TARUN GANGADHAR VADAPARTHI

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EDUCATION

UNIVERSITY AT BUFFALO — Buffalo, New York, USA
Masters in Computer Science and Engineering — Aug 2024 – Present
Cumulative GPA: 3.93/4.0

VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY — Nagpur, Maharashtra, IND
Bachelor of Technology in Electrical and Electronics Engineering — Dec 2020 - May 2024
Cumulative GPA: 7.31/10

UNIVERSITY OF OXFORD — Oxford, England, UK
Summer School in Artificial Intelligence and Machine Learning — Jun 2023 - Jul 2023
Grade: A+

PROJECTS

PhysGS Lite: Physics Aware Gaussian Splatting | Website | Github | PDF
- Designed a lightweight extension of Gaussian Splatting by implementing **semantic rigid/deformable separation** with sinusoidal wind fields, reducing splat count from 364k → 100k (72%) while retaining scene fidelity.
- Employed **graph Laplacian smoothing** to stabilize deformable dynamics, producing consistent water/rigid segmentation (29% water vs 71% rigid) and removing 13k false splats for cleaner structural integrity.

Semantic Fusion for 3D Gaussian Splatting | Website | Github | PDF
- Integrated **Segment Anything (SAM)** with multi-view projection and majority voting to assign semantic labels across 1.9M splats, ensuring consistent class mapping across different viewpoints.
- Achieved semantic rendering in 8 novel views, detecting up to 15 object categories (walls, floor, furniture) and maintaining cross-view stability without requiring any 3D supervision.

Hybrid Pruning Framework for 3D Gaussian Splatting | Website | Github | PDF
- Developed a pruning pipeline combining **SH color energy, multi view visibility, local density, silhouette hit-rate, and projected area** via z-score fusion, pruning 40–60% of splats while preserving near-baseline fidelity.
- Delivered 27 dB PSNR at 40% kept and 29.4 dB PSNR at 60% kept, outperforming opacity and area thresholds (13–18 dB) and removing floaters while retaining fine low-albedo details.

Uncertainty Aware Gaussian Splatting | Website | Github | PDF
- Implemented per-splat variance estimation using **multi view orbit sampling** and **cross view dispersion**, diagnosing unstable regions without retraining on 40k splats.
- Produced RGB + uncertainty heatmap visualizations, highlighting peripheral/noisy splats (mean uncertainty 0.28, max 2157) and enabling quality diagnostics for dataset curation.

Unpaired Day to Night Translation (CycleGAN) | Website | Github | PDF
- **Trained** a **CycleGAN (ResNet-9, PatchGAN)** with **LSGAN and cycle/identity losses** on the BDD100K dataset, reaching A→B (SSIM 0.83, PSNR 24.9, LPIPS 0.210) and B→A (SSIM 0.83, PSNR 25.2, LPIPS 0.199).
- Engineered a reproducible pipeline with data preprocessing (resize, crop, flip), Adam (2e-4) optimization, TorchScript checkpoints, and automated evaluation on Tesla T4 GPUs.

Video Stabilization with Deep Learning | Website | Github | PDF
- Applied **RAFT optical flow** on the UCF101 dataset to extract motion vectors, training **Bi-LSTM, Transformer, and GRU** models for temporal smoothing of camera trajectories.
- Reduced motion jitter variance from 0.159 → 0.105 (1.51× improvement); Bi-LSTM converged to 0.415 MSE, outperforming GRU (0.422) and Transformer (1.02), with trajectory plots and output confirming smoother stabilized paths.

FREELANCE PROJECTS

LLM Chatbot Developer — Jan 2025 – Feb 2025
- Led a team of 4 developers to design and deploy a **RAG chatbot** for document and web-based Q&A, built with **Python**, **LangChain**, **ChromaDB**, and the **OpenAI API**.
- Constructed scalable pipelines for document parsing (PDF, DOCX, TXT), embeddings, and retrieval with web scraping modules, increasing knowledge access efficiency by 35%.

