Divyam Madaan

Contact Information

New York University
E-mail: divyam.madaan@nyu.edu
Homepage: dmadaan.com

Research Interests

I am primarily interested in learning representations continually on a data stream while making them interpretable and robust to distribution shifts.

Education

New York University, New York, United States

Ph.D., Computer Science, Courant Institute of Mathematical Sciences — 2021 – Present

- Advisors: Sumit Chopra and Kyunghyun Cho
- GPA: 3.96/4.00

KAIST, Daejeon, Republic of Korea

M.S., School of Computing — 2019 – 2021

- Thesis: Generalizable Robust Deep Learning via Adversarial Pruning and Meta-Noise Generation
- Advisor: Sung Ju Hwang
- Committee: Jinwoo Shin, Eunho Yang
- GPA: 4.21/4.30

Panjab University, Chandigarh, India

B.E. (with Honors) in Information Technology — 2015 – 2019

- GPA: 9.21/10

Work Experience

NVIDIA — Summer 2022
Researcher, with Honxu Yin, Wonmin Byeon, Pavlo Molchanov and Jan Kautz
Explore continual learning on a stream of data with heteregenous architectures.

FOR.ai — 2018 – 2020
Machine Learning Researcher, with Aidan Gomez and Yarin Gal
Explore sparse-ensembles and adversarial robustness to train robust and efficient models.

Celestini Project India — Summer 2018
Research Intern, with Aakanksha Chowdhery and Brejesh Lall
Develop an end-to-end real-time system for multivariate air-pollution forecasting of Delhi.

Google Summer of Code, KDE — Summer 2017
Open Source Contributor, with GCompris
Implement strategic and musical activities to identify the notes and teach the piano instrument.

Conference Publications

[1] **Heterogeneous Continual Learning**
Divyam Madaan, Hongxu Yin, Wonmin Byeon, Jan Kautz, Pavlo Molchanov,
Conference on Computer Vision and Pattern Recognition (CVPR) 2023, Vancouver, Canada. (**highlight presentation**) (**acceptance rate = 10%**)

[2] **What Do NLP Researchers Believe? Results of the NLP Community Metasurvey**
Julian Michael, Ari Holtzman, Alicia Parrish, Aaron Mueller, Alex Wang, Angelica Chen, **Divyam Madaan**, Nikita Nangia, Richard Yuanzhe Pang, Jason Phang, Samuel R. Bowman,
Association for Computational Linguistics (ACL) 2023, Toronto, Canada.
(long paper) (acceptance rate = 23.5%)

[3] **On Sensitivity and Robustness of Normalization Schemes to Input Distribution Shifts in Automatic MR Image Diagnosis**
Divyam Madaan, Daniel Sodickson, Kyunghyun Cho, Sumit Chopra,
Medical Imaging with Deep Learning (MIDL) 2023, Nashville, USA.

[4] **Representational Continuity for Unsupervised Continual Learning**
Divyam Madaan, Jaehong Yoon, Yuanchun Li, Yunxin Liu, Sung Ju Hwang,
International Conference on Learning Representations (ICLR) 2022, Online.
(oral presentation) (acceptance rate = 1.6%)

[5] **Online Coreset Selection for Rehearsal-based Continual Learning**
Jaehong Yoon, **Divyam Madaan**, Eunho Yang, Sung Ju Hwang,
International Conference on Learning Representations (ICLR) 2022, Online.
(**acceptance rate = 32.9%**)

[6] **Learning to Generate Noise for Multi-Attack Robustness**
Divyam Madaan, Jinwoo Shin, Sung Ju Hwang,
International Conference on Machine Learning (ICML) 2021, Online.
(**acceptance rate = 21.5%**)

[7] **Adversarial Neural Pruning with Latent Vulnerability Suppression**
Divyam Madaan, Jinwoo Shin, Sung Ju Hwang,
International Conference on Machine Learning (ICML) 2020, Online.
(**acceptance rate = 21.8%**)

WORKSHOP PRESENTATIONS

[8] **Temporal Fine-tuning of Medical Vision-Language Representations**
Haoxu Huang, Cem M. Deniz, Kyunghyun Cho, Sumit Chopra, **Divyam Madaan**,
Workshop on Medical Imaging meets NeurIPS, 2023, New Orleans, USA.

