Akshat Bhandari

Website: akshatbhandari15.github.io

Research Interests

Generative modeling using deep learning architectures, for reconstruction and manipulation; Computer Vision; Causal machine learning, for building robust models able to deal with distribution shifts; Machine learning for medicine, particularly for neuroscience applications; Reinforcement Learning to complete real-world tasks

EDUCATION

•	Manipal Institute of Technology Bachelor of Technology - (Computer Science and Engineering)	Manipal, India 2020 - 2024
•	Maharaja Sawai Man Singh Vidyalaya All India Senior School Certificate Examination with 96.33% (PCM)	Jaipur, India 2018-2020
E	Experience	

KLIV, IIT Kharagpur

Research Intern

• Worked with Anupam Borthakur. Contributed to developing a highly modular customizable open-source framework for Federated Learning (FedERA).

• Experimented with different aggregation and training pipelines to build a model robust to data and model poisoning attacks in a Federated Learning setting.

IIIT Hyderabad

Research Intern

• Supervised by Prof. Ravi Kiran S. Worked on part-based object generation using multi-stage VAEs.

IIIT Delhi

Research Intern

• Supervised by Dr. Ranjitha Prasad. Working on post-hoc explanations for models using Bayesian inference and Gaussian processes.

Xook

Computer Vision and Machine Learning Intern

• Developed computer vision based feedback loop for the robotic picker as well as the ingredient identification and spread verification module for the automated kiosk.

Mars Rover Manipal

Senior AI/ML Researcher

• My research work at MRM is focused towards Generative Modelling, Causal Machine Learning and Deep Learning for Medicine and the Environment. Responsible for organizing and leading junior AI research team.

PUBLICATIONS

- Evaluating Predictive Uncertainty and Robustness to Distributional Shift Using Real World Data: Lakara, K., Bhandari, A., Seth, P., & Verma, U. Presented at Bayesian Deep Learning Workshop at NeurIPS 2021.
- UATTA-ENS:Uncertainty Aware Test Time Augmented Ensemble for PIRC Diabetic Retinopathy Detection: Seth, P., Khan, A., Gupta, A., Mishra SK., Bhandari, A. Presented at Medical Imaging meets NeurIPS 2022 Workshop

• Performance evaluation of deep segmentation models for Contrails detection: Bhandari, A., Rallabandi, S., Singhal, S., Kasliwal, A. Presented at NeurIPS 2022 Workshop Tackling Climate Change with Machine Learning

Projects

- Evolution of Alzheimer's Disease in Brain using Generative Model manipulation: Predicting the evolution of an human brain affected by Alzheimer's disease using latent space interpretation and manipulation of inverted StyleGAN2 models trained on custom dataset.
- Robustness evaluation of a Convolution Neural Networks for detection of Diabetic Retinopathy: Robustness analysis of various CNNs to classify digital colour fundus photographs of the retina relevant for diagnosing Diabetic Retinopathy (DR) to multiple modes of plausible image perturbations.
- Fake It Till You Make It: Analyzing Effects of Fake Training Data on the Performance of Modern Deep Learning Models: Analyzing the effect that various quantities of synthetic data when mixed with original data can have on a model's robustness to out of distribution data as well as general quality of predictions.
- Using a Adversarial Trained Ensemble of ConvBERTs for Acronym Disambuigation task: Building and Training a ConvBERT based ensemble for Shared Task 2 of SDU Workshop @ AAAI-22 Tech: Python, HuggingFace, TensorFlow, TextAttack (October '21)
- YOLOv3 and RCNN based Event Review model: Computer Vision model with back-end to analyse sentiment in a classroom-like setting in real-time. Tech: Python, TensorFlow, Flask.

Feb 2022 - August 2022

May 2023 - November 2023

May 2022 - October 2022

June 2022 - February 2023

May 2021 - July 2023

MISCELLANEOUS

Trustworthy AI Lab, UCLA

• Collaboration

 $\circ\,$ Working with Dr. Chi-Hua Wang on improving tabular models using synthetic data generators (such as TabDDPM).

Finalists for National Flipkart Robotics Challenge GRiD 5.0 August 2023 - Present

- Competition
 - Built an autonomous warehouse robot to streamline package handling. (For reference, Amazon Sparrow); Finals to be held in January 2024.

Reviewer

- $\circ\,$ NeurIPS 2023 SyntheticData4ML Workshop at NeurIPS 2023
- $\circ\,$ Tackling Climate Change with Machine Learning Workshop at NeurIPS 2023

Bhukh Mukt Bachpan

- Social Work
 - Taught underprivileged children basic and essential computer skills. Encouraged young interest towards robotics Developed and maintained database for needy children and optimized how to and who to help using AI.

Pure India Trust

Social Work

- $\circ~$ Supervising and organizing volunteers on behalf of the organization
- Focused on uplifting disadvantaged women and girls about IT (Secure banking, government e-portals, basic computer skills) and how they can utilize it in their lives.

Personal Skills

- Independent Coursework: Reinforcement Learning (David Silver, UCL); Machine Learning (Andrew Ng, Coursera); Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization (DeepLearning.AI); Convolutional Neural Networks (DeepLearning.AI); Neural Networks and Deep Learning (DeepLearning.AI), Structuring Machine Learning Projects (DeepLearning.AI); Sequence Models (DeepLearning.AI)
- Machine Learning: Keras, TensorFlow, PyTorch, NumPy, Pandas, OpenCV
- **Programming Languages:** : Python, C++/C, Java
- Misc.: Bash, Git, HTML/CSS, SQL, LATEX