Adheesh Trivedi

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4th year, BS Computer Science & Engineering, IISER Bhopal, India

Education

IISER Bhopal | *GPA: 9.08*[*]*/10 (3.63/4)* *2022 – 2026*
B.S. | *Computer Science & Engineering* *Bhopal, India*
O (Outstanding): 10/10 • A: 10/10 • B+: 9/10 • B: 8/10

Multivariable Calculus (B+)
Discrete Mathematics (A)
Probability & Statistics (A)
Complex Variables (A)
Real Analysis (B+)
Applied Optimization (B+)
Introduction to C Programming (A)
Data Structures & Algorithms (B+)
Signals & Systems (A)
Theory of Computation (A)
Principles of Model Checking (A)
Fundamentals of Database Systems (O)
Algorithms (A)
Machine Learning (B+)
Computer Vision (B)
Artificial Intelligence (B+)
Group Theory[*]
Modern Cryptography[*]
Information Theory & Coding[*]
Computer Organization[*]

Research Projects

On Robust Coloring of Graphs and ETH *July 2025 – Present*
Mentor: Dr. Prafullkumar Tale

- Studing a relaxation of proper coloring in which edges with same color are associated with some cost.
- Studied the Exponential Time Hypothesis, and ETH-Preserving reductions.
- Investigated treewidth; applied tree decompositions to dynamic programming on hard problems.

Scientific Tool for Bridging Model Checking Ecosystems *Dec 2024 – Present*
Mentor: Dr. Arpit Sharma, PhD. Shonak Shaha

- The Model Checking ecosystem remains fragmented, with various tools and frameworks lacking seamless interoperability specifically between action based and state based model checking.
- Developing high-performance converters between action-labeled models (CADP) and (mCRL2) and state-labeled models (PRISM) / (Storm) to enable cross-ecosystem model checking.
- Emphasis on parser design, memory-efficient graph transformations, semantic preservation, and interoperability testing.

On the feasibility of parameterized algorithms for VC Dimensions *May 2025 – July 2025*
Mentor: Dr. Prafullkumar Tale

- VC Dimension of a classification model is related to how complicated it can be, specifically in terms of the model's capacity to fit various datasets. Precisely, model's ability to generalize to unseen data.
- Tested efficient algorithms for computing the Graph VC Dimension.
- Assessed and compared the parameterized algorithm with current state-of-the-art for Graph VC Dimension for real world networks.

Reading Project on Graph Theory *Jan 2024 – Apr 2024*
Mentor: Dr. Prafullkumar Tale

- Studied *A First Look at Graph Theory* (Clark & Holton) with problem solving.
- Reinforced concepts: Graphs & their types, connectivity, traversals, matching problem, planarity.

[*] Ongoing

Technical Projects

Extensively Customizable Exam Scheduler using Graph Coloring *Oct 2025 – Nov 2025*

- Analyzed relationships among major Nifty companies and summarized insights in an interactive dashboard and formal report.
- Delivered clear visual findings on market structure, influential firms, and cluster patterns for course project.

Extensively Customizable Exam Scheduler using Graph Coloring *Oct 2024 – Jan 2025*

Vivek Kumar, Rahul Jana, Ayushman Shaha, Dr. Prafullkumar Tale

- Discovered that exam schedules for 2,000+ students in my college were being created manually, requiring significant effort.
- Developed an engine that assigns exams to time slots & halls minimizing same-day conflicts ($\leq$24h) using graph coloring + randomized optimization heuristics.
- Supports multi-hall allocation when enrollment exceeds single capacity; leverages NetworkX for constraint modeling.

Texture Classification & Face Clustering for Image Search *Sep 2024 – Nov 2024*

- The project aims to address the common challenge of navigating through directories containing a large collection of images, enabling users to efficiently filter and search for images.
- Pipeline: MTCNN detection → InceptionResNetV1 embeddings → cosine similarity for face grouping.
- Implemented batching to control GPU memory and multiple texture descriptors for retrieval precision.

GUI Developer Intern *Feb 2024 – Aug 2024*

Mentor: Prof. Vardharajan Srinivasan *AITG Labs*

- Led integration of scientific engines (Octopus, GPAW, NWChem) within a Python toolkit for photo-induced phenomena simulations.
- Automated submission workflows and job orchestration on national HPC clusters (PARAM-Ganga / PARAM-Kamrupa).

Context aware Bag-of-Words Chatbot *Oct 2021 – Dec 2021*

- Built a context-aware chatbot supporting tasks like to-do lists, word definitions, note taking, and time queries across timezones.
- Trained a sequential neural network in TensorFlow on a custom dataset tailored to project requirements.

General Purpose Discord Bot *Mar 2021*

- Python project that utilized PostrgreSQL to implement feature reach Discord bot.

Talks & Teaching

Teaching Assistant - Theory of Computation *Aug 2025 – Dec 2025*

Instructed by Dr. Arpit Sharma

Fast Matrix Multiplication Algorithms *1 Sept 2023*

Math Club @ IISER Bhopal

- Delivered a talk on Strassen's algorithm and its implications on computational complexity.

Leadership & Engagement

Club Coordinator *May 2024 – May 2025*

Coding club @ IISER Bhopal

Hackathon Organizer – Armacode 0 *Jan 2024 – Apr 2024*

IISER Bhopal × IIIT Bhopal

Additional Interests

Music (Guitar) • Competitive Programming • Speed Typing • Mathematical Visualization (Desmos, Manim)