Debadeepta Dey

Distinguished Researcher, DataRobot

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Mission Statement

My mission is to make Generative AI more efficient: from more efficient foundational models, to more efficient agentic workflows. I draw from my core background in Reinforcement Learning, Imitation Learning, Planning and Combinatorial Optimization to aid me in this mission.

My superpower is leading lean, agile teams of AI researchers and engineers from fundamental research to product: I built a team of 7 researchers and engineers dedicated to Neural Architecture Search at Microsoft Research. My team published multiple NeurIPS, ICLR, ICML high-impact papers. Models from this research serve as efficient, real-time, on-device, text-prediction models for Microsoft Outlook, Word, PowerPoint and Teams which serve billions of queries a month. I also co-invented AirSIM which not only has become the leading open-source Robotics simulator but also spawned an enterprise-grade product at Microsoft.

I give back to the AI community by regularly Area Chairing for ICML, NeurIPS, ICLR.

Education

PhD in Robotics, The Robotics Institute, Carnegie Mellon University, 2015

MS in Robotics, The Robotics Institute, Carnegie Mellon University, 2012

BS in Electrical Engineering, Delhi College of Engineering, 2007

Experience

Years	Position	Organization
2024–present	Distinguished Researcher	DataRobot, Boston
2023–2024	Principal Researcher	Azure AI Frameworks, Redmond
2019–2023	Principal Researcher	Microsoft Research, Redmond
2015–2019	Senior Researcher	Microsoft Research, Redmond
2010–2015	PhD Student	The Robotics Institute, Carnegie Mellon
2013	Research Intern	Microsoft Research, Redmond
2010	Research Intern	Intel Research Labs, Pittsburgh
2007–2010	Research Tech Associate	The Robotics Institute, Carnegie Mellon

Publications

Thesis

Predicting Sets and Lists: Theory and Practice, *Debadeepta Dey, The Robotics Institute, Carnegie Mellon University, 2015*

Journals

A cascaded method to detect aircraft in video imagery, *Debadeepta Dey, Christopher Geyer, Sanjiv Singh, Matt Digioia, International Journal of Robotics Research, 2011*

Data-driven Planning via Imitation Learning, *Sanjiban Choudhury, Mohak Bhardwaj, Sankalp Arora, Ashish Kapoor, Gireeja Ranade, Sebastian Scherer, Debadeepta Dey, International Journal of Robotics Research, 2018* (IJRR Best Paper of the Year Shortlist)

Conference Proceedings (grouped by theme)

Efficient Deep Network Architectures

What Makes Convolutional Models Great on Long Sequence Modeling?, *Yuhong Li, Tianle Cai, Yi Zhang, Deming Chen, Debadeepta Dey, ICLR 2023*

LiteTransformerSearch: Training-free On-device Search for Efficient Autoregressive Language Models *Mojan Javaheripi, Shital Shah, Subhabrata Mukherjee, Tomasz L Religa, Caio CT Mendes, Gustavo H de Rosa, Sebastien Bubeck, Farinaz Koushanfar, Debadeepta Dey, NeurIPS 2022*

AutoDistil: Few-shot Task-agnostic Neural Architecture Search for Distilling Large Language Models *Dongkuan Xu, Subhabrata Mukherjee, Xiaodong Liu, Debadeepta Dey, Wenhui Wang, Xiang Zhang, Ahmed Hassan Awadallah, Jianfeng Gao, NeurIPS, 2022*

Neural Architecture Search: Insights from 1000 Papers *Colin White, Mahmoud Safari, Rhea Sukthanker, Binxin Ru, Thomas Elsken, Arber Zela, Debadeepta Dey, Frank Hutter, ArXiv, 2023*

A Deeper Look at Zero-Cost Proxies for Lightweight NAS *Colin White, Mikhail Khodak, Renbo Tu, Shital Shah, Sebastien Bubeck, Debadeepta Dey, ICLR 2022 (Blog Post Track)*

FEAR: A Simple Lightweight Method to Rank Architectures *Debadeepta Dey, Shital Shah, Sebastien Bubeck, ArXiv, 2021*

