

MACHINE LEADNING . PH D STUDEN

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## Summary\_

I am a Machine Learning Ph.D. student at Carnegie Mellon University. My research interest spans the intersection of machine learning, causality and computer vision for learning robust causal representations. I am proficient in Python and work extensively with deep learning frameworks like PyTorch and Tensorflow. **Actively seeking student research positions starting May 2024.** I have authorization to work full-time in Canada (PGWP) and can obtain authorization to work in the USA (CPT).

### Education\_

**Carnegie Mellon University** 

Pittsburgh, USA 2023 - Present

Ph.D., Machine Learning

**University of British Columbia** 

Vancouver, Canada

M.Sc., COMPUTER SCIENCE

2020 - 2023

• GPA: 91.33/100

#### **Indraprastha Institute of Information Technology**

New Delhi, India

B.Tech., Computer Science and Engineering

2013 - 2017

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

## **Publications**

#### **Peer-Reviewed Conferences**

- R. Pogodin\*, N. Deka\*, Y. Li\*, D. Sutherland, V. Veitch, A. Gretton. Efficient Conditionally Invariant Representation Learning. In Proceedings of the 11th International Conference on Learning Representations (ICLR), 2023. (Oral/Top 5%) \*Equal Contribution. arXiv:2212.08645
- N. Deka, D. Sutherland. MMD-B-Fair: Learning Fair Representations with Statistical Testing. *In Proceedings of the 26th International Conference on Artificial Intelligence and Statistics (AISTATS), 2023.* arXiv:2211.07907

#### **Workshops & Technical Reports**

- N. Deka, D. Sutherland. Learning Privacy-Preserving Deep Kernels with Known Demographics. *In Proceedings of the 36th AAAI Conference on Artificial Intelligence. Workshop on Privacy-Preserving Artificial Intelligence*, 2022. aaai-ppai22.github.io/files/30.pdf
- D. Sutherland, N. Deka. Unbiased estimators for the variance of MMD estimators. Technical report, 2022. arXiv:1906.02104

## Experience \_\_\_\_\_

# Borealis AI

Vancouver, Canada

MACHINE LEARNING RESEARCH INTERN

September 2022 - January 2023

- Advisor: Dr. Frederick Tung
- · Audited deep learning models for automated discovery of systematic errors in under-represented groups

## **University of British Columbia**

Vancouver, Canada

September 2020 - April 2023

GRADUATE RESEARCH ASSISTANT

- Advisor: Dr. Danica J. Sutherland
- Worked in the intersection of representation learning and kernel methods with applications in invariance and fairness.
- Developed a novel fair representation learning paradigm using statistical two-sample tests.
- Developed kernel measures of conditional independence to learn counterfactually invariant representations.

### École Polytechnique Fédérele de Lausanne (EPFL)

Lausanne, Switzerland

RESEARCH INTERN, SUMMER@EPFL

June 2021 - August 2021

- Advisor: DR. AMIR ZAMIR
- · Conducted research to learn articulated object models from video using 3D optical flow and depth estimates.

#### Wadhwani Institute for Artificial Intelligence

Mumbai, India

RESEARCH FELLOW August 2018 - August 2020

- Advisors: Dr. Rahul Panicker and Dr. Alpan Raval
- Built a 3D vision-based solution to screen low birth-weight babies using smartphone-captured videos for public health sectors in rural India.
- Built a pipeline to generate and annotate synthetic videos of infants using a differentiable renderer.
- Developed a novel deep learning algorithm to reconstruct 3D infant meshes to metric scale with deform-able models of reference objects.
- Mentored and managed intern research projects.

**Microsoft Research** Bengaluru, India

RESEARCH INTERN

January 2018 - July 2018

- Advisor: Dr. Sreangsu Acharyya
- · Built a classifier to identify very rare personally identifiable information (P.I.I.) of customers using a pairwise-AUROC 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.
- Resulting model was adopted by internal teams across Microsoft to comply with the EU-GDPR mandate.

### 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

## **Projects**

#### Open-ended Evolution of Embodied Intelligence in Mutating Environments

Vancouver, Canada

GRADUATE COURSE PROJECT, UBC

October 2021 - December 2021

- Mentor: DR. JEFF CLUNE
- Developed 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

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

Vancouver, Canada

GRADUATE COURSE PROJECT, UBC

October 2020 - December 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.
- Augmented policy learning 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, Canada

GRADUATE COURSE PROJECT, UBC

September 2020 - December 2020

- Mentor: Dr. Helge Rhodin
- Developed a deep generative model to synthesize novel scenes by rearranging objects in images.
- · Used a stacked VAE architecture with W-GANs to learn plausible distributions of object-centric shifts for each object in the image.
- Tools & Frameworks: PyTorch, Weights & Biases

# Teaching \_\_\_\_\_

#### **University of British Columbia**

Vancouver, Canada

GRADUATE TEACHING ASSISTANT

Multiple Semesters

• Intelligent Systems - Level 400 (>100 students)

New Delhi, India

TEACHING ASSISTANT

Multiple Semesters

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

Indraprastha Institute of Information Technology (IIITD)

NAMRATA DEKA · RÉSUMÉ AUGUST 15, 2023