Yogesh Kulkarni

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Academic Website

Education

Arizona State University, Tempe, AZ — August 2024 – August 2029
Doctor of Philosophy in Computer Science, GPA – 4.29/4.0
Advisor: Dr. Pooyan Fazli

University of Southern California, Los Angeles, CA — May 2024
Master of Science in Computer Science, GPA – 3.67/4.0

Pune Institute of Computer Technology, Pune, India — May 2022
Bachelor of Engineering in Computer Engineering, CGPA – 9.8/10.0

Preprints

VideoPASTA: 7K Preference Pairs That Matter for Video-LLM Alignment
Y. Kulkarni, P. Fazli
arXiv preprint arXiv:2504.14096, Under Review at ICCV'25

VideoSAVi: Self-Aligned Video Language Models without Human Supervision
Y. Kulkarni, P. Fazli
arXiv preprint arXiv:2412.00624, 2024, Under Review at COLM'25

Publications

EnsembleNTLDetect: An intelligent framework for electricity theft detection in smart grid
Y. Kulkarni, S. Hussain, K. Ramamritham and N. Somu
IEEE International Conference on Data Mining Workshops (ICDM), 2021

Kryptonite: An adversarial attack using regional focus
Y. Kulkarni, K. Bhambani
International Conference on Applied Cryptography and Network Security (ACNS), 2021

Intensive image malware analysis and least significant bit matching steganalysis
Y. Kulkarni and A. Gorkar
IEEE International Conference on Big Data (Big Data), 2020

Academic Research Experience

People and Robots Laboratory (PeRL), Tempe, AZ — August 2024 – Present
Arizona State University
Graduate Research Assistant with Dr. Pooyan Fazli
Developed VideoPASTA, a framework enhancing video-language models by generating targeted adversarial examples (spatial, temporal, cross-frame) and applying Direct Preference Optimization (DPO) with only 7K pairs, achieving significant benchmark improvements without human annotation and using efficient 32-frame sampling.
Designed and implemented VideoSAVi, a novel self-training pipeline enabling video-language models to reason over video content without external supervision by using a self-critique mechanism and DPO, achieving state-of-the-art on MVBench (74.0%) and gains on Perception Test (3.9%) and EgoSchema (6.8%).

USC Institute for Creative Technologies, Los Angeles, CA — Jan 2023 - March 2024
Graduate Research Assistant with Dr. Meida Chen
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.

RBCDSAI (IIT Madras), Chennai, India — July 2021 - October 2021
Research Intern with Dr. Nivethitha Somu
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.

Industry Research Experience

Nokia Bell Labs, New Providence, NJ — June 2023 - August 2023
Research Intern with Dr. Thomas Woo
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.

DRDO HQ, New Delhi, India — July 2020 - October 2020
Research Intern
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 485: Computer Science Capstone I, Spring 2025
CSE 240: Intro to Programming Languages, Fall 2024, Spring 2025
CSE 220: Programming for Computer Engineering, Fall 2024

Technical Skills	**Languages:** Python, C/C++, SQL, JavaScript, LaTeX **Libraries/Frameworks:** PyTorch, TensorFlow, Pandas, SpaCy, NumPy, DeepSpeed, ColossalAI **Analytical Tools & Databases:** MongoDB, Docker, Spark, MLFlow, Kubernetes, GCP	
Awards	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
Service	Reviewer: ICCV'25, CVPR'25	