[9] **Separating Multimodal Modeling from Multidimensional Modeling for Multimodal Learning**
Divyam Madaan, Taro Makino, Sumit Chopra, Kyunghyun Cho,
ICML Workshop on Spurious correlations, Invariance, and Stability 2023,
Hawaii, USA.

[10] **Learning to Generate Noise for Multi-Attack Robustness**
Divyam Madaan, Jinwoo Shin, Sung Ju Hwang
NeurIPS Workshop on Meta-Learning (MetaLearn) 2020, Online.

[11] **Adversarial Neural Pruning**
Divyam Madaan, Jinwoo Shin, Sung Ju Hwang
NeurIPS Workshop on Safety and Robustness in Decision Making 2019,
Vancouver, Canada.

PREPRINTS

[12] **A Framework for Multi-modal Learning: Jointly Modeling Inter- & Intra-Modality Dependencies**
Divyam Madaan, Taro Makino, Sumit Chopra, Kyunghyun Cho
Manuscript, 2024

[13] **Predicting Risk of Alzheimer's Diseases and Related Dementias with AI Foundation Model on Electronic Health Records**
Weicheng Zhu, Huanze Tang, Hao Zhang, Haresh Rengaraj Rajamohan, Shih-Lun Huang, Xinyue Ma, Ankush Chaudhari, **Divyam Madaan**, Elaf Almahmoud, Sumit Chopra, John A Dodson, Abraham A Brody, Arjun V Masurkar, Narges Razavian
Manuscript, 2024

[14] **Learning Sparse Networks Using Targeted Dropout**
Aidan N. Gomez, Ivan Zhang, Siddhartha Rao Kamalakara, **Divyam Madaan**, Kevin Swersky, Yarin Gal, Geoffrey E. Hinton
Manuscript, 2019

ACADEMIC SERVICE

Journal Reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- International Journal of Computer Vision (IJCV)

Conference Reviewer

- International Conference on Learning Representations (ICLR) 2022 – 2024
- Neural Information Processing System (NeurIPS) 2020 – 2024
- International Conference on Machine Learning (ICML) 2020 – 2024
- Conference on Lifelong Learning Agents (CoLLAs) 2023
- ContinualAI Unconference 2023
- Association for the Advancement of Artificial Intelligence (AAAI) 2021
- Asian Conference on Machine Learning (ACML) 2020

Workshop Reviewer

- Neural Information Processing System Meta-Learning Workshop 2020
- ICML New Frontiers in Adversarial Machine Learning Workshop 2022

Student Volunteer

- International Conference on Machine Learning (ICML) 2020 – 2022
- International Conference on Learning Representations (ICLR) 2020, 2022
- Neural Information Processing System (NeurIPS) 2020, 2022

HONORS

- Neural Information Processing System Top Reviewer $(1000/10406 = 0.1\%)$ 2022
- NYU MacCracken PhD Fellowship 2021 – Present
- International Conference on Machine Learning Top Reviewer 2020
- KAIST International Students Scholarship 2019 – 2021

TEACHING

Teaching Assistant

- Causal Inference (DS-GA 3001.003) Spring 2024
  - Prepared and taught four recitations.
  - Held office hours, graded, answered questions.
- Fundamentals of Machine Learning (CSCI-UA 473-1.011) Fall 2023
  - Taught three lectures to a class for twenty students.
  - Held office hours, prepared problem sets, and answered questions.
- Machine Learning for Healthcare (CSCI-GA 3033.083 and DS-GA 3001.002) Fall 2022
  - Prepared and taught weekly recitations.
  - Held office hours, graded, answered questions.

ADVISING

- **Research Mentees:**
  - Matthew Dong (BS student at NYU) 02/2023 – Present
  - Haoxu Huang (MS student at NYU $\rightarrow$ Ph.D. student at NYU) 02/2023 – Present
  - Michael Sun (MS student at Stanford $\rightarrow$ Ph.D. student at MIT) 08/2022 – 02/2023
- **Mentor**, Codementor 2018 – 2021
- **Mentor**, Google Summer of Code (university students) Summer 2018
- **Mentor**, Google CodeIn (pre-university students) Winter 2018
- **Mentor**, Season of KDE (university students) Winter 2019

INVITED TALKS

- Representational Continuity for Unsupervised Continual Learning, ContinualAI 2022
- Fooling and protecting deep learning models, Pydata Conference 2018
- Getting started with GCompris, KDE India Conference 2017