Namrata **Deka**

Computer Science · MSc.

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Education

The University of British Columbia (UBC)

Vancouver, Canada

Master of Science in Computer Science

2020 - Present

- GPA: 91.3/100

Indraprastha Institute of Information Technology (IIITD)

New Delhi, India

Bachelor of Technology in Computer Science and Engineering

2013 - 2017

- GPA: 8.41/10
- Among the 10% in the class to graduate with Honors

Experience

The University of British Columbia

Vancouver, Canada

Graduate Research Assistant

September 2020 - Present

- Advisor: Dr. Danica J. Sutherland
- I am investigating deep kernel methods to learn fair and invariant representations of high-dimensional data samples using statistical two-sample testing objectives and integral probability metrics.

École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

Research Intern, Summer@EPFL

June 2021 - August 2021

- Advisor: Dr. Amir Zamir
- I am developing a deep neural network method to learn articulated object models from monocular videos using optical flow and depth estimates.

Wadhwani Institute for Artificial Intelligence

Mumbai, India

Research Fellow

August 2018 - August 2020

- Mentors: Dr. Rahul Panicker, Dr. P. Anandan and Dr. Alpan Raval
- Built an AI-based solution to screen low birth-weight babies using monocular videos for public health sectors in rural India.
- Built a pipeline to generate and annotate synthetic videos of infants using a differentiable renderer.
- Created a novel deep learning algorithm to reconstruct infant meshes to metric scale using deformable models of reference objects in the scene.
- Mentored and managed interns and their research projects.

Microsoft Research

Bengaluru, India

Research Intern

Jan 2018 - July 2018

- Mentor: Dr. Sreangsu Acharyya
- Built a classifier to identify very rare personally identifiable information (P.I.I.) of customers using a pairwise-optimization method.
- Achieved an AUROC of 99.8% for the rarest P.I.I. tag which accounted for only 0.54% of the entire dataset.
- The resulting model was adopted by internal teams across Microsoft to comply with the EU-GDPR mandate.

Publications

- **N. Deka**, D. Sutherland. "Learning Privacy-Preserving Deep Kernels with Known Demographics." In *In Proceedings of the 36th AAAI Conference on Artificial Intelligence. Workshop on Privacy-Preserving Artificial Intelligence. 2022.*

Projects

Open-ended Evolution of Embodied Intelligence in Mutating Environments

Vancouver, BC

Graduate Project, UBC

October 2021 - Present

- Mentor: Dr. Jeff Clune
- I am developing an open-ended algorithm using reinforcement learning and evolutionary strategies to continuously co-evolve agent morphologies and environmental complexities to create a diverse population of agents that can learn to perform tasks faster and better.
- Tools & Frameworks: PyTorch, OpenAI Gym

Amortized Inference with Rejection Loops for Autonomous Vehicles

Vancouver, BC

Graduate Project, UBC

March 2021 - April 2021

- Mentor: Dr. Frank Wood
- Created a probabilistic generative model for traffic at road intersections using the CARLA simulation engine and PyProb.
- Performed amortized inference over the number of cars in the scene using inference compilation and amortized rejection loop-based importance sampling.
- Tools & Frameworks: PyTorch, PyProb, CARLA Python API

Push-Nav: Self-Supervised Learning of Task-Based Object Representations for Navigation Through Clutter

Vancouver, BC

Graduate Project, UBC

Oct 2020 - Dec 2020

- Mentor: Dr. Ian Mitchell
- Developed a reinforcement learning-based system where a robot can learn task-based physical properties of objects that can maximize expected rewards.
- Policy learning is augmented with a self-supervised dense optical flow objective to incentivise the learning of physical representations.
- Tools & Frameworks: PyBullet, OpenAI Gym, PyTorch, Weights & Biases

Novel Scene Generation via Decomposition

Vancouver, BC

Graduate Project, UBC

Sep 2020 - Dec 2020

- Mentor: Dr. Helge Rhodin
- Developed a deep generative model to synthesize novel scenes by rearranging objects in a given image.
- Tools & Frameworks: PyTorch, Weights & Biases

Understanding Human Behaviour for Autonomous Vehicle Path Planning

New Delhi, India

Undergraduate Research Project, IIITD

July 2016 - August 2017

- Mentors: Dr. Saket Anand and Dr. Sanjit Kaul
- Studied and implemented simple imitation learning methods to gain insights from cost-maps used by Indian drivers to make driving decisions.
- Implemented detection and tracking algorithms for pedestrians and vehicles.
- Also worked on sensor cross-calibration, 3D mapping of outdoor scenes and analysis of vehicle trajectory behaviour with respect to other agents on the road.
- Tools & Frameworks: Python, Matlab, TensorFlow, ROS

Teaching Experience

The University of British Columbia

Vancouver, Canada

Graduate Teaching Assistant

January 2021 - April 2021

- Intelligent Systems - Level 400 (110 students)

Indraprastha Institute of Information Technology (IIITD)

New Delhi, India

Teaching Assistant

August 2015 - April 2016

- Computer Vision - Graduate Level (42 students)
- Advanced Programming - Undergraduate Level (200 students)

Invited Talks

Perceiving Systems Department, Max Planck Institute for Intelligent Systems (MPI-IS)

Tübingen, Germany

Neonatal Anthropometry and Growth Tracking via model based 3D Reconstruction from Video

November 2019

Volunteering Experience

Pygmy Hog Breeding Center, EcoSystems India

Guwahati, India

Summer Research Volunteer

July 2014

- Observed pygmy hogs (highly-endangered) and gained insights into litter-behaviour.
- Aided in various animal husbandry tasks essential for the survival of the species in the breeding center.