### **Pulkit Madaan**

pulkit.madaan@ymail.com | madaanpulkit.github.io | Baltimore, Maryland, USA

### **Education**

Johns Hopkins University
MSE COMPUTER SCIENCE

#### **Incoming Fall 2022**

### Indraprastha Institute of Information Technology Delhi

B.Tech in Computer Science and Applied Mathematics [Thesis]

#### Aug 2020

CGPA: 9.23/10.0

Best Academic Performance in B.Tech. CSAM

### Skills

Languages: Python, Java, C++, Bash

**Other:** PyTorch, Jupyter, Git, Torchtext, ŁTEX, Streamlit, Numpy, scikit-learn, PyTorch Lightning, Detectron2, Voxel51, Docker, Hydra

### **Publications**

- White, J., **Madaan, P.**, Shenoy, N., Agnihotri, A., Sharma, M., & Doshi, J. (2022). A Case for Rejection in Low Resource ML Deployment. arXiv preprint arXiv: 2208.06359. [preprint] [LINK]
- Madaan, P., Maiti, A., Anand, S., & Mittal, S. (2019). Deep mean shift clustering. [preprint] [LINK]
- Madaan, P., & Sadat, F. (2020, May). Multilingual neural machine translation involving Indian languages. In Proceedings of the WILDRE5–5th Workshop on Indian Language Data: Resources and Evaluation (pp. 29-32).[LINK]

### **Academic Service**

Served as a Reviewer, Programme Committee at The Second Workshop on Speech and Language Technologies for Dravidian Languages-ACL 2022

### **Experience**

Associate ML Scientist - I

Jul'20 - Jul'22

## **Wadhwani Institute of Artificial Intelligence**Agirculture Team, Core ML Team

- Developed a flexible & generic Object Detection codebase with rejection, visualization & deployment capabilities, on top of PyTorch Lightning. Improved the existing model, added new architectures & rejection framework for improved system performance incorporating on-ground feedback.
- Solution won the Global Change Award 2022 [article].
- Built a prototype that uses remote sensing to advise farmers on the frequency and quantity of crop-specific irrigation.

Summer Research Intern

May'20 - Jul'20

### Indraprastha Institute of Information Technology, Delhi

Advisor: Dr. Kaushik Kalyanaraman, Dr. Ojaswa Sharma

• Extended 3D surface reconstruction from curved cross-sections' codebase for experiments and visualisation.

## Bachelor's Thesis Jan'19 - Dec'19 Indraprastha Institute of Information Technology, Delhi

Advisor: Dr. Saket Anand, Dr. Sushil Mittal

• Developed a model for better representation learning using deep neural clustering with mean-shift.

### Mitacs Globalink Research Intern May'19 - Aug'19 Université du Québec à Montréal (UQAM)

Advisor: Dr. Fatiha Sadat

• Developed new data augmentations & training pipeline to improve Multilingual Neural Transformer for better translation of low-resource languages.

#### **Awards**

- Part of Wadhwani AI team that won the HUL, Google and MyGov India's AI for Agriculture Hackathon. The winning prize was a grant of 1 Million INR.
- Recipient of Best Academic Performance in B.Tech.
   CSAM [Branch Topper | Gold Medalist] [cert]
- Recipient of Dean's Academic Excellence Award for 2 consecutive years: 2017-18, 2018-19 [cert]

### **Select Projects**

Course: Probabilistic Graphical Models [PyTorch]
Flow Based Generative Models: GLOW
[Code] [Slides]

• Conditioned GLOW in different generation and conversion tasks (as a vocoder, as well as generation, usually done by GANs)

Course: Speech Understanding [PyTorch, Librosa] **Emotional TTS** 

#### [Code]

• Conditioned State-of-the-Art Text-To-Speech models, like Tacotron, on emotional labels to produce to non-robotic audios of a given text in a given emotion.

# Course: Reinforcement Learning [PyTorch, VizDoom] Doom Playing DeepRL Agent [Code] [Slides]

• Trained an agent using Deep Recurrent Q-Learning to play Doom: An FPS game having partially observable 3D states. Added the capability to self-learn as the agent plays against self to train itself.

### **Relevant Courses**

**CS**: Probabilistic Graphical Models, Speech Recognition and Understanding, Reinforcement Learning, Deep Learning, Machine Learning, Digital Image Processing, Object Oriented Programming, Analysis and Design of Algorithms, Data Structures

**Math:** Differential Geometry, Calculus on  $\mathbb{R}^N$ , Numerical PDEs, Stochastic Processes, Statistical Inference, Linear Optimisation, Real Analysis, Abstract Algebra, Discrete Structures, Scientific Computing, ODEs & PDEs, Probability and Statistics, Linear Algebra