

# Nisarg Vekariya

B.Tech (Honours) - Information and Communication Technology with minor in Computational Science

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## Education

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|----------------------------------------------------------|----------------------------------------|
| <b>Dhirubhai Ambani University</b><br>CPI: 8.3           | 2024 - Present<br>Gandhinagar, Gujarat |
| <b>Aashadeep IIT (GHSEB)</b><br>Percentage: 88.15%       | 2023 - 2024<br>Surat, Gujarat          |
| <b>Aashadeep Vidhyalay 1 (GSEB)</b><br>Percentage: 92.5% | 2021 - 2022<br>Surat, Gujarat          |

## Projects

- RouteHub: Algorithmic Route Estimation Engine** | Java, Graph Algorithms, Spatial Data Structures 
- Built a framework-less **Java backend engine** optimizing graph traversal across **99k+ geospatial nodes** of New Delhi.
  - Engineered **A\* Search** with **Haversine heuristics**, achieving a **1.62x speedup** over standard **Dijkstra's Algorithm** while guaranteeing optimal routing.
  - Implemented a custom **QuadTree spatial index** for GPS coordinate snapping, delivering a **734.8x performance leap** over **Linear Search** with  $O(\log N)$  lookups.
  - Designed a **SOLID architecture** utilizing the **Strategy Pattern** to decouple dynamic pricing, driver matching, and ride lifecycle management.
- AeroFlow: Aviation Management System** | PostgreSQL, PL/pgSQL, Next.js, Node.js 
- Architected a highly scalable airline platform in 3NF with **18 normalized tables** and **50+ PL/pgSQL functions**, leading a cross-functional team of 5.
  - Engineered **8 reactive triggers** and transaction wrappers to enforce **atomic multi-step operations** and absolute data integrity.
  - Deployed **37 advanced queries** using CTEs, Window Functions, and Relational Division to drive complex backend operations analytics.
  - Optimized backend infrastructure by building a Next.js API layer featuring a singleton **database connection pool** and custom exception handling.
- Lynq: Scalable URL Shortener & Analytics** | Node.js, React, Redis, PostgreSQL, Gemini, k6  
- Designed a **Producer-Consumer** architecture via a **Redis Message Queue**, validated by **k6 load tests** to handle **140k+ requests/5 min** (a **20.4x throughput increase**).
  - Engineered **Redis Hash Caching** (`hGetAll`) to completely eliminate PostgreSQL bottlenecks on the hot-path, reducing redirection latency to **<10ms**.
  - Decoupled database writes via **5-second bulk-insert batching** to prevent TCP starvation, and secured **API endpoints** using **isolated Redis rate limiters**.
  - Integrated **Google Gemini API** for SEO-optimized custom aliasing and built a robust **data processing pipeline** for instantaneous mass link generation.

## Technical Skills

**Languages:** Java, C++, C, JavaScript, SQL  
**Core CS:** Data Structures & Algorithms, Object-Oriented Programming, DBMS  
**Backend:** Node.js, Express.js, Socket Programming, Twilio API, Resend  
**Frontend:** React.js, HTML, CSS  
**Databases & Cloud:** PostgreSQL, Redis, MySQL, MongoDB, Firebase, Railway, Render, Vercel  
**Developer Tools:** Git/GitHub, Linux, VS Code, POSIX Threads (pthreads)  
**Areas of Interest:** Full Stack Development, Competitive Programming

## Achievements

- Codeforces:** Specialist (Max Rating: 1425) [NISARG\_07]
- CodeChef:** 3-Star (Max Rating: 1640) [nisarg.v07]
- JEE Mains 2024:** 99.33 Percentile (AIR 10821)
- JEE Advanced 2024:** AIR 18321