Boosting the Throughput and Accelerator Utilization of Specialized CNN Inference Beyond Increasing Batch Size *Jack Kosaian, Amar Phanishayee, Matthai Philipose, Debadeepta Dey, Rashmi Vinayak, ICML 2021*

Efficient Forward Architecture Search *Hanzhang Hu, John Langford, Rich Caruana, Eric Horvitz, Debadeepta Dey, Neural Information Processing Systems, (NeurIPS), 2019*

Anytime Neural Networks via Joint Optimization of Auxiliary Losses *Hanzhang Hu, Debadeepta Dey, J. Andrew Bagnell, Martial Hebert, Association for Advancement of Artificial Intelligence (AAAI), 2019*

Imitation Learning, Reinforcement Learning and Planning

Metareasoning in Modular Software Systems: On-the-Fly Configuration using Reinforcement Learning with Rich Contextual Representations *Aditya Modi, Debadeepta Dey, Alekh Agarwal, Adith Swaminathan, Besmira Nushi, Sean Andrist, Eric Horvitz, Association for Advancement of Artificial Intelligence (AAAI), 2020*

Vision-based Navigation with Language-based Assistance via Imitation Learning with Indirect Interventions *Khanh Nguyen, Debadeepta Dey, Chris Brockett, Bill Dolan, Computer Vision and Pattern Recognition, (CVPR), 2019*

Learn-to-Score: Efficient 3D Scene Exploration by Predicting View Utility *Benjamin Hepp, Debadeepta Dey, Sudipta Sinha, Ashish Kapoor, Neel Joshi, Otmar Hilliges, European Conference on Computer Vision (ECCV), 2018*

Adaptive Information Gathering via Imitation Learning, *Sanjiban Choudhury, Ashish Kapoor, Gireeja Ranade, Sebastian Scherer, Debadeepta Dey, Robotics Science and Systems (RSS), 2017*

Submodular Trajectory Optimization for Aerial 3D Scanning, *Mike Roberts, Debadeepta Dey, Anh Truong, Sudipta Sinha, Ashish Kapoor, Pat Hanrahan, Neel Joshi, International Conference on Computer Vision (ICCV), 2017*

Learning to Gather Information via Imitation, *Sanjiban Choudhury, Ashish Kapoor, Gireeja Ranade, Debadeepta Dey, International Conference on Robotics and Automation (ICRA), 2017*

Risk-Aware Algorithms for Adversarial Contextual Bandits, *Wen Sun, Debadeepta Dey, Ashish Kapoor, International Conference on Machine Learning (ICML), 2017*

No-regret Replanning Under Uncertainty, *Wen Sun, Niteesh Sood, Debadeepta Dey, Gireeja Ranade, Siddharth Prakash, Ashish Kapoor, International Conference on Robotics and Automation (ICRA), 2017*

Spoken language interaction with robots: Recommendations for future research *Matthew Marge, Carol Espy-Wilson, Nigel G Ward, Abeer Alwan, Yoav Artzi, Mohit Bansal, Gil Blankenship, Joyce Chai, Hal DaumÃl III, Debadeepta Dey, Mary Harper, Thomas Howard, Casey Kennington, Ivana Kruijff-KorbayovÃą, Dinesh Manocha, Cynthia Matuszek, Ross Mead, Raymond Mooney, Roger K Moore, Mari Ostendorf, Heather Pon-Barry, Alexander I Rudnicky, Matthias Scheutz, Robert St Amant, Tong Sun, Stefanie Tellex, David Traum, Zhou Yu, Computer Speech and Language, 2021*

MultiPoint: Cross-spectral registration of thermal and optical aerial imagery *Florian Achermann, Andrey Kolobov, Debadeepta Dey, Timo Hinzmann, Jen Jen Chung, Roland Siegwart, Nicholas Lawrance, CoRL 2021*

A recipe for creating multimodal aligned datasets for sequential tasks *Angela S Lin, Sudha Rao, Asli Celikyilmaz, Elnaz Nouri, Chris Brockett, Debadeepta Dey, Bill Dolan, ACL 2020*

