UTKARSH NATH

Arizona ⋄ 602 815 2265 ⋄ unath@asu.edu ⋄ github ⋄ LinkedIn

EDUCATION

Arizona State University *Dec 2025*
Doctor of Philosophy, Computer Science. GPA: 4.0
New York University *May 2021*
Master of Science, Computer Science GPA: 3.96
Delhi Technological University *May 2018*
Bachelor of Technology, Information Technology. CGPA: 7.89

RESEARCH EXPERIENCE

Deep Geometric Moments Promote Shape Consistency in Text-to-3D Generation. Jan 2024 - June 2024
Under Review, WACV 2025 [paper]

- MT3D: A 3D Gaussian-based 2D lifting technique that leverages a high-fidelity 3D object to explicitly infuse geometric knowledge into text-to-3D image generation.
- Utilizes ControlNet and Geometric moment analysis to optimize and refine the shape and structure of 3D objects, effectively alleviating the Janus problem.
- Surpassing other state-of-the-art text-to-3D generators, MT3D significantly reduces geometric inconsistencies, delivering superior shape, high-fidelity, and enhanced photorealism.

Polynomial Implicit Neural Framework for Promoting Shape Awareness in Generative Models
In Minor Revision, International Journal of Computer Vision *Aug 2023 - Mar 2024*

- Poly-INR: The first INR-based model designed to represent complex shapes within large, diverse datasets such as ImageNet.
- Employs a geometric moment-based module to generate high-fidelity images without using convolution, upsample, or self-attention layers.
- Achieved performance on par with state-of-the-art GAN models on the ImageNet dataset, with $3-4\times$ fewer parameters.

RNAS-CL: Robust Neural Architecture Search by Cross-Layer Knowledge Distillation Mar 2022 - Dec 2022
International Journal of Computer Vision, June 2024 [paper]

- RNAS-CL: The first NAS method that optimizes adversarial robustness and prediction accuracy without robust training
- Extends standard Knowledge Distillation by learning student-teacher cross connections
- Achieves SOTA results in terms of clean accuracy, robust accuracy and model size on CIFAR-10 and ImageNet dataset

Predict Treatment Response for Lung and Liver Cancer Patients June 2022 - Oct 2023
Mayo Clinic

- Designed an architecture by combining weighted 3D U-Net and Siamese networks to accurately quantify tumor reduction in pre- and post-treatment MRI scans.
- Successfully trained model to segment lung and liver tumors on a proprietary dataset.
- Significantly reduced treatment time by 3 weeks through the implementation of our model

Adjoined Networks: A Training Paradigm with Applications to Network Compression Dec 2020 - Dec 2021
AAAI Spring Symposium, 2022 [paper]

- Proposed Adjoined Network (AN), a One-shot learning paradigm to compress and regularize any CNN-based architecture
- Enhanced AN: Diferential Adjoined Network, a NAS technique applied over AN to obtain the optimal compressed architecture
- Achieves accuracy comparable to current SOTA structured pruning methods but with $2\times$ fewer parameters

WORK EXPERIENCE

Samsung Research New Delhi
Software Engineer *July 2018 - July 2019*

- Led a team of three to build a mobile application to interact and control internal functioning of Samsung Smart TV through wireless(wifi-direct) and wired connection
- Features of application involved controlling factory settings, fetching serial logs, running internal tests and fixing them

Coding Blocks New Delhi
Algorithm Instructor *Aug 2017 - July 2019*

- Conducted Launchpad course for C++: Data Structures, Algorithms, Object Oriented Programming
- Taught batch of 60 students at a time: includes preparing assignments, quizzes, doubt-solving sessions

Google Summer of Code, FOSSASIA New Delhi
Student Developer *May 2017 - Aug 2017*

- Worked on Open-Event project, which aims to develop automated tool for creation of app and website for conferences. Part of the team responsible for frontend development and designing of the tool
- Used Semantic UI components to build responsive UI, EmberJS in back-end and GitHub for version control

