Shivam Goel

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Education

Tufts University — Medford, MA
Ph.D. Candidate in Computer Science — *Jan 2020 – Present*
Advisors: Prof. Jivko Sinapov & Prof. Matthias Scheutz

Washington State University — Pullman, WA
Masters of Science in Computer Science — *Aug 2015 – May 2017*
Advisor: Prof. Matthew E. Taylor

Uttar Pradesh Technical University — Noida, UP
Bachelors of Engineering in Information Technology — *Aug 2011 – June 2015*

Selected Publications

Open-World Novelty Handling — 2021 – Present
Novelty detection, adaptation, neurosymbolic reasoning

- **Shivam Goel**, Panagiotis Lymperopoulos, et al. A Neurosymbolic Cognitive Architecture Framework for Handling Novelties in Open Worlds. AIJ, 2024.
- **Shivam Goel**, Yichen Wei, Panagiotis Lymperopoulos, et al. NovelGym: A Flexible Ecosystem for Hybrid Planning and Learning. AAMAS, 2024.
- **Shivam Goel**, Yash Shukla, Vasanth Sarathy, Matthias Scheutz, Jivko Sinapov. RAPid-Learn: A Framework for Learning to Recover for Handling Novelties in Open-World Environments. ICDL, 2022.

Generalizability in Robotic Skills (Sim2Real) — 2023 – Present
Force-based skills, object-centric robot-agnostic learning, sim-to-real transfer

- **Shivam Goel**, Shijie Fang, Wenchang Gao, Matthias Scheutz, Jivko Sinapov. FLEX: Robot-Agnostic Force-based Skills. ICRA, 2025.
- Yash Shukla, Bharat Kesari, **Shivam Goel**, et al. Few-Shot Policy Transfer through Observation Mapping. IROS, 2023.

Applied Robotics: Agriculture & Healthcare — 2017 – 2019
Computer vision, agricultural robotics, smart homes

- **Shivam Goel**, Santosh Bhusal, Matthew E Taylor, Manoj Karkee. Detection and localization of birds for Bird Deterrence using UAS. ASABE, 2017.
- Garrett Wilson, Christopher Pereyda, **Shivam Goel**, et al. Robot-enabled support of daily activities in smart homes. Cognitive Systems Research, 2019.

Full publication list available on Google Scholar.

Experience

Mulip Lab – Tufts University — Medford, MA
Researcher · Advisor: Prof. Jivko Sinapov — *Jan 2020 – Present*

- Developed neurosymbolic AI techniques that improved sample efficiency and adaptability in robot learning.
- Led projects on open-world novelty handling and hybrid learning frameworks.
- Published in premier venues including ICRA, IROS, AAMAS, and AIJ.

HRI Lab – Tufts University — Medford, MA
Researcher · Advisor: Prof. Matthias Scheutz — *May 2023 – Present*

- Designed on-the-fly adaptation strategies for robotic manipulation and autonomous driving domains.
- Integrated neurosymbolic methods in DIARC Cognitive Architecture to enable adaptive decision-making in dynamic environments.

IRL Lab – Washington State University — Pullman, WA
Researcher · Advisor: Prof. Matthew E. Taylor — *Oct 2016 – Dec 2019*

- Built computer vision systems for agricultural robotics applications.

- Developed UAV-based bird deterrence systems and contributed to automated fruit harvesting research.
- Co-authored journal and conference papers in agricultural technology and AI for robotics.

CASAS Lab – Washington State University Pullman, WA
Researcher · Advisor: Prof. Diane J. Cook *Jan 2018 – Dec 2019*

- Developed smart home AI for elder care, focusing on daily activity support.
- Published in healthcare and cognitive systems venues.

Center of AI for Social Good – University of Southern California Los Angeles, CA
Research Intern · Advisor: Prof. Milind Tambe & Prof. Bistra Dilkina *Apr 2018 – Dec 2018*

- Applied AI to wildlife conservation, developing UAV-based thermal vision methods for poacher detection.
- Increased detection accuracy from 30% to 68% through novel computer vision models.

Active Projects

Generalizable Robotic Skills | *Physics-based Learning, Object-centric RL*

- Develop advanced motion primitives (e.g., twisting) to enable transferable robot skills across tasks and platforms.

Scalable Frameworks for General-Purpose Robots | *Neurosymbolic AI, General-purpose Robotics*

- Leverage hybrid neurosymbolic architectures to integrate force-based robot-agnostic skills into larger robotic platforms capable of broad generalization.

Reasoning for Open-World Adaptation | *Novelty Handling, Affordances discovery*

- Incorporate symbolic reasoning to guide skill learning when encountering novel objects and their affordances.

Technical Demonstrations

Tufts Robotics Open House | *2024, 2025*

- Showcased neurosymbolic robotic learning systems for novelty handling to cross-disciplinary audience.

MassRobotics | *Boston, 2023*

- Demonstrated VR-based interaction capabilities of a turtlebot

Tufts Graduate Showcase | *2022*

- Presented multimodal robotic interaction systems to cross-disciplinary audiences.

Skills

Programming: Python, Java, C++, R, MATLAB
Frameworks: Robot Operating Systems (ROS), Robosuite, CARLA
Deep Learning frameworks: PyTorch, Tensorflow
Developer Tools: Linux, Git, Docker, VS Code, IntelliJ
Simulations: Pybullet, Gazebo, Mujoco
Relevant Coursework: Reinforcement Learning, Probabilistic Robotics for HRI, Machine Learning, Artificial Intelligence, Introduction to Robotics, Operating Systems, Pervasive Computing, Robot Kinematics and Dynamics.

Service & Outreach

Professional Service

- Reviewer: AAAI-26, ICRA-26, IROS-25, ICAPS-25, ICAPS-24, AIJ, IEEE-ICDL-24, IEEE Transactions on Control Systems Technologies-22, AAMAS-22, AAMAS-24.
- Co-organizer & Program Committee Member: 2nd IJCAI Workshop on Artificial Intelligence for Autonomous Driving (AI4AD), 2022.

Academic & Community Engagement

- Organizer and Coordinator: VLA Reading Group at Tufts (2025), RL Reading Group at Tufts SAIL-ON (2020), RL Reading Group at WSU (2019).
- Seminar Coordinator: IRL Lab bi-weekly seminar at WSU (2016–2017).
- Volunteer Photographer: Eastern Washington Aspirations in Computing Award Ceremony (2018–2019).