Sanket Daphal

Final Year Undergraduate
Mathematics and Scientific Computing
Indian Institute of Technology Kanpur

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Examination	University	Institute	Year
Graduation	IIT Kanpur	IIT Kanpur	2025
12th	CBSE	Jawahar Navodaya Vidyalaya, Bundi	2021
10th	CBSE	Jawahar Navodaya Vidyalaya, Pune	2019

Achievements

- Maximum Leetcode rating of **2175**, ranked as a **knight** in the **top 3%** of all users worldwide
- Recipient of the **Ram Nagrani Scholarship 2022**, awarded by the Navprakashan Foundation to **IIT Kanpur** students
- Awardee of the **MPSFER Scholarship 2022**, awarded by Mahabir Prasad Sing Foundation for Education and Research
- Achieved rank in the top **3% in MHT-CET** 2021, conducted by the Government of Maharashtra, out of 7 lakh candidates

Work Experience

Visual GPS Localization — *May'25 - Jul'25*

ML Intern - Invictron

- **Objective** - Built an **offline** image-based **geolocalization pipeline** to estimate a drone's location from onboard images
- **Approach** - Built a **grid-based satellite gallery**, extracted features from grid & stored with lat/lon in structured metadata
- Integrated a **ConvNeXt-based encoder** with **TorchScript** tracing for optional feature normalization (L2)
- Used **prior** pose to find the nearest grid cell, then limited matching to a **5x5** neighborhood to **accelerate retrieval**
- **Outcome** - Achieved average latency of 10s per query on **Raspberry Pi-class** hardware and 0.5s per query on GPU systems

Personalized Feedback System — *Jun'24 - Jul'24*

Data Science Intern - My Analytics School

- **Objective** - Engineered an **AI feedback system** to enhance student learning with **personalized, auto-generated videos**
- **Approach** - Developed a **RAG engine** using **LangChain** and **OpenAI** to generate highly accurate, context-aware scripts
- Worked with a 5-member team to research and validate the **knowledge base**, ensuring accuracy and reliability of data
- Built an automated pipeline with **MoviePy**, **OpenCV**, and **Pydub** to transform text into dynamic video content
- **Outcome** - Delivered **personalized video feedback** to **300+** students, significantly enhancing their learning engagement
- The automated pipeline significantly reduced the manual effort & time required to provide individualized feedback

Technical Skills

- **Languages:** C, C++, Python, SQL, MATLAB
- **Utilities:** GitHub, LaTeX, Jupyter, Tableau, Excel, Power BI
- **Libraries & Frameworks:** Numpy, Pandas, Scikit-learn, Matplotlib, PyTorch, TensorFlow, OpenCV, LangChain
- **Proficient in**: Machine Learning, OOPS

Social Impact / Extracurricular

- Managed JDST/NCST at JNV Ayodhya as a **Dakshana Exam Coordinator**, managing **150+** candidates
- Mentored three JEE aspirants and provided JEE Advanced counselling as Dakshana Foundation representative
- Won **1st** place in solo instrumental music competition at **Kala Utsav** at cluster level and **3rd** at regional level
- Participated in **Amazon ML Summer** School selection 2025 and Flipkart GRiD 5.0 E-Commerce & Tech Quiz

Projects

RAG Pipeline with Multi Data Sources — *Jun'25 - Jul'25*

Self Project —

- Built a RAG Pipeline integrating **Gemini LLM**, **LangChain**, FAISS **vectorstore**, Wikipedia, and Arxiv APIs
- Developed custom **tool wrappers** and **agent chains** to retrieve and combine information from **multiple sources**
- Created an interactive **Streamlit interface** for real-time queries with secure **API key** management
- Enabled efficient search and response generation, integrating LLMs, vector databases, and external knowledge sources

Security Analysis for CAR-PUFs — *Feb'24 - Apr'24*

Course Project | Intro to Machine Learning

- Demonstrated how a **Companion Arbiter PUF** can be compromised using a single linear model through analysis
- Implemented feature mapping & training methods like **one-hot encoding** and **polynomial** features to learn model parameters
- Analyzed and compared **LinearSVC** & **Logistic Regression**, evaluating hyperparameter impact on training time
- Achieved **99.85%** training accuracy and **99.19%** test accuracy with optimized training processes and low misclassification rate

Football Match Analysis — *Dec'24 - Jan'25*

Self Project

- Constructed a football analysis system with **YOLOv5**, **PyTorch**, **OpenCV** to track movements and classify players
- Used **YOLOv5** and **SORT** for tracking, calculated speed, ball control, & integrated optical flow and perspective transformation
- Applied **K-means Clustering** for precise team classification by t-shirt colors, improving the accuracy of player identification
- Achieved mAP score of **0.63** for ball detection, **91%** accuracy for player detection, **98%** accuracy in classifying players' teams

Mini Display Wall — *Sep'23 - Nov'23*

Course Project | Topics in Large Data Analysis & Visualisation

- Built a high-performance mini display wall for **large data visualization** using **Python**, **VTK**, **TCP** sockets, and **OpenCV**
- Implemented efficient parallel data generation and transmission for real-time **multi-client visualization**
- Optimized network via server-side image partitioning and smart distribution to reduce overhead
- Achieved real-time rendering of **100** large frames in **150s**, demonstrating scalability **(1k×1k×4B)**

IITK Campus: Shortest Path Finder — *May'23 - Jul'23*

Self Projects

- Developed an optimal pathfinding solution for the IIT Kanpur campus by applying and implementing **Dijikstra's** algorithm using **C++**
- Engineered a custom **graph** data structure and leveraged **STL** containers like **vector**, **unordered map**, and **priority queue**
- Optimized graph representation using **adjacency lists**, reducing memory usage by **30%** compared to the **adjacency matrix**

Relevant Courses

Fundamentals of Computing
Data Structures & Algorithms
Integral Equations
Set Theory & Logic
Probability And Statistics
Real & Complex Analysis
Number Theory
Introduction to Electronics
Introduction to Machine Learning
Nonlinear Regression
Scientific Computing I & II
Abstract Algebra