Dweep Joshipura

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Department of Electrical Engineering
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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2023 - Present	B.Tech	Indian Institute of Technology Kanpur	**9.7/10**
2023	CBSE(XII)	NPS Yelahanka, Bangalore	97.2%
2021	CBSE(X)	NPS Yelahanka, Bangalore	94.6%

Scholastic Achievements

- Cited by **Stanford** & **CMU** researchers for the first **dataset** & **LSTM** based approach for **Tongue Twister Generation**
- Secured **All India Rank 1235** in **JEE Advanced 2023** and **1081** in **JEE Mains 2023** from **over 1 million** candidates.
- Received the **Academic Excellence Award** for **exceptional academic performance** in the 2023-24 academic session.
- Speaker at **Grace Hopper Conference India 2018**, on **Tech for Good**, regarding use of tech to **reduce water scarcity**.

Work Experience

Research Intern | **Perception and Intelligence Lab** | *Prof. Tushar Sandhan, EE, IITK* *(May'25 - Present)*

- Explored unsupervised and supervised learning techniques for **Radar Signal Deinterleaving** in dense multi-radar environments.
- Designed a **MATLAB-based simulation GUI** to generate labeled radar datasets under **realistic tactical formations**.
- Benchmarked **HDBSCAN**, **Laplacian** Graph-based Clustering, **YOLO11n** and **YOLO11s** on custom multi-emitter dataset.
- Achieved **0.85 mAP** with YOLO11 on real signals; tested novel **stacked I/Q input** for improved performance under overlap.

Freelance Machine Learning Engineer | **Giovanni Franzan** | Letter of Recommendation *(Jun'23 - Jul'24)*

- Benchmarked **MediaPipe**, **ONNX.js**, and **tfjs** for low-latency, **browser-based palm detection** in a Unity-based application.
- Designed a novel **16-FER** pipeline using **MediaPipe Face** landmark vectors as input to a lightweight CNN for low-data training.
- Achieved **70% top-1 accuracy** and real-time performance on a **skewed 1K-image** sample from a Google Research paper.

Major Competition

Detection of AI-Generated Images | **Adobe** | **Inter IIT Tech Meet 13.0** | | *(Nov'24 - Jan'24)*

Objective	• Developed a model to **classify AI Generated images**, **identify artifacts** and **generate explanations**.
Approach	• Implemented a **BNN** with **Fourier Magnitude** and **Local Binary Pattern** channels for classification. • Benchmarked **Static** & **Dynamic Quantization** in **PTQ** & **QAT** using **PyTorch** for real-time performance. • Utilized **Jina-Clip-V2** and **ResNets** to identify artifacts, with fine-tuned **Ovis1.6** for explanation generation.
Results	• Achieved **2.6x speedup** from **80ms** to **30ms**, with **<1%** loss in accuracy using **Dynamic FX Mode PTQ**. • Secured **7th place** among **23 IITs** with a model accuracy of **97.2%** and inference time of **30ms** on CPU.

Key Projects

Combating Catastrophic Forgetting | **Course Project (CS771)** | *Prof. Piyush Rai, CSE, IITK* | | *(Oct'24 - Nov'24)*

- Developed a novel **Weighted Prototype Update** for CIFAR-10 classifier (on **BeiT** features) that **generalizes** to datasets belonging to same distribution **without labels**. Prevented **catastrophic forgetting** by limiting worst-case accuracy at **97.4%**.
- Designed a novel **Clustering-based Mean Shift** prototype update algorithm for **Unsupervised Domain Adaptation**.
- Achieved $\approx$ **5% increase in accuracy** on data from different distributions, while maintaining accuracy on previously seen data.

GenAI User Interaction Extension | **Overlayy Labs Pte Ltd** | *(Jun'24 - Jul'24)*

- Developed a **Chrome Extension** which tracked **12+ interactions** and analyzed **proportion of user attention** using **LLM**.
- Integrated **webGazer.js** for **Eye Gaze tracking**, and added support for **automatic calibration** through the device webcam.
- Designed a pipeline for providing **multimodal interaction data** and HTML elements to **gemini** and displaying on console.

Technical Skills

Programming Languages	Software & Libraries
C, C++, C#, Python, MATLAB, javaScript, Rust, LaTeX	Git, OpenCV, Pandas, Numpy, PyTorch, Tensorflow, Matplotlib

Relevant Courses

A* - outstanding performance

Introduction to Machine Learning (A*)	Probability and Statistics	Analog Electronics (A*)
Data Structures and Algorithms	Ordinary & Partial Differential Equations (A*/A*)	Control Systems (A*)
Fundamentals of Computing I & II	Linear Algebra	Introduction to Electronics (A*)

Positions of Responsibility

Team Head (Avionics and Payload) | **IITK Rocketry and Space Exploration Team** *(Apr'25 - Ongoing)*

- Managing a **3-tier team** of **50+ students** along with 3 other heads working on advancing technologies in **amateur rocketry**.
- Developed an STM32F4-based **Flight Computer** entirely in-house, from PCB design to software integration and system testing.
- Successfully cleared **Critical Design Review** for **Teknofest Rocket Competition, Turkiye** & **IN-SPACe Model Rocketry**

Extra-Curricular Activities

- Led **800+ students** across batches to win **First Position** in Takneek '24, IITK's premier inter-hall technical competition.
- Managed and contributed technically to **two Gold-winning projects** in Takneek '24 - *OptiParser* (|) and *Electrobeat*.