Ishika Singh

PH.D. STUDENT · COMPUTER SCIENCE · USC

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Education

University of Southern California — *Los Angeles, CA*
PHD IN COMPUTER SCIENCE — *2021-present*
Advisor: Prof. Jesse Thomason
Research Interests: Language and 3D perception for robotic manipulation, imitation learning, multi-agent task planning, embodied AI, robot learning, vision and language navigation.

Indian Institute of Technology (IIT) Kanpur — *India*
B.TECH, DOUBLE MAJOR IN COMPUTER SCIENCE AND CHEMICAL ENGINEERING — *2016 - 2021*

Experience

NVIDIA Seattle Robotics Lab | RESEARCH INTERN W/ DR. VALTS BLUKIS AND PROF. ANIMESH GARG — *May - Aug'24 | Seattle, WA*
Research topic(s): 3D perception based robot instruction following using LLMs and VLMs.

GLAMOR Lab, USC | PI: PROF. JESSE THOMASON — *Aug'21 - Present | LA, CA*
Research topic(s): Multi-agent collaborative hierarchical planning, generative data augmentation for robot learning, 3D representation learning for robotics, data cartography, vision and language navigation.
Simulators worked with: AI2THOR, Habitat, RLBench, VirtualHome, Matterport 3D Simulator (topological and Habitat-based continuous)

NVIDIA Seattle Robotics Lab | RESEARCH INTERN W/ DR. VALTS BLUKIS AND PROF. ANIMESH GARG — *May - Sept'22 | Seattle, WA*
Research topic(s): Long-horizon robot task planning using LLMs

Exploration Lab, IIT Kanpur | PI: PROF. ASHUTOSH MODI — *Jan'20 - Jul'21 | India*
Research topic(s): Text-based games, RL, affective language modeling, text generation

Big Data Labs, Adobe Research | RESEARCH INTERN — *Apr - July'20 | India*
Research topic(s): Information retrieval, natural language reasoning

UC San Diego | PI: PROF. PENGTAO XIE — *Jan - May'20 | Remote*
Research topic(s): Differential privacy, theoretical ML, federated neural architecture search, optimization

Conference Papers

*equal contribution

THE COLOSSEUM: A Benchmark for Evaluating Generalization for Robotic Manipulation — *RSS 2024*
WILBERT PUMACAY*, **ISHIKA SINGH***, JIAFEI DUAN*, RANJAY KRISHNA, JESSE THOMASON, DIETER FOX — *[arXiv | website]*
Robotics: Science and Systems (RSS) 2024
Also in *A Future Roadmap for Sensorimotor Skill Learning for Robot Manipulation workshop @ ICRA 2024*; *Embodied AI workshop @ CVPR 2024*

ProgPrompt: Generating Situated Robot Task Plans using Large Language Models — *ICRA 2023, AuRo 2023*
ISHIKA SINGH, VALTS BLUKIS, ARSALAN MOUSAVIAN, ANKIT GOYAL, DANFEI XU, JONATHAN TREMBLAY, DIETER FOX, JESSE THOMASON, ANIMESH GARG — *[arXiv | website]*
IEEE International Conference on Robotics and Automation (ICRA) 2023
Also in *LaReL workshop @ NeurIPS 2022*; *LangRob workshop @ CoRL 2022*
Invited journal paper in *Autonomous Robots 2023 - Special Issue: Large Language Models in Robotics*

Pre-trained Language Models as Prior Knowledge for Playing Text-based Games *AAMAS 2022*
Ishika Singh, Gargi Singh, Ashutosh Modi [arXiv | code]
International Conference on Autonomous Agents and Multiagent Systems 2022: Extended Abstract

Adapting a Language Model for Controlled Affective Text Generation *COLING 2020*
Ishika Singh*, Ahsan Barkati*, Tushar Goswamy, Ashutosh Modi [arXiv | talk | code]
International Conference on Computational Linguistics 2020 (Long Paper, Oral)
Also in *Wordplay: When Language Meets Games workshop @ NeurIPS 2020*

Preprints

Language Models can Infer Action Semantics for Classical Planners from Environment Feedback *arXiv*
Wang Zhu, **Ishika Singh**, Robin Jia, and Jesse Thomason [arXiv]
In submission at NeurIPS'24

TwoStep: Multi-agent Task Planning using Classical Planners and Large Language Models *arXiv*
Ishika Singh, David Traum, and Jesse Thomason [arXiv]
In submission at IROS'24

Workshop Papers

Self-Supervised 3D Representation Learning for Robotics *PT4R-ICRA'23*
Ishika Singh, Anthony Liang, Mohit Shridhar, Jesse Thomason [pdf]
Pretraining4Robotics Workshop @ ICRA 2023

Noisy Instructions Are All You Need for VLN Pretraining *O-DRUM - CVPR'23*
Wang Zhu, **Ishika Singh***, Yuan Huang*, Robin Jia, Jesse Thomason [arXiv]
Open-Domain Reasoning Under Multi-Modal Settings workshop @ CVPR 2023

Transformer Adapters for Robot Learning *PRL-CoRL'22*
Anthony Liang, **Ishika Singh**, Karl Pertsch, Jesse Thomason [pdf]
Pretraining for Robot Learning workshop @ CoRL 2022

Differentially-private Federated Neural Architecture Search *FL-ICML'20*
Ishika Singh*, Haoyi Zhou*, Kunlin Yang, Meng Ding, Bill Lin, Pengtao Xie [arXiv | code]
Federated Learning for User Privacy & Data Confidentiality workshop @ ICML 2020 (Long Presentation)

Patents

Prompt Generator for Use with One or More Machine Learning Processes *US Patent 2024*
Ishika Singh, Arsalan Mousavian, Ankit Goyal, Danfei Xu, Jonathan Tremblay, Dieter Fox, Animesh Garg, Valts Blukis [pdf]
US Patent No. 2024/0095077 | NVIDIA Research

Machine-Learning Techniques for Augmenting Electronic Documents with Data-Verification Indicators *US Patent 2022*
Navita Goyal, Vipul Shankhpal, Priyanshu Gupta, **Ishika Singh**, Baldip Bijlani, Anandhavelu N [pdf]
US Patent No. 2022/0171935 | Adobe Research

Awards

2024	**Qualcomm Innovation Fellowship finalist**, US-wide fellowship program for PhD studnets	*USA*
2021	**USC Graduate Fellowship**, for 1 year of the Ph.D. program	*USA*
2020	**Adobe India Women in Technology Scholarship**, 5 undergrad/masters awardees nation-wide	*India*
2019-20	**Academic Excellence Award**, for both majors, given to **top 10%** students in the department	*India*
2019	**Grand Prize**, worth 6,800 USD, Deloitte TechnoUtsav2.0 AI competition, **1st** in 9.5K+ contestants	*India*

Academic Service

- Reviewer for conference papers: EMNLP'23, Humanoid'23, ICRA'24, RA-L'23, UR'24, RA-L'24, IROS'24.
- Reviewer for workshop proposals: RO-MAN'24.
- Mentored 4 BS/MS student for research projects in GLAMOR lab, on vision-language robot navigation in simulation and real-world, data cartography for sequential decision-making tasks, and robot learning.
- Co-organized vision-and-dialogue TEACh TATC Challenge at Embodied AI Workshop, CVPR'22 and CVPR'23.
- Presented project demos at Robotics Open House 2023 and 2024, hosted by USC Viterbi K-12 STEM Center.
- Student volunteer for: virtual organization of ICLR'20, ICML'20, etc.