Yogesh Kulkarni

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Academic Website

Education

Arizona State University, Tempe, AZ — August 2024 – Present
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

VideoSAVi: Self-Aligned Video Language Models without Human Supervision
Y. Kulkarni, P. Fazli
arXiv preprint arXiv:2412.00624, 2024

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.

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	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