

Kushal Kedia

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Research Interests

Robotics & AI: Robot Learning, Reinforcement Learning, Human-Robot Interaction, Motion Planning

Academics

Ph.D. in Computer Science Cornell University	2022 - 2027 (expected)
B. Tech in Electronics (Minor: Computer Science) Indian Institute of Technology (IIT) Kharagpur	2018 - 2022 Grade: 9.53/10

Publications

- Kushal Kedia***, Yuki Wang*, Juntao Ren*, et al., and Sanjiban Choudhury. MOSAIC: Modular system for assistive and interactive cooking. *Under Review at RSS*, 2024 [Project Page]
- Kushal Kedia**, Atiksh Bhardwaj, Prithwish Dan, and Sanjiban Choudhury. InterACT: Transformer models for human intent prediction conditioned on robot actions. *IEEE International Conference on Robotics and Automation (ICRA)*, 2024 [Project Page]
- Kushal Kedia**, Prithwish Dan, Atiksh Bhardwaj, and Sanjiban Choudhury. ManiCast: Collaborative manipulation with cost-aware human forecasting. *7th Annual Conference on Robot Learning (CoRL)*, 2023 [Project Page]
- Kushal Kedia**, Prithwish Dan, and Sanjiban Choudhury. A game-theoretic framework for joint forecasting and planning. *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023 [Project Page]
- Punyajoy Saha, Divyanshu Sheth, **Kushal Kedia**, Binny Mathew, and Animesh Mukherjee. Rationale-guided few-shot classification to detect abusive language. *26th European Conference on Artificial Intelligence*, 2023 [PDF]
- Troy McMahon, Aravind Sivaramakrishnan, **Kushal Kedia**, Edgar Granados, and Kostas E. Bekris. Terrain-aware learned controllers for sampling-based kinodynamic planning over physically simulated terrains. *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022 [PDF]

Peer-Reviewed Workshop Papers

- Kushal Kedia***, R. Jenamani*, R. Kumar*, and P. Mall*. Robotic Motion Planning Using Learned Critical Sources & Local Sampling. In *MLPC Workshop, ICRA 2020* [PDF] [Video]
- Kushal Kedia** and A. Nandy. Offensive Language Identification in Dravidian Languages. In *First Workshop on Speech and Language Technologies for Dravidian Languages*, EACL 2021 [PDF] [Poster]

Technical Skills

Programming Languages: Python | C | C++ | MATLAB

Libraries & Tools: PyTorch | Keras | ROS | MuJoCo | PyBullet | OpenCV | NetworkX | Unix

Research Experiences

PoRTaL Group, Cornell University 🌐 *Guide: Prof. Sanjiban Choudhury* Jul '22 - Current

- Integrated human motion forecasting for collaborative manipulation
- Developing game-theoretic frameworks for joint forecasting and planning

PRACSYS Group, Rutgers University 🌐 *Guide: Prof. Kostas Bekris* Mar '21 - Apr '21

- Improving the efficiency of kinodynamic planning for mobile robots using data-driven techniques
- Contributed to **ML4KP**: A library for integrating machine learning with kinodynamic planning

Microsoft Research Labs India 📄 *Multilingual NLP Intern* April '21 - July '21

- Worked on predicting the performance of multilingual LLMs on low-resourced languages as part of Team LITMUS (Linguistically Informed Testing of Multilingual Systems)

Multi-Agent Research Group, IIT Kharagpur 📄 🌐 *Guide: Prof. Partha P. Chakrabari* Jan '21 - May '22

- Designed optimal Multi-Agent Path Finding (MAPF) algorithms for sequential task assignment and collision-free routing in manufacturing applications with inter-task precedence constraints

Hate Alert, IIT Kharagpur *Guide: Prof. Animesh Mukherjee* Dec '20 - Nov '21

- Developed explainable models for abusive language detection using rationale prediction networks

Kharagpur RoboSoccer Students Group 🌐 *3-D Simulation Humanoid Team* Feb '19 - Mar '21

- Worked on skills like passing & defense on top of C++ framework to enhance game strategy for Robocup
- Optimized parameters of walk-engine using CMA-ES; increased speed of humanoid from 5m/s to 9.5m/s

Mentorship and Outreach

Head, Technology Robotix Society, IIT Kharagpur

Leading a 3-tier team to execute the annual Robotix fest & conducting workshops; In charge of Makerspace - an open source lab for robotics enthusiasts seeking guidance & components

IEEE Mentor, Winter School of AI & Robotics, IIT Kharagpur

Mentored 100+ students in week-long workshops on Machine Learning & Image Processing

Reviewing Assignments

IJRR, RSS (2024), ICRA (2023, 2024), HRI (2024), IROS (2022), MRS (2023)

Awards and Achievements

- **Top 1% among 1400+** undergraduate students at IIT Kharagpur
- Part of **bronze-winning** contingent at the 9th Inter-IIT Tech-Meet
- Awarded **KVPY 2018 fellowship** by the Department of Science & Technology, India
- Among top 10 teams in the world that qualified for **RoboCup Humanoid League, 2021**
- Felicitated by **Chief Minister** of West Bengal for outstanding academic performance in ISC 2018