Pulkit Madaan | in ⌗ ℊ

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I am a Machine Learning enthusiast who loves solving real-world problems with impact. I have been working on developing machine learning models at scale from inception to business impact and defining research goals informed by practical engineering concerns. I thrive working with cross-functional and diverse teams.

EDUCATION

Johns Hopkins University
MSE Computer Science
Aug 2022 – May 2024
CGPA: 3.97/4.0

Indraprastha Institute of Information Technology Delhi
B.Tech in Computer Science and Applied Math
Aug 2016 – Aug 2020
CGPA: 9.23/10.0 [Best Academic Performance in Major]

SKILLS

Languages: Python, Java, C++, Bash, R, SQL
Other: PyTorch, Tensorflow, HuggingFace, LangChain, Git, Flask, scikit-learn, Detectron2, Docker, NNI, GCP, AWS, Tableau, AutoGen, Transformers, APIs.

EXPERIENCE - INDUSTRY

Associate ML Scientist - I   Jul'20 - Jul'22
Wadhwani Institute for Artificial Intelligence
Core ML Team, Agriculture Team
- Executed multiple deployments reaching 10k+ users across 10+ states.
- Reduced the Mean Absolute Error from 10+ to <2.
- Open-sourced and developed a flexible & generic Object Detection ML pipeline containerized with Docker. [Code]
- Mentored interns and hosted GCP instances to delineate their work from the on-prem source.
- Built a light-weight visualization and annotation platform using Voxel51 and Flask.
- Conducted experiments and studies to publish the novel methods we developed for peer review.
- Won the Global Change Award 2022 [article].

EXPERIENCE - ACADEMIA

Research Assistant - NLP   Aug'23 - Ongoing
JHU x Amazon AGI
Advisor: Anjalie Field [Amazon: Charith Peris, Lisa Bauer]
- Anonymizing long-form unstructured text medical notes while maintaining research fidelity.
- Working with Child Protective Services to help them redact and replace sensitive information automatically with an ML pipeline to anonymize and share data effortlessly.

Graduate Research Assistant - CV   Nov'22 - Aug'23
MINDS @ JHU
Advisor: Benjamin Haeffele, Matthew M. Ippolito
- Built Domain Adaptative ML Library for Malarial Parasite detection and life-stage prediction.
- Improved F1-score from 56% to 89% with the domain adaptive approach making the process viable for use on unseen unlabled datasets.

Mitacs Globalink Research Intern   May'19 - Aug'19
UQAM
Advisor: Dr. Fatiha Sadat
- Improved multilingual translation of low-resource languages by 15 BLEU score points.

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`. [Accepted at Challenges in Deploying and Monitoring ML Systems Workshop - NeurIPS 2022] [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]
- **Madaan, P.**, Maiti, A., Anand, S., & Mittal, S. (2019). Deep Mean Shift Clustering. [preprint] [LINK]

ACADEMIC SERVICE

- Program Committee - DravidianLangTech 2022, 2023.
- Reviewer - ACM TALLIP 2022.
- Course Assistant for Big Data Machine Learning at JHU's business school. Created LLM course material.

SELECT PROJECTS

Anime GPT Chatbot
- Built a chatbot with LangChain prompt templates, HuggingFace google-flan-t5-xl model on Anime data vectors with HuggingFace Transformers indexed in Pinecone.
[Generative AI, LLM, Transformers, Pinecone]

Flow Based Generative Models: GLOW
Course: Probabilistic Graphical Models   [Code] [Slides]
- Conditioned GLOW in different generation and conversion tasks (eg: replacement to vocoders, GANs)
[PyTorch, Colab, Generative AI]

SaNJI: Satellite eNhanced Judicial Irrigation
- Predicting soil factors from satellite spectral images to recommend near real time irrigation recommendation.
[PyTorch, Landsat, Torchvision]

Benoit: Better English Noisy Audio Transcripts
Course: Machine Learning   [Code] [Slides]
- Trained a denoising seq2seq autoencoder on top of Wav2Vec 2.0 for grammatically correct ASR.
[PyTorch Lightning, TorchAudio, TorchText, Colab]

AWARDS

- Won the HUL, Google and MyGov India's AI for Agriculture Hackathon with a 1 Million INR grant.
- Best Academic Performance in B.Tech. CSAM [Branch Topper | Gold Medalist] [cert]
- Dean's Academic Excellence Award for 2 consecutive years: 2017-18, 2018-19 [cert]

RELEVANT COURSES

CS: ML System Design, AI Ethics, Computer Vision, Causal Inference, Machine Translation, Speech Recognition, Reinforcement Learning, Image Processing
Math: Differential Geometry, Calculus on $\mathbb{R}^N$, Stochastic Processes, Statistical Inference, Linear Optimisation, Real Analysis, Abstract Algebra