

Omkar Kadam

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Professional Summary

Data Scientist and Machine Learning Engineer skilled in **predictive modeling, statistical inference**, geospatial machine learning, **deep learning**, and production systems, building end-to-end pipelines across ETL, feature engineering, training, evaluation, and deployment with **Python, SQL, PyTorch, TensorFlow, Scikit-Learn, Docker, and FastAPI**. Backed by two years of IIT Bombay research delivering supervised, unsupervised, and geophysical models on large-scale geoscientific datasets, plus published deep learning research in computer vision and multimodal sensor fusion for space-weather monitoring and an awarded publication.

Education

B.E. in Computer Engineering | SSJCOE, University of Mumbai | **CGPI: 7.58** **2022 to 2026**

Professional Experience

Research Assistant | IIT Bombay **Jun'26 to Present**

- Architected end-to-end **ML pipelines** for **mineral prospectivity prediction** across DhatuVerse geological survey datasets
- Ranked **Random Forest, Gradient Boosting, XGBoost, LightGBM, and CatBoost** ensembles for reproducible baselines
- Countered **class imbalance** with **SMOTE and SMOTE-Tomek**, validated under **Stratified K-Fold and LOOCV** cross-validation
- Raised mineral prediction **F1-score from ~30% to 70%+** via systematic feature engineering and hyperparameter tuning
- Built a **magnetic inversion model** recovering **3D subsurface susceptibility** through regularized least-squares optimization
- Containerized inversion and modeling workflows with **Docker** and served them via **FastAPI REST endpoints** in DhatuVerse
- Implemented isotropic, anisotropic, and cubic **interpolation** for **grade estimation** across sparse, irregular drill-hole grids
- Ran **statistical significance testing** on model gains, confirming improvements held across independent held-out survey blocks
- Engineered a **WebGL point-cloud visualization system** rendering large geological models with **cross-sectional slicing**

Research Intern | Machine Intelligence Group, IIT Bombay **Aug'25 to Jun'26**

- Built **data preparation pipelines** applying outlier detection, imputation, and coordinate normalization on geospatial data
- Ran **exploratory data analysis** on large-scale drill-hole records, surfacing **distribution shifts** and feature relationships
- Initiated the **DhatuVerse ML workflow**, defining **evaluation benchmarks**, baseline metrics, and reproducible tracking
- Standardized **data versioning and quality control** checks across all geological datasets used by the research group
- Delivered **orebody modeling, ore prediction, lode detection, and alpha-beta analysis** via regression and clustering models

Technical Skills

Languages and Tools | Python, SQL, Git, Docker, FastAPI, Jupyter, Google Colab, Kaggle, Tableau, Power BI, Anaconda, Excel

Machine Learning & Statistics | Classification, Regression, Clustering, Feature Engineering, Hypothesis Testing, A/B Testing, Cross-Validation, Class Imbalance Handling, Hyperparameter Tuning, Model Evaluation, ETL Pipelines, Data Versioning, SMOTE

Libraries & Deep Learning | Pandas, NumPy, SciPy, Scikit-Learn, TensorFlow, PyTorch, XGBoost, LightGBM, CatBoost, Keras, CNNs, Transfer Learning, Object Detection, Image Segmentation, YOLO, ResNet, OpenCV, MediaPipe, Matplotlib, Plotly, Seaborn

Geospatial & Geophysical | Magnetic Inversion, Orebody Modeling, 3D Prospectivity Modeling, Lode Detection, Alpha-Beta Analysis, Interpolation (Isotropic, Anisotropic, Cubic), Point Cloud Processing, Geospatial Data Analysis

Key Projects

Halosight: Multimodal Halo CME Detection System | Deep Learning, Computer Vision **2026**

- Developed a **multimodal deep learning framework** for **real-time Earth-directed Halo CME detection** from Aditya-L1 data
- Fused **VELC coronagraph** imaging with **SWIS-ASPEX** particle streams by temporal alignment, raising **detection reliability**
- Awarded **Best Paper**, published in **IJSRSET Vol. 13, Issue 8, 2026** with fully reproducible space-weather benchmarks

AstroPit: Deep Learning Crater Detection System | YOLOv12, Python, OpenCV **2025**

- Trained a **YOLOv12** detection pipeline on **5,000+ satellite images**, reaching **87% mAP** through hyperparameter tuning
- Designed a **modular batch-inference architecture** extensible to segmentation and downstream geomorphological analysis

NeoPilot: Real-Time Gesture-Controlled Drone Simulator | OpenCV, MediaPipe, Three.js **2025**

- Built an **OpenCV and MediaPipe** hand-landmark pipeline at **95% gesture recognition accuracy** under varied lighting
- Developed an interactive **Three.js 3D drone simulator** sustaining **30 FPS** with **sub-100ms** gesture-to-response latency

Achievements & Certifications

- **Winner, Smart India Hackathon 2024:** Led a 5-member team building an AI-driven water resource optimization platform
- **Club Mentor, TechNova Club:** Ran AI/ML workshops, mentoring **500+ students** across project and hackathon teams
- **Certifications:** IBM Watson Studio (ML deployment), Microsoft Copilot Generative AI, Deloitte Data Analytics via Forage