

Aaditya Singh

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EDUCATION

Georgia Institute of Technology

M.S in Computer Science with specialization in Machine Learning

GPA: 4.0/4.0

Aug 23 2021 - May 6 2023

Indian Institute of Technology, Kanpur

B.Tech in Electrical Engineering (Major) and Computer Science (Minor)

GPA: 9.1/10.0

Jul 1 2016 - Jul 1 2020

WORK EXPERIENCE

Amazon Web Services AI

Research Engineer, Face Liveness Team

May 22 2023 - present

Seattle, Washington

- Working towards deepfake generation with state-of-the-art one-shot methods for training deepfake detection models
- Authored inference pipeline documentation for onboarding new hires and updated protocols for benchmarking results

Amazon Web Services AI

Research Engineer Intern, Lookout For Vision Science Team

May 16 2022 - Aug 12 2022

Seattle, Washington

- Developed an accuracy-cutoff based threshold selection strategy for detecting anomalies using only normal images
- Experimented with heuristic and language-based image generation techniques for generating synthetic anomalies

IBM Research

Software Engineer, Artificial Intelligence for Business Automation Department

Aug 10 2020 - Aug 8 2021

Bangalore, Karnataka

- Evaluated the effect of transliteration and task-specific pre-training for Sentiment Analysis on multilingual corpus
- Adapted BERT-based DITTO algorithm for detecting semantically identical textual entities in E-Commerce data
- Developed Watson Orchestrate agents for addressing natural language user queries in real-time on Microsoft Teams

Samsung R&D Institute

Summer Intern, On-Device Artificial Intelligence Team

May 17 2019 - July 12 2019

Bangalore, Karnataka

- Developed a maximum a posteriori probability classifier for context-based device ranking on cloud and on device
- Integrated the cloud-based device ranking model with an Android app for on-device inference using TensorFlow Lite

PUBLICATIONS

Benchmarking Low-Shot Robustness to Natural Distribution Shifts

International Conference on Computer Vision (ICCV) 2023

Aug 20 2022 - Mar 8 2023

Dr. Judy Hoffman

TL:DR; Robustness to natural distribution shifts has seen remarkable progress thanks to better pre-training strategies combined with recent fine-tuning methods. However, such fine-tuning assumes access to large amounts of labelled data which can be prohibitive for practitioners. Thus, we propose the “low-shot robustness” setting wherein a pre-trained model is fine-tuned with limited (order of thousands) in-domain data and evaluated on out-of-distribution (OOD) data, and demonstrate that conventional wisdom for OOD robustness might not apply in low-shot regimes.

Adapting Self-Supervised Vision Transformers by Probing Attention-Conditioned Masking Consistency

2022 Conference on Neural Information Processing Systems (NeurIPS)

Jan 8 - May 16 22'

Dr. Judy Hoffman

TL:DR; Vision Transformers (ViTs) provide better out-of-distribution calibration and compute efficiency than Convolution Neural Networks (CNNs). Recently, self-supervised learning (SSL) has emerged as powerful pre-training strategy for ViTs, but SSL ViTs are largely unused for unsupervised domain adaptation (UDA). We bridge this gap in our work by applying recent UDA methods for SSL ViTs, and show that a selective self-training approach called PACMAC which leverages ViT’s attention mechanism outperforms them on standard benchmarks.

SAFIN: Arbitrary Style Transfer with Self-Attentive Factorized Instance Normalization

IEEE International Conference on Multimedia and Expo (ICME) 2021

May 1 2020 - Sept 29 2020

Dr. Zhangyang Wang

TL:DR; Recent methods for neural style transfer either leverage either normalization or self-attention based techniques but often fail to perform semantically meaningful stylization. We combine the two in a spatially adaptive module called SAFIN which reduces content distortions without compromising stylization to produce more visually appealing results.

An End-to-End Network for Emotion-Cause Pair Extraction

11th Workshop on Computational Approaches to Subjectivity, Sentiment & Social Media Analysis (oral)

Jan 1 2020 - July 1 2020

IIT Kanpur

TL:DR; Recent methods for the relatively new task of Emotion-Cause Pair Extraction (ECPE) leverage end-to-end training in conjunction with complex architectures. We demonstrate that a simpler end-to-end architecture with significantly fewer parameters leads to comparable performance on an English-language corpus adapted by us.

SKILLS

Languages and Tools: C++, Python, Docker, Git, \LaTeX **Libraries:** PyTorch, TensorFlow, OpenCV, spaCy, Pandas, Scikit-Learn

THESIS

Evaluating Visual Classification Models On Out-of-distribution Shifts With Limited Training Data Aug 20 22' - Apr 25 23'
Master's Thesis, Georgia Tech *Dr. Judy Hoffman*

TL:DR; As deep learning based models continue to advance several artificial intelligence (AI) applications including safety-critical ones, it becomes increasingly important that such models are reliable even under distribution (OOD) shifts. Moreover, the expectation from a practitioner shouldn't be to train such models on large-scale datasets that might be infeasible to collect. Thus, the thesis motivates the need for evaluating state-of-the-art deep learning models on diverse OOD shifts when the amount of training data is limited, through our recent works in domain adaptation and robustness to natural shifts [3].

PROJECTS

Music Source Separation Dec 1 2018 - Apr 2019
Undergraduate Research Project, IIT Kanpur *Dr. Vipul Arora*

- Implemented source-based filtering model of Probabilistic Latent Component Analysis (PLCA) for feature extraction
- Used Convolutional Neural Networks on top of extracted features for data and resource efficient source identification

Realtime Object Tracking March 1 2019 - Apr 17 2019
Course Project, IIT Kanpur *Dr. Vinay P. Namboodiri*

- Applied Simple Online RealTime Tracking (SORT) algorithm with YOLOv3 for object detection and tracking in videos
- Integrated future frame prediction using Generative Adversarial Networks (GAN's) to augment the SORT algorithm

SCHOLASTIC ACHIEVEMENTS

- Served as Graduate Teaching Assistant for the courses Computer Vision and Deep Learning at Georgia Tech
- Graduated with B.Tech and an Undergraduate Distinction for meritorious academic performance in IIT Kanpur
- Received Academic Excellence Award in the academic session 2016-17 for outstanding performance by IIT Kanpur
- Received A* for exceptional performance in the courses Complex Variables and Topics in Topology by IIT Kanpur
- Secured All India Rank of 487 in JEE-Advanced 2016 and 3235 in JEE-Mains 2016 among 1.2 million candidates

RELEVANT COURSES

- **Computer Science:** Computer Vision, Natural Language, ML with Limited Supervision, Data Structures and Algorithms
- **Mathematics :** Probability and Statistics, Linear Algebra, Analytical Calculus, Differential Equations, Complex Analysis
- **Electrical Engineering :** Digital Signal Processing, ML for Signal Processing, Power Electronics, Peer to Peer Networks