Sonia Raychaudhuri, Ph.D. candidate

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PhD Advisor – Angel X. Chang
Affiliations – Simon Fraser University [3dlg-hcvc] [GrUVi]
Collaborators – Manolis Savva, Unnat Jain, Bernadette Bucher, and many more.

Summary

My research in embodied AI and multimodal reasoning focuses on pushing the boundaries of AI-driven autonomy, bridging vision, language and spatial reasoning to enhance robotic intelligence.
During my internship at the Robotics and AI Institute, I developed a novel natural-language grounded instruction-following method, demonstrating its zero-shot navigation capabilities on a real Spot robot. My work has been published in top-tier conferences, and I bring both academic rigor and industry experience, having previously worked as a Software Engineer.
I am passionate about advancing multimodal reasoning by integrating cutting-edge techniques to develop intelligent, adaptable and impactful solutions.

Skills

- Multimodal Reasoning, Natural Language Understanding, Embodied AI, Reinforcement Learning, Deep Learning, Visual SLAM, Python, PyTorch

Research Publications

1. S. Raychaudhuri, E. Cancelli, T. Campari, L. Ballan, M. Savva, and A. X. Chang, *LangNavBench: Evaluation of Natural Language Understanding in Semantic Navigation (under review)*, 2025. arXiv: 2507.07299. URL: https://3dlg-hcvc.github.io/langmonmap/.
2. S. Raychaudhuri and A. X. Chang, *Semantic Mapping in Indoor Embodied AI – A Survey on Advances, Challenges, and Future Directions (accepted to TMLR)*, 2025. arXiv: 2501.05750 [cs.RO]. URL: https://arxiv.org/abs/2501.05750.
3. S. Raychaudhuri, D. Ta, K. Ashton, A. X. Chang, J. Wang, and B. Bucher, *Zero-shot Object-Centric Instruction Following: Integrating Foundation Models with Traditional Navigation*, 2025. arXiv: 2411.07848. URL: https://sonia-raychaudhuri.github.io/nlslam/.
4. S. Raychaudhuri, T. Campari, U. Jain, M. Savva, and A. X. Chang, "MOPA: Modular Object Navigation With PointGoal Agents," in *WACV*, 2024. URL: https://3dlg-hcvc.github.io/mopa.
5. Q. Wu, S. Raychaudhuri, D. Ritchie, M. Savva, and A. X. Chang, "R3DS: Reality-linked 3D scenes for panoramic scene understanding," in *European Conference on Computer Vision*, Springer, 2024, pp. 452–468.
6. M. Deitke, D. Batra, Y. Bisk, *et al.*, *Retrospectives on the embodied ai workshop*, 2022. arXiv: 2210.06849 [cs.CV]. URL: https://arxiv.org/abs/2210.06849.
7. S. Raychaudhuri, S. Wani, S. Patel, U. Jain, and A. Chang, "Language-Aligned Waypoint (LAW) Supervision for Vision-and-Language Navigation in Continuous Environments," in *EMNLP*, 2021. URL: https://3dlg-hcvc.github.io/LAW-VLNCE.
8. X. Xu, D. Charatan, S. Raychaudhuri, *et al.*, "Motion annotation programs: A scalable approach to annotating kinematic articulations in large 3D shape collections," in *2020 International Conference on 3D Vision (3DV)*, IEEE, 2020, pp. 613–622.

Ongoing Projects

Fine-tuning VLM reasoning for semantic navigation, 2025. F. Taioli, S. Raychaudhuri, U. Jain, A. Chang.

Education

2020 – present — **Ph.D., Simon Fraser University** Computer Science
Thesis title: *Toward Navigation Agents that Understand and Generalize via Spatial Semantic Representations.*

2003 – 2007 — **B.E., Indian Institute of Engineering Science and Technology, Shibpur (IIEST)** in Information Technology

Employment History

Industry

January – June 2024 — **Research Intern.** Robotics and AI Institute, Cambridge, MA, USA.

2011 – 2019 — **Senior Software Engineer.** Ericsson India Global Services Pvt. Ltd., Kolkata, India.

2007 – 2011 — **Software Engineer.** Tata Consultancy Services Pvt. Ltd., Kolkata, India.

Teaching

Fall 2021 — **Graduate Teaching Assistant**, Natural Language Processing. Simon Fraser University, Burnaby, Canada.

Spring 2021 — **Graduate Teaching Assistant**, Grounded Natural Language Understanding. Simon Fraser University, Burnaby, Canada.

Fall 2020 — **Graduate Teaching Assistant**, Natural Language Processing. Simon Fraser University, Burnaby, Canada.

Miscellaneous Experience

Awards and Achievements

2022 — **Outstanding TA Award** Computer Science, Simon Fraser University.

Peer Reviews

Intl. Conferences. — ICRA, IROS, RA-L, CVPR, ICCV, ACL ARR, CRV, WACV, TPAMI, SIGGRAPH, SIGGRAPH Asia, IJCV, and more.

Others

July 2025 — **Volunteered** in WiML Symposium @ ICML.

June 2022 — **Co-hosted MultiON challenge**. Embodied AI Workshop @ CVPR. [video]

June 2023 — **Co-hosted MultiON challenge**. Embodied AI Workshop @ CVPR. [video]

June 2024 — **Co-hosted MultiON challenge**. Embodied AI Workshop @ CVPR. [video]

References

Available on Request