors

- 2024 SCAI Doctoral Fellowship (Merit-Based), Arizona State University.
- 2021 CIDSE Doctoral Fellowship (Merit-Based), Arizona State University.
- 2018 Vice Chair Management of the student chapter CODECHEF-VIT, Vellore Institute of Technology