Mayank Singh

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INTERESTS

Few-shot and Self-supervised Learning, 3D Computer Vision, Generative Models

EDUCATION

CARNEGIE MELLON UNIVERSITY

School of Computer Science
Master of Science in Robotics
Feb. 2021 - Present | Pittsburgh, PA
Expected Dec 2022
GPA: 4.0/4.0

IIT KHARAGPUR

B.Sc/M.Sc in Mathematics & Computing
2012-2017 | Kharagpur, India
GPA: 8.85 / 10.0
Department Rank : 3

COURSEWORK

GRADUATE

Machine learning, Computer Vision, Reinforcement Learning

UNDERGRADUATE

Linear Algebra
Data Structures and Algorithms

ACHIEVEMENTS

YOUNG ENGINEER AWARD

Won the Outstanding Young Engineers Award at Adobe Inc., 2020

YOUNG DATA SCIENTIST AWARD

Won the data science coding talent competition at ZS Associate, 2017

SKILLS

Proficient in : Python • PyTorch
• Numpy • Scikit-learn
Comfortable in : C++ • Apache Spark
• TensorFlow

POSITIONS

Teaching Assistant:
Regression & Time Series (IIT KGP),
Machine Learning (Adobe)

EXPERIENCE

CMU | Research Assistant under Prof. Katerina Fragkiadaki
February 2021 – Present | Pittsburgh, PA
- Working on 3D object detection/reconstruction and few-shot learning.

ADOBE | Member of Technical Staff 2
July 2017 – Jan 2021 | Noida, India
- Developed a Video Tutorial Recommendation system for Adobe Creative Cloud.
- Designed a reinforcement learning based approach to obtain personalized user journeys for marketing campaigns.

ADOBE | Intern
May 2016 – July 2016 | Noida, India
- Worked on a novel recommendation technique that jointly learns representation of items and users.

JOHNS HOPKINS UNIVERSITY | Intern
May 2015 – July 2015 | Baltimore, MD
- Worked on building statically typed scripting language BigBang.

PUBLICATIONS

ATTRIBUTIONAL ROBUSTNESS TRAINING USING INPUT-GRADIENT SPATIAL ALIGNMENT **| ECCV 2020 (paper link)**
- Achieved state-of-the-art attributional and adversarial robustness by a margin of $\approx 6 - 18\%$ on standard computer vision datasets.
- Improved weakly supervised object localization performance on CUB-200 dataset by $\approx 18\%$

DATA INSTANCE PRIOR (DISP) IN GENERATIVE ADVERSARIAL NETWORKS **| WACV, 2022 (paper link)**
- Proposed a transfer learning method for GAN training in low data setting.
- Improved image generation quality in limited data setting over FID metric by $\approx 43 - 63\%$ on Places, FFHQ and CUB datasets.

CHARTING THE RIGHT MANIFOLD: MANIFOLD MIXUP FOR FEW-SHOT LEARNING **| (Spotlight Presentation) MetaLearn workshop, NeurIPS 2019 | WACV 2020 (paper link)**
- Analyzed the role of self-supervision techniques along with Manifold-Mixup augmentation in few-shot image classification.
- Improved the state-of-the-art few-shot accuracy on mini-ImageNet, CUB and tiered-ImageNet datasets by $\approx 3 - 8\%$.

LT-GAN: SELF-SUPERVISED GAN WITH LATENT TRANSFORMATION DETECTION **| WACV, 2021 (paper link)**
- Proposed a self-supervised approach to improve the generation quality and diversity of images by estimating the GAN-induced transformation.

HARNESSING THE VULNERABILITY OF LATENT LAYERS IN ADVERSARIALLY TRAINED MODELS **| IJCAI 2019 (paper link)**
- Proposed an adversarial training method based on latent perturbations to increase the robustness of neural networks.

PATENTS

- Machine-learning based multi-step engagement strategy generation and visualization (US10609434B2)
- Generating trained neural networks with increased robustness against adversarial attacks (US20200234110A1)