

# Vedant Asati

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## Education

### Indian Institute of Science Education and Research (IISER)

Bhopal, MP

*BS-MS in Mathematics and Minor in Computer Science*

*Expected: Aug 2029*

- **Relevant Coursework:** Linear Algebra, Introduction to Programming, Multivariable Calculus, Linear Regression and Time Series Analysis, Probability and Statistics, Differential Equations, Real Analysis, Complex Analysis, Numerical Methods, Discrete Mathematics

## Research Interests

- Exploring applied machine learning with a focus on the mathematical foundations of model evaluation, data visualization, and algorithmic analysis.
- Particularly interested in the intersection of mathematics and machine learning, including number theory, optimization, and computational modeling.
- Eager to deepen understanding through hands-on research projects that combine theoretical insight with practical experimentation.

## Projects

### Aurras

*Sep 2023 - Present*

- Developed fuzzy search algorithms with configurable similarity metrics and ranking functions for information retrieval tasks.
- Built memory-efficient data structures with lazy loading and streaming support for large-scale dataset analysis.
- Designed adaptive caching mechanisms with LRU eviction and memory-aware storage to optimize performance in data-intensive workflows.
- Optimized concurrent processing with async/await and thread pooling, enabling scalable parallel computing workflows.
- Implemented real-time signal processing with buffering and latency optimization, demonstrating streaming data analysis techniques.
- Created a modular plugin-based architecture supporting dynamic component loading and runtime adaptability for scientific pipelines.

### Blog on Alpha-Beta Pruning

*Sep 2024*

- Authored a technical blog on Alpha-Beta Pruning, analyzing its algorithmic foundations, implementation, and performance optimization. Included code demonstrations and visual explanations. [Read here.](#)

## Technical Skills

**Programming Languages:** Python, Rust, SQL, Mathematica, LaTeX, Bash/Fish

**Libraries and Frameworks:** Numpy, Pandas, Matplotlib, FastAPI, Textual, Manim

**Tools:** Github, Git, Visual Studio Code, Jupyter Notebook, Ollama, Hugging Face

**Operating Systems:** Linux, Windows

## Additional Information

- **Languages:** Hindi (Native), English (Fluent)
- **Interests:** Applied Machine Learning, Algorithm Design, Open Source Contribution