# Yogesh Kulkarni

ykulka10@asu.edu
Academic Website

## Education

**Arizona State University**, Tempe, AZ — August 2024 – Present
*Doctor of Philosophy in Computer Science*
*Advisor: Dr. Pooyan Fazli*

**University of Southern California**, Los Angeles, CA — May 2024
*Master of Science in Computer Science*

**Pune Institute of Computer Technology**, Pune, India — May 2022
*Bachelor of Engineering in Computer Engineering*

## Preprints

**VideoSAVi: Self-Aligned Video Language Models without Human Supervision**
**Y. Kulkarni**, P. Fazli
*arXiv preprint arXiv:2412.00624.*

## 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*
Currently exploring alignment of Large Video Language Models with human preferences.

**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.

**Episource LLC**, Mumbai, India — January 2022 - March 2022
*NLP Intern*
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%.

**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.

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| Teaching Experience | **Graduate Teaching Associate, Arizona State University** | |
| | CSE 220: Programming for Computer Engineering, Fall 2024 | |
| | CSE 240: Intro to Programming Languages, Fall 2024 | |
| 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 |