Prakhar Maurya

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Research Interests

My research lie in Astronomy, Astrophysics, and Cosmology, with a particular interest in applying Machine Learning/Deep Learning within these fields.

Education

Indian Institute of Science Education & Research (IISER) Pune, BS-MS (Bachelor of Science-Master of Science) — Pune, India, 2022 - 2027 (expected)

- Major: Physics
- Courses: Astronomy & Astrophysics, Cosmology, Deep Learning, Natural Language Processing, Signal Processing, Classical Mechanics, Quantum Mechanics, Electrodynamics, Statistical Mechanics, Linear Algebra

Research Experience

National Center for Radio Astrophysics (NCRA)-TIFR, Summer Internship — Pune, India, May 2025 - Present

- **Supervisor:** Dr. Yogesh Wadadekar, Professor - H, NCRA-TIFR, Pune
- Working on *SEA* (Shared Embeddings for Astrophysics) to learn a common embedding space across galaxy images, its morphological text descriptions, and spectral data using contrastive learning.

Indian Institute of Science Education & Research (IISER) Pune, Semester Project — Pune, India, January 2025 - April 2025, August 2025 - Present

- **Supervisor:** Dr. Bedartha Goswami, Assistant Professor, Department of Data Science, IISER Pune
- Working on *DeepAR* (Deep Learning for the Atmospheric River segmentation) by modifying and extending the Segment Anything Model (SAM)'s backbone to better capture atmospheric river structures.
- Applying Parameter-Efficient Fine-Tuning (PEFT) techniques such as LoRA and AdaLoRA for the fine-tuning of the SAM model.
- Github Repository: mphysicus/deep_AR

Indian Institute of Technology (IIT)- BHU, Summer Internship — Varanasi, India, May 2024 - July 2024

- Worked under Dr. Bidya Binay Karak, Associate Professor, Department of Physics, IIT-BHU, India
- Worked on developing the Surface Flux Transport (SFT) code for simulating the magnetic field on the surface of the Sun.
- It utilized spectral methods based on spherical harmonics for the simulation.

Computer Skills

Python	• **Machine Learning:** PyTorch, Hugging-face, scikit-learn • **Astronomy:** Astropy • **Others:** Numpy, Scipy, Matplotlib, Sympy, Pandas, OpenCV
HPC & Parallel Computing	SLURM Workload manager
Softwares	Microsoft Office, Blender 3D
OS	Linux (Primary), Windows
Others	LaTeX, git, bash

Workshop & Courses

- **Neural Networks and Deep Learning** - Coursera (Instructor: Andrew Ng) [Certificate]

Volunteering

- **Gravity Spy Project (by LIGO Scientific Collaboration):** *Volunteered from December 2024 - March 2025.*

Languages

- Hindi (Native/Bilingual Proficiency)
- English (Full Professional Proficiency)