TAPAS RATH

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PROFILE SUMMARY

Cognitive Scientist and Ph.D. candidate specializing in decision-making biases and computational modeling. Bridging behavioral science and artificial intelligence by using Reinforcement Learning (RL) agents as benchmarks for human cognition. Experienced in designing granular human evaluation frameworks, probabilistic modeling, and investigating user "Sense of Agency" in Human-AI interactions.

EDUCATION

Ph.D. in Cognitive Science *Expected 2026*
Indian Institute of Technology (IIT) Kanpur
Relevant Coursework: Computational Tools for Cognitive Science, Neurobiology, Topics in Cognitive Neuroscience.
Bachelor of Technology in Electronics & Instrumentation Engineering *2008 – 2012*
SRM University, Chennai

SKILLS

Statistical Analysis & Modeling: Bayesian Statistics (brms, BayesFactor), Linear Mixed-Effects Models (lme4), Agent-Based Simulation, R, Python (Pandas, NumPy, SciPy, Statsmodels)

Experimental Design & Evaluation: Human Evaluation Frameworks, Psychophysics, PsychoPy, Vanilla JavaScript for Online Experiments, Eye Tracking (Eyelink 1000 Plus), User Study Design

Research Methodologies: Computational Modeling, Decision-Making Analysis, Human-AI Interaction Research, Statistical Robustness Testing, Jupyter Notebooks

Machine Learning & AI: Basic Reinforcement Learning (RL), Deep Q-Networks (DRQN), Multi-Agent RL, POMDPs, Contrastive Learning, PyTorch, Probabilistic Modeling

EXPERIENCE

Ph.D. Researcher - Cognitive Science *2019 – Present*
Indian Institute of Technology (IIT) Kanpur *Kanpur, India*

- Designed human behavioral experiments (PsychoPy, JavaScript) and developed RL agents (DRQN, PyTorch) to benchmark human decision-making and cognitive flexibility.
- Built agent-based simulations to test statistical robustness of decision-making metrics; revealed vulnerabilities in standard evaluation methods.
- Published 1 peer-reviewed article and 1 preprint; presented at ACCS 2023, 24, CogSci 2025, MathPsych 2024 and SJDM 2024.

Research Intern - Human-AI Interaction *2018 – 2019*
Indian Institute of Technology (IIT) Kanpur *Kanpur, India*

- Investigated user "Sense of Agency" in human-AI interaction.
- Studies spontaneous perception and attention mechanism using eye-tracking.

Lecturer in Physics *2014 – 2017*
DPS Kalyanpur & Chaitanya's Academy *Pune/Kanpur India*

- Designed curriculum and assessments for competitive physics examinations; mentored 500+ students.

Senior Software Engineer - Quality Assurance *2012 – 2014*
Accenture (British Telecom Project) *Pune, India*

- Led QA strategy for enterprise telecom systems; designed automated testing frameworks.

- Collaborated with backend engineers and offshore teams to identify edge-case vulnerabilities and implement robust solutions.

PUBLICATIONS

Rath, T. R., Srinivasan, N., & Srivastava, N. (2025). The attraction effect in perceptual decision-making. *Frontiers in Psychology.*[Link]
Rath, T. R., & Marupudi, V. (2025). Re-evaluating the numerical–perceptual distinction in the attraction effect. *Proceedings of CogSci 2025.*[Link]
Rath, T. R., Srivastava, N., & Srinivasan, N. (2025). Unmasking the flaws of triplet–triplet attraction effect measures. *PsyArXiv.* [DOI]

PROJECTS

DRQN for Probabilistic Reversal Learning. PyTorch implementation benchmarking RL agent adaptive strategies against human behavioral data. [GitHub]

Situated Agency Alignment (KARMA). Multi-agent RL with contrastive learning to study role-invariant representations in social interactions. [GitHub]

Robust-Context-Metrics. Agent-based simulations revealing critical flaws in decision-making metrics under heterogeneous baselines. [GitHub]

Bounded Rationality Strategy Selection. Computational framework comparing RL predictions to empirical human choices in multi-attribute decision-making. [GitHub]

PROFESSIONAL MEMBERSHIPS

Society for Judgment and Decision Making • Society for Mathematical Psychology • Psychonomic Society • Cognitive Science Society

POSITIONS OF RESPONSIBILITY

Teaching Assistant: Human-Centered Computing (CGS616) *Jan–Jul 2024*

Teaching Assistant: Introduction to Cognitive Science (CGS401)