PUBLICATIONS AND PATENT

- Utkarsh Nath, Yancheng Wang, Pavan Turaga and Yingzhen Yang. RNAS-CL: Robust Neural Architecture Search by Cross-Layer Knowledge Distillation *International Journal of Computer Vision (IJCV), June 2024*
- Utkarsh Nath, Yancheng Wang and Yingzhen Yang. Neural Architecture Search Finds Robust Models by Knowledge Distillation *Uncertainty in Artificial Intelligence (UAI) 2024*
- Utkarsh Nath, Yancheng Wang and Yingzhen Yang. RNAS-CL: Robust Neural Architecture Search by Cross-Layer Knowledge Distillation. *ICLR 2023 Workshop on Pitfalls of limited data and computation for Trustworthy ML. 2023.*
- Utkarsh Nath, Shrinu Kushagra and Yingzhen Yang. Adjoined Networks: A Training Paradigm with Applications to Network Compression. *AAAI Spring Symposium 2022*
- Method and system for guided breathing from audio data. *U.S. Provisional Pat. Ser. No. 63/087,930, filed October 2020*

Under Review

- Utkarsh Nath, Rajhans Singh, Ankita Singh, Kuldeep Kulkarni and Pavan Turaga. Polynomial Implicit Neural Framework for Promoting Shape Awareness in Generative Models. In Minor Revision, IJCV.
- Utkarsh Nath, Rajeev Goel, Eun Som Jeon, Changhoon Kim, Kyle Min, Yezhou Yang , Yingzhen Yang and Pavan Turaga. Deep Geometric Moments Promote Shape Consistency in Text-to-3D Generation. In Review, WACV 2025.
- Rajeev Goel *, Utkarsh Nath *, Yancheng Wang*, AC Silva, Teresa Wu and Yingzhen Yang. Learning Low-Rank Feature for Thorax Disease Classification. In Review, NeurIPS 2024.

SKILLS

Languages: C/C++, Java, Python, Javascript, HTML/CSS, Swift
Libraries: Pytorch, Numpy, Pandas, Scikit Learn, OpenCV, Matplotlib
Other Tools: MySQL, Android, Xcode, Linux, Git

PROJECTS

Shvaas May 2020 - October 2021

- Developed an app for AI guided breathing exercises/ meditation to ease the cognitive load of an user
- Filled an US patent for our model which keeps track of breathe-in, breathe-out and various different sounds while performing breathing exercises

AI Gym Trainer[*Demo*] Sept 2019 - May 2020

- Developed a smart mirror for real-time workout posture feedback, enhancing training effectiveness.
- Trained a pose estimation model tailored for exercise alignment.
- Deployed the model onto a Jetson Nano integrated within the mirror for on-device processing.
- The smart mirror was operational for a month at the University of Waterloo Gym.

Evento[*github*] Dec 2016 - May 2017

- Built a Web-app which helps users create their own personalised event specific android app
- Used Node JS for backend, MongoDB as our database, shell scripts for android app generation, passport for authentication and Semantic-UI for frontend

Geo-locator[*github*] Nov 2015 - Feb 2016

- Android app to notify the users of their friends' proximity in a set radius using Geo-Fencing technology
- Used GCM for instant notifications and Content provider and Cursor Adapter to automatically update UI from database
- Used GCM for instant notifications. Content provider and Cursor Adapter were used to update UI from database

SERVICES

- Reviewer NeurIPS 2024 , WACV 2025, IEEE Transactions on Information Forensics and Security
- Teaching Assistant for Data Structures and Algorithm (CSE 310) ASU, Foundation of Machine Learning (CSE 475) ASU, Statistical Machine Learning (CSE 575) ASU and Introduction to programming (CS 1114) NYU.
- Google facilitator for Applied CS with Android for DTU, 2017