Overcoming Blind Spots in the Real World: Leveraging Complementary Abilities for Joint Execution *Ramya Ramakrishnan, Ece Kamar, Besmira Nushi, Debadeepta Dey, Julie Shah, Eric Horvitz, Association for Advancement of Artificial Intelligence (AAAI), 2019*

Discovering Blind Spots in Reinforcement Learning *Ramya Ramakrishnan, Ece Kamar, Debadeepta Dey, Julie Shah, Eric Horvitz, International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS), 2018*

Flight Dynamics-based Recovery of a UAV Trajectory using Ground Cameras, *Artem Rozantsev, Sudipta Sinha, Debadeepta Dey, Pascal Fua, Computer Vision and Pattern Recognition (CVPR), 2017*

AirSim: High-fidelity Visual and Physical Simulation for Autonomous Vehicles, *Shital Shah, Debadeepta Dey, Chris Lovett, Ashish Kapoor, Field and Service Robotics (FSR), 2017*

Predicting Multiple Visual Structured Prediction, *Debadeepta Dey, Varun Ramakrishna, Martial Hebert, J. Andrew Bagnell, International Conference on Computer Vision (ICCV), 2015*

Vision and Learning for Deliberative Monocular Cluttered Flight, *Debadeepta Dey, Kumar Shaurya Shankar, Sam Zeng, M. Talha Agcayazi, Christopher Eriksen, Shreyansh Daftry, Martial Hebert, J. Andrew Bagnell, Field and Service Robotics (FSR), 2015*

Gauss Meets Canadian Traveler: Shortest-Path Problems with Correlated Natural Dynamics, *Debadeepta Dey, Andrey Kolobov, Rich Caruana, Ece Kamar, Eric Horvitz, Ashish Kapoor, Autonomous Agents and Multi-Agent Systems (AAMAS), 2014*

Learning Policies for Contextual Submodular Prediction, *Stephane Ross, Jiaji Zhou, Yisong Yue, Debadeepta Dey, J. Andrew Bagnell, International Conference on Machine Learning (ICML), 2013*

Learning Monocular Reactive UAV Control in Cluttered Natural Environments, *Stephane Ross, Narek Melik-Barkhudarov, Kumar Shaurya Shankar, Andreas Wendel, Debadeepta Dey, J. Andrew Bagnell, Martial Hebert, International Conference on Robotics and Automation (ICRA), 2013*

Contextual Sequence Optimization with Application to Control Library Optimization, *Debadeepta Dey, Tommy Liu, Martial Hebert, J. Andrew Bagnell, Robotics Science and Systems (RSS), 2012*

Efficient Optimization of Control Libraries, *Debadeepta Dey, Tommy Liu, Boris Sofman, J.Andrew Bagnell, Association for Advancement of Artificial Intelligence (AAAI), 2012*

Classification of Plant Structures from Uncalibrated Image Sequences, *Debadeepta Dey, Lily Mummert, Rahul Sukthankar, Workshop on Applications of Computer Vision (WACV), 2012*

Passive long-range detection of Aircraft: Towards a field deploy-able Sense and Avoid System, *Debadeepta Dey, Christopher Geyer, Sanjiv Singh, Matthew Digioia, Field and Service Robotics (FSR), 2009*

Technical Reports and Workshops

Metareasoning in Modular Software Systems: On-the-Fly Configuration using Reinforcement Learning with Rich Contextual Representations *Aditya Modi, Debadeepta Dey, Alekh Agarwal, Adith Swaminathan, Besmira Nushi, Sean Andrist, Eric Horvitz, Reinforcement Learning for Real Life Workshop at ICML 2019*

Efficient Forward Architecture Search *Hanzhang Hu, John Langford, Rich Caruana, Eric Horvitz, Debadeepta Dey AutoML Workshop at ICML 2019*

Macro Neural Architecture Search Revisited *Hanzhang Hu, John Langford, Rich Caruana, Eric Horvitz, Debadeepta Dey, Metalearning Workshop at NeurIPS 2018*

