Tanmay Ambadkar

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Education

The Pennsylvania State University — University Park, PA
Ph.D. in Computer Science and Engineering — *Jan. 2024 – May 2027 (Expected)*

Experience

The Pennsylvania State University — University Park, PA
Research Assistant — *May 2023 — Present*

- Developing and refining specification-guided frameworks to enhance the reliability, safety, and interpretability of RL agents.
- Designing frameworks to implement Reinforcement Learning agents for optimizing operational costs of grid-integrated district energy systems, achieving a **32% cost reduction**.
- Predicted Autism Spectrum Disorder cases in children using time-series models on Electronic Health Records (EHR) data, preprocessing over 500GB of data with PySpark.

Siemens Technology and Services — Remote
Research and Digitization Automation Intern — *Jan. 2022 — July 2022*

- Owned the end-to-end development of a plug-and-play anomaly detection library using AutoEncoders and Explainable AI, deploying the final model on Databricks and presenting a working demo to project stakeholders.
- Engineered end-to-end forecasting workflows that achieved a **0.98** r^2 **score** on internal benchmarks and built CNN-based models for a major client (Starbucks).

Siemens Technology and Services — Remote
Research and Digitization Automation Intern — *May 2021 — July 2021*

- Optimized the Industrial Predictive Analytics Engine (IPAE) by integrating real-time monitoring tools, reducing pipeline execution time by **30%**.
- Developed a library to forecast building occupancy and energy requirements in conjunction with an RL model for optimizing building setpoints for maximum energy savings, for Dubai Expo 2021.

Publications

Specification Guided Reinforcement Learning. T. Ambadkar, *Accepted at AAAI Doctoral Consortium 2026*

Robust Adaptive Multi-Step Predictive Shielding. T. Ambadkar, D. Chudiwal, G. Anderson, and A. Verma. *Accepted Student Abstract at AAAI 2026; Submitted to ICLR 2026.* [Paper] [Project Page]

Preference Conditioned Multi-Objective Reinforcement Learning. T. Ambadkar, S. Panda, S. Kale, A. Verma, and J. Dodge. *Submitted to ICLR 2026.* [Paper] [Project Page]

AutoSpec: Automating the Refinement of Reinforcement Learning Specifications. T. Ambadkar, Djordje Zikelic, and A. Verma. *Submitted to ICLR 2026; Accepted at Post-AI Formal Methods at AAAI-2026; Poster at PLDI SRC*, 2024. [Paper] [Poster]

Safer Policies via Affine Representations using Koopman Dynamics. T. Ambadkar, D. Chudiwal, G. Anderson, and A. Verma. *Submitted to AAAI 2026.*

MIXTAPE: Middleware for Interactive XAI with Tree-Based AI Performance Evaluation. T. Ambadkar, H. Moore, S. Panda, et al. *SISO SIMposium*, 2025.

Optimizing Operational Costs in Combined Heat and Power Integrated District Heating Systems. S. Anbarasu, **T. Ambadkar**, R. Adhikari, et al. *SimBuild*, 2024. [Paper]

Deep reinforcement learning approach to predict head movement in 360° videos. T. Ambadkar and P. Mazumdar. *Proc. IS&T Int'l. Symp. on Electronic Imaging*, 2022. [Paper] [Code]

Technical Skills

Programming Languages: Python, PySpark, JavaScript, C++
Frameworks: PyTorch, TensorFlow, Stable-Baselines3, Scikit-learn, Flask
Topics: Reinforcement Learning, AI Safety, Formal Methods, Multi-Objective RL, Time-Series Analysis