

EDUCATION	Arizona State University , Tempe, AZ <i>Doctor of Philosophy in Computer Science</i> <i>Advisor: Dr. Pooyan Fazli</i>	August 2024 – Present
	University of Southern California , Los Angeles, CA <i>Master of Science in Computer Science</i>	May 2024
	Pune Institute of Computer Technology , Pune, India <i>Bachelor of Engineering in Computer Engineering</i>	May 2022
RESEARCH INTERESTS	Developing vision-language models for applications in robotics, natural language processing, and healthcare. Enhancing the robustness of these models through adversarial training and privacy-preserving techniques. Exploring novel methods for multimodal learning across vision and language domains.	
PUBLICATIONS	EnsembleNTLDetect: An intelligent framework for electricity theft detection in smart grid Y. Kulkarni , S. Hussain, K. Ramamritham and N. Somu <i>IEEE International Conference on Data Mining Workshops (ICDM), 2021</i>	
	Kryptonite: An adversarial attack using regional focus Y. Kulkarni , K. Bhambani <i>International Conference on Applied Cryptography and Network Security (ACNS), 2021</i>	
	Intensive image malware analysis and least significant bit matching steganalysis Y. Kulkarni and A. Gorkar <i>IEEE International Conference on Big Data (Big Data), 2020</i>	
ACADEMIC RESEARCH EXPERIENCE	People and Robots Laboratory (PeRL) , Tempe, AZ Arizona State University <i>Graduate Research Assistant with Dr. Pooyan Fazli</i> Working on LVLMs for video understanding.	August 2024 – Present
	USC Institute for Creative Technologies , Los Angeles, CA <i>Graduate Research Assistant with Dr. Meida Chen</i> Built a 3D style transfer pipeline with a Vision Transformer backbone using CLIP guided gaussian splatting for transferring real colors to a synthetic point cloud with guidance from text prompts. Utilized probabilistic diffusion models (DDPM) guided by semantic features and self-attention, leveraging pre-trained SparseUNet for this problem. Explored Pix2Pix and CycleGAN with backbone architectures like Point Transformer, KPConv, SparseUNet, and PointNet for 3D Point Cloud Colorization in 3D Photogrammetric point clouds.	Jan 2023 - March 2024
	RBCDSAI (IIT Madras) , Chennai, India <i>Research Intern with Dr. Nivethitha Somu</i> Proposed an End-to-End framework for detecting Electricity Theft in Industrial Smart Grids. Applied Enhanced Dynamic Time Warping for imputation, Stacked Auto-Encoder for dimensionality reduction & Conditional GAN's for robustness attaining an impressive accuracy of 99% & Matthews Correlation Coefficient of 0.98.	July 2021 - October 2021

INDUSTRY RESEARCH EXPERIENCE	Nokia Bell Labs , New Providence, NJ	June 2023 - August 2023
	<i>Research Intern with Dr. Thomas Woo</i>	
	Implemented automatic model parallelism and partitioning for GPT-3 and LLaMA foundational models, increased model training throughput by 15% across heterogeneous clusters. Designed and executed communication and compute efficient inter-node pipeline parallelism approach for training LLMs on heterogeneous and geo-distributed cluster GPUs.	
	Episource LLC , Mumbai, India	January 2022 - March 2022
	<i>NLP Intern</i>	
	Implemented and deployed a solution for Abbreviation - Disambiguation of real-time Clinical Texts. Prepared an annotated dataset and re-engineered an ACL research paper, fine-tuned Bio.ClinicalBERT and PubmedBERT to achieve accuracy of 99% and 98%. Mapped 200+ clinical drugs to their strength, dosage, form with a custom Python script and boosted company's existing NER model by 15%.	
	Omdena , Remote	October 2020 - January 2021
	<i>Junior ML Engineer</i>	
	Worked with Kenya Red Cross Society to classify Sentinel1 and Sentinel2 satellite imagery into different cropland types for 16 counties of Kenya which were severely affected by desert locust attacks. Devised a custom version of U – Net Convolutional Neural Network for image segmentation achieving an impressive 81% accuracy on the LandCoverNet dataset. Devised a custom LSTM network for predicting future NDVI (Normalized difference vegetation index) values and to prepare the counties for upcoming desert locust attacks on croplands having an RMSE score of 0.024.	
	DRDO HQ , New Delhi, India	July 2020 - October 2020
	<i>Research Intern</i>	
	Investigated Hex dump, EXIF data of images for identifying embedded payloads with sophisticated string-matching algorithms in Python. Developed a novel, robust and scalable framework for malware analysis of images. Constructed a Stacked Ensemble classifier using XGBoost, Catboost & Feedforward Neural Net for detecting LSB Matching Steganography both for color & grayscale images, with an AUC of 0.98 & 0.87 respectively.	
TEACHING EXPERIENCE	Graduate Teaching Associate, Arizona State University	
	CSE 220: Programming for Computer Engineering, Fall 2024 CSE 240: Intro to Programming Languages, Fall 2024	
SIDE PROJECTS	Dual Policy Networks for Multi-Task RL	Engineered a dual-teacher network model improving policy distillation in multi-task robotic environments, utilizing Deep Q Networks. Developed a cross-attention module enabling superior learning efficiency, evidenced by higher average rewards in Cartpole and Acrobot tasks. Demonstrated marked performance gains in complex Atari environments, outperforming single-teacher and baseline models in adaptability and resilience.
	Imitation Learning for Autonomous Driving in POMDP Framework	Implemented behavior cloning and conditional imitation learning (CoIL) algorithms in a POMDP framework for autonomous driving policies. Leveraged Mixture Density Networks to output Gaussian distribution parameters, optimizing action predictions. Conducted systematic evaluations in intersection and lane-change scenarios, refining the neural network architectures for optimal performance.

TECHNICAL SKILLS	Languages: Python, C/C++, SQL, JavaScript	
	Libraries/Frameworks: PyTorch, TensorFlow, Pandas, SpaCy, NumPy, DeepSpeed, ColossalAI	
	Analytical Tools & Databases: MongoDB, Docker, Spark, MLFlow, Kubernetes, GCP	
AWARDS	Google Research India Graduate Symposium	Jan 2022
	Conference Travel Grant for ICDM conference in Auckland, NZ	Dec 2021
	IIT Madras Summer Fellowship	Sep 2021
	Conference Travel Grant for IEEE Big Data Conference in Atlanta, USA	Dec 2020