Robust Monocular Flight in Cluttered Outdoor Environments *Shreyansh Daftry, Sam Zeng, Arbaaz Khan, Debadeepta Dey, Narek Melik-Barkhudarov, J. Andrew Bagnell, Martial Hebert, Workshop on Vision-based High Speed Autonomous Navigation of UAVs, International Conference on Intelligent Robots and Systems, 2016*

Towards Fast Safe Motion Planning *Debadeepta Dey, Dorsa Sadigh, Ashish Kapoor, Robotics Science and System Workshop on Task and Motion Planning, 2016*

Probabilistic Safety Programs, *Ashish Kapoor, Debadeepta Dey, Shital Shah, ArXiv, 2016*

Predicting Contextual Sequences via Submodular Function Maximization, *Debadeepta Dey, Tian Yu Liu, Martial Hebert, J. Andrew Bagnell, CMU-RI-TR-12-05, The Robotics Institute, Carnegie Mellon University, 2012.*

Efficient Optimization of Control Libraries, *Debadeepta Dey, Tian Yu Liu, Boris Sofman, J. Andrew Bagnell, CMU-RI-TR-11-20, The Robotics Institute, Carnegie Mellon University, 2011.*

Prototype Sense-and-Avoid System for UAVs, 2009, *Christopher Geyer, Debadeepta Dey, Sanjiv Singh, Technical Report, Robotics Institute, Carnegie Mellon University*

Academic Service

Teaching Experience: Co-taught Reinforcement Learning for Robotics section of University of Washington's graduate course Robotics: Algorithms and Applications, Winter 2019.

Senior Area Chair: Automl-Conf 2022

Area Chair: ICML 2020, NeurIPS 2020, NeuIPS 2021, NeurIPS 2022, ICML 2025

Regular Reviewer: NeurIPS, ICML, ICLR

Occasional Reviewer: AAAI, IJCAI, JFR, JMLR, ICRA, IROS, ICCV, CVPR, ECCV

Reviewer awards: NeurIPS 2018, ICLR 2019, NeurIPS 2019 (top 50% of reviewers)

Sponsorship and Publicity Chair 1st Conference on Robot Learning (CoRL) 2017

Selected Invited Talks

Fireside Chat on AutoML *State Of The Art Conference, 2022*

Neural Architecture Search: Trends and Open Problems *Oregon State University, February 2021*

Decision-making in Robotics with Vision-in-the-Loop: Best Practices and Open Problems *CVPR 2020 Workshop on Fair, Data-Efficient and Trusted Vision, June 2020*

Imitation Learning with Indirect Oracles, Robotics Colloquium *University of Washington, November 2019*

Learning via Interaction for Machine Perception and Control *University of Maryland, September 2018*

Imitating the Clairvoyant Oracle: Information Gathering, Planning and Grounded Visual Navigation *New York University, August 2018*

Trends in Learning and Robotics *UW-MSR Summer Institute on Social Robotics, August, 2018*

Data-driven Information Gathering via Imitation Learning *The Robotics Institute, Carnegie Mellon University, January 2018*

Is ML Ready for Robotics?, *High Performance Computing Conference, December 2018*

Adaptive Information Gathering via Imitation Learning *Symposium on Aerial Robotics, University of Pennsylvania, June 2017*

Learning via Interaction for Machine Perception and Control *Robotics Colloquium, University of Washington, April 2017*

Vision, Learning and Control for UAV Flight in Dense Clutter *Workshop on Vision-based High Speed Autonomous Navigation of UAVs, IROS 2016*

Fast, Safe Perception Planning and Control *Workshop on Safe Cyber-Physical Systems, Faculty Summit, Microsoft Research, 2016*

Improving Agent Behavior via Submodular Sequence Optimization *Microsoft Research, 2015*

Vision and Learning for UAVs *National Robotics Engineering Consortium, 2015*

Multiple Prediction Learning: Improving Robot Behavior via Submodular Sequence Optimization *Jet Propulsion Laboratories, NASA, 2014*

Shortest-Path Problems with Correlated Natural Dynamics *Social Intelligence: Learning, Aggregation and Applications, INFORMS 2014*