

Divyam Madaan

(+82) 010-5164-1997 ✉ dmadaan@kaist.ac.kr 🌐 dmadaan.com

Education

KAIST, Republic of Korea

Masters, Computer Science

Sept. 2019 – (Expected) May 2021

GPA: 4.24/4.30

- Supervise by Professors [Sung Ju Hwang](#) and [Jinwoo Shin](#).
- Working on the reliability and scalability of deep neural networks.

Panjab University, India

Bachelor of Engineering With Honours, Information Technology

Aug. 2015 – May 2019

CGPA: 9.21/10

- Fourth position in B.E. program in Information Technology Department (120 students).

Relevant coursework: Machine Learning for AI* (A⁺), Advanced Deep Learning* (A⁺), Advanced Information Security* (A⁺), Design and Analysis of Algorithm* (A⁺), Network Security and Cryptography (A⁺), Operating System (A), Theory of Computation (A), Discrete Mathematics (A⁺), Software Engineering (A⁺)

* indicates graduate level

Research Interests

Adversarial robustness, Network compression, Ensemble learning, Meta learning

Publications

Divyam Madaan, Jinwoo Shin, and Sung Ju Hwang. Learning to generate noise for robustness against multiple perturbations, Under Review at ICLR 2020 [[paper](#)]

Divyam Madaan, Jinwoo Shin, and Sung Ju Hwang. Adversarial neural pruning. In *NeurIPS Safety and Robustness in Decision Making Workshop 2019; ICML, 2020* [[paper](#), [code](#), [slides](#), [video](#)]

Aidan N. Gomez, Ivan Zhang, Siddhartha Rao Kamalakara, **Divyam Madaan**, Kevin Swersky, Yarin Gal, and Geoffrey E. Hinton. Learning sparse networks using targeted dropout, 2019 [[paper](#)]

Divyam Madaan*, Radhika Dua*, Prerana Mukherjee, and Brejesh Lall. VayuAnukulani: adaptive memory networks for air pollution forecasting. In *IEEE GlobalSIP, 2019* [[paper](#), [code](#), [slides](#)]

* indicates equal contribution

Experience

Reliability and scalability of networks

Machine Learning Researcher

FOR.ai

May 2018 – Present

- Lead a group of students and new researchers across the world to conduct research in deep learning.
- Currently leading the effort to enhance the diversity and efficiency of sparse ensembles.
- Worked on research topics relating to adaptive computation time, adversarial examples and pruning.

Multivariate time series forecasting of air pollution

Research Intern | Advisors: [Dr Aakanksha Chowdhery](#) and [Professor Brejesh Lall](#)

IIT Delhi

June 2018 – Aug. 2018

- Developed attention based architecture for tackling long term dependencies of different air pollutants to make reliable and accurate sequence predictions.
- Created a progressive web-application with Django to display real-time air-quality predictions.
- Our work was selected to present at IEEE Global Conference on Signal and Information Processing, 2019.

Google Summer of Code, KDE [[status report](#)]

Software Developer

May 2017 – Sept. 2017

- Implemented the AI and multi-player mode for Oware, a strategy activity for GCompris using JavaScript and Qt5.
- Formulated an activity play piano to help kids to learn to play piano.
- Implemented note names activity to help kids identify notes.

Season of KDE [[code](#)]

Software Developer

Nov. 2016 – Feb. 2017

- Designed and implemented the categorization activity for images and words with 30 categories using Qt5 and JavaScript.
- The developed activity is used in a large number of students in Europe to teach the concepts of categorization.
- Implemented the background music functionality in GCompris in C++ and Qt5.

Projects

- **Multi-agent variational reinforcement learning**
KAIST *Oct. 2020 – Present*
 - Working on the improvement of the Variational Inference for Reinforcement learning (ViREL) framework by exploring better estimates of the residual error.
 - Scaling the variational inference framework to multi-agent reinforcement learning.
- **Diversity promoting sparse ensembles**
FOR.ai *Jan. 2020 – Present*
 - Working on the formulation of sparse ensembles by promoting diversity using Information Bottleneck.
 - Scaling up experiments to consider state-of-the-art compression techniques.
- **Adversarial robustness using shake shake regularization**
FOR.ai *Aug. 2018 – Mar. 2019*
 - Worked on a different approaches to emulate the shake shake regularization as an ensemble of networks to reduce the model's sensitivity to small perturbation.
 - Formulated Refusal of Response to refuse the classification of samples with high uncertainty.
- **Adaptive computation time** [code]
FOR.ai *Jan. 2018 – April 2018*
 - Proposed an alternative ponder cost function to the paper Adaptive Computation Time for RNNs by Alex Graves.
 - Implemented a new ponder cost which relaxes the objective constraints when the model is struggling and then asks for computation efficiency when the model has solved the problem.
 - The proposed new ponder cost achieved higher accuracy and converged faster than the old ponder cost and transitional RNN in parity task, though performed similarly in sort and addition tasks.

Technical and Personal skills

- **Programming Languages:** C, C++, Python, HTML, CSS, Javascript Arduino, \LaTeX
- **Technologies and Frameworks:** Linux, Git, Docker, OpenCV, PyTorch, TensorFlow, Keras, Qt, Django
- **General Business Skills:** Good presentation skills, Work well in a team

Leadership and Mentoring Experience

- **Codementor** *Sept. 2018 – Present*
Mentor at Codementor
- **Mentor** *Dec. 2017 – Jan. 2019*
Mentored students for Google Summer of Code, Google CodeIn, and Season of KDE
- **Programming Club** *Aug. 2017 – Sept. 2018*
Founded the community which has grown to 700+ members.
- **Software Freedom Day** *Sept. 2017*
Co-organizer and speaker at Software Freedom Day.

Talks

- **Pydata Conference** *Aug. 2018*
Fooling and protecting deep learning models [video]
- **KDE India Conference** *March 2017*
Getting started with GCompris.

Service

- **Conference Reviewer**
ICML 2020 (Top 33%), ACML 2020, NeurIPS 2020, AAI 2021
- **Workshop Reviewer**
NeurIPS Meta Learning Workshop 2020
- **Volunteer**
ICLR 2020, ICML 2020