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)
Machine Learning (B+)
Computer Vision (B)
Artificial Intelligence (B+)
Group Theory*
Modern Cryptography*
Information Theory & Coding*
Computer Organization*

Research Projects

Series of Research Projects in Theoretical Computer Science *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.

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.
- It helps in understanding the model's ability to generalize to unseen data.
- Tested efficient algorithms for computing the Graph VC Dimension.
- Assessed and compared the parameterized algorithms for Graph VC Dimension.

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.

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..

*Ongoing

Technical Projects

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

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

- Discovered that exam schedules for 14,000+ students and course registrations 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; evaluated multiple texture descriptors for retrieval precision.

Bag-of-Words Chatbot (Context-Aware) *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*

- Implemented modules for moderation, games, music playback, jokes & meme generation.
- The project was written in Python and utilized PostgreSQL database to store every configuration for the bot, which was server and user specific. The bot was designed to be scalable.

GUI Developer Intern (Litesoph, AITG) *Feb 2024 – Aug 2024*

Mentor: Prof. Varadharajan Srinivasan

- 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).

Leadership & Service

Coordinator – Coding Club *May 2024 – May 2025*

IISER Bhopal

- The club aims to foster competitive programming skills and algorithmic thinking among students.
- It organizes onsite competitive programming contests; facilitates open discussions & tutorials.
- I actively mentor junior members and led workshops on advanced topics.

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

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- Prepared questions for online round with over 500 applicants.
- Co-organized a 35-hour national hackathon; collaborated with faculty and industry experts on problem design and judging of 12 onsite teams.

Additional Interests

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