Debadeepta Dey

Principal Researcher, Microsoft Research AI
Affiliate Assistant Professor,
University of Washington

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Research Interests

AI, Machine Learning: Decision-making under constraints of uncertainty and computation, Reinforcement Learning, Optimization, Deep Learning, Graphical Models, Structured Prediction

Robotics: Perception for autonomous aerial and ground robots, 3D reconstruction, Path Planning, Mapping and Navigation

Education

PhD in Robotics, The Robotics Institute, Carnegie Mellon University (July, 2015)

MS in Robotics, The Robotics Institute, Carnegie Mellon University (July, 2012)

BS in Electrical Engineering, Delhi College of Engineering, Delhi, India, 2007

Research Experience

Position	Place	Duration	References
Principal Researcher	Microsoft Research, Redmond	Sept 2019 onwards	Dr. Eric Horvitz
Senior Researcher	Microsoft Research, Redmond	Aug 2015-July 2019	Dr. Eric Horvitz
PhD Student	The Robotics Institute, Pittsburgh	Aug 2010-July 2015	Prof. J. Andrew Bagnell
Research Intern	Microsoft Research, Redmond	July-Sept 2013	Dr. Rich Caruana Dr. Eric Horvitz
Research Intern	Intel Research Labs, Pittsburgh	June-Aug 2010	Dr. Lily Mummert Dr. Rahul Sukthankar
Research Technology Associate	The Robotics Institute, Carnegie Mellon University	2007-2010	Prof. Sanjiv Singh

Programming Skills

Programming Languages: Python (proficient), C++, C#.
Extensive experience developing on real robots with Linux, ROS, OpenCV, etc.
Deep Learning Frameworks: PyTorch, Tensorflow.

Publications

Preprints

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

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*

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

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*

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*

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*

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*

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*

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*

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*

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*

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.

Area Chair: ICML 2020, NeurIPS 2020

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

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*