INTERNSHIP EXPERIENCE

CLAIR ENGINEERS Remote
Machine Learning Engineer Intern May 2025 – Aug 2025

- Modeled customer specification dimension patterns using historical datasets to generate predicted 7 different mechanical layouts, providing engineers with CAD-ready design suggestions that accelerated design initiation.
- Connected the ML pipeline with **AutoCAD APIs**, automating the generation of machine drawings directly from client dimensions and reducing manual drafting effort by ~60%, shortening delivery from 2 hours to ~30 minutes.

VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY Nagpur, Maharashtra, IND
Research Assistant Aug 2023 – May 2024

- Architected a Python-based compiler and parser (**PLY, AST**) to convert optimization models into structured MILP formulations, which reduced model preprocessing time by **30%** and standardized workflows for future use.
- Linked industrial grade solvers (**Gurobi, CPLEX, HiGHS, Xpress**) and optimized constraint execution with NumPy and multiprocessing, achieving a 25% solver speedup while ensuring numerical stability.

HITACHI SOLUTIONS Hyderabad, Telangana, IND
Data Engineer Intern May 2022 – Aug 2022

- Orchestrated enterprise-scale data workflows with **Azure Data Factory & Pipelines**, processing 2M+ daily records from diverse sources into a centralized data lake for analytics.
- Streamlined ETL pipelines with **Azure Databricks** and **SQL Server**, reducing runtime by ~35% and improving SLA compliance for downstream reporting.

VERTICROSS INDIA Hyderabad, Telangana, IND
Research Assistant May 2021 – Dec 2021

- Devised Python/SQL pipelines to unify multi-source industrial sensor streams, improving dataset consistency and reducing preprocessing overhead by 25%.
- Deployed time-series anomaly detection on equipment logs to flag early fault patterns, lowering unplanned downtime in monitoring projects by 15%.

PUBLICATIONS https://scholar.google.com/citations?user=Z967hFwAAAAJ&hl=en%20target=

1. Bimal Kumar Dora, Tarun Gangadhar, Arghya Mitra, Nidhi Haribhau Gaikwad, Ruchita Sunil Waghmare, Damien Ernst, Pranjali Kulkarni, Sudip Halder, Sunil Bhat, "Cost Optimization of Renewable Energy Installation in a Four-Microgrid System Using GBOML", in *IEEE Fifth International Conference on Sustainable Energy and Future Electric Transportation (SeFet)*, 2025. [Paper]
2. Bimal Kumar Dora, Sudip Halder, Ruchita Sunil Waghmare, Tarun Gangadhar, Pranjali Kulkarni, Sunil Bhat, "Solution of Optimal Power Flow Problems Using Enhanced Hunter-Pray Optimization Algorithm", in *IEEE Third International Conference on Power Electronics, Intelligent Control and Energy Systems (ICPEICES)*, 2024. [Paper]

TECHNICAL SKILLS

Programming & Frameworks: Python, C++, CUDA, PyTorch, TensorFlow, Keras, SQL, MATLAB
Machine Learning & AI: Deep Learning, Neural Rendering, Gaussian Splatting, Computer Vision, NLP, Generative Models
Cloud & Data Engineering: Azure, Hadoop, Apache Spark, ChromaDB, LangChain
Tools & Platforms: Open3D, OpenCV, Git/GitHub, Docker, REST APIs, Linux

POSITIONS OF RESPONSIBILITY

THE BALDY CENTER FOR LAW AND SOCIAL POLICY Buffalo, New York, USA
Podcast Host/Producer Aug 2024 – Present

- Conducted 5+ podcast episodes featuring academic and professional guests and edited using AI tools.

VISVESVARAYA NATIONAL INSTITUTE OF TECHNOLOGY Nagpur, Maharashtra, IND
Student Mentor Aug 2022 – May 2024

- Mentored 15 freshmen students for 2 years, providing academic and non-academic guidance.

GOOGLE DEVELOPER STUDENT CLUBS Nagpur, Maharashtra, IND
Multimedia Lead Aug 2022 – May 2023

- Conducted workshops on Web Development, Cloud, and Flutter for 100+ students.