



**Pradyumn Shirsath**

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Bachelor of Technology

Indian Institute of Information Technology Nagpur

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## EDUCATION

### •B.Tech in Computer Science and Engineering (AI and ML)

2022-26

Indian Institute Of Information Technology, Nagpur

## PROJECTS

### •SKILLO

Nov 24 – Dec 24

*React, Express, MongoDB, Mongoose, Tailwind CSS, ShadCN*

- Built a full-stack **course-selling platform** with secure **JWT authentication** and **session management**.
- Developed admin features for course management with **Mongoose transactions** for **atomic operations**.
- Implemented a **responsive frontend** with **React** and **ShadCN**, styled using **Tailwind CSS**.
- Deployed the application seamlessly using **Vercel**, ensuring high availability and performance.

### •NAVIX

Smart India Hackathon 2024

*React.js, Leaflet.js, Tailwind CSS, Python, Flask, Node.js*

- Developed a **maritime navigation system** optimizing ship routes using **real-time weather data**.
- Implemented **A\* algorithm** to reduce **fuel consumption by 15%** and **sail time by 20%**.
- Created **dynamic graph visualizations** and an **interactive map** for safe navigation.
- Promoted **greener shipping practices** by reducing **carbon emissions**.

### •Cloud Vault

Dec 2024 – Present

*Node.js, AWS S3, Lambda, CloudFront, TypeScript, Prisma*

- Developed a subscription-based cloud storage service offering scalable and secure file storage, sharing, and quick downloads via **AWS CloudFront**.
- Integrated **AWS Lambda** functions with **S3 triggers** to scan uploaded files for harmful content, ensuring a secure storage environment.

### •High-Performance Batched LU Factorization on GPU & Multi-Core CPU (Ongoing)

2025

*OpenMP, CUDA, GPU Parallelism, Matrix Factorization, Numerical Computing*

- Implemented **OpenMP parallelized** and **basic CUDA** versions for solving simultaneous linear systems ( $50 \times 50$  to  $500 \times 500$ ).
- Optimized performance for multi-core CPUs and GPUs, leveraging **thread-level and batch-level parallelism**.
- Validated accuracy using test matrices from **structural topology optimization** and **chemical kinetics**.
- Assessed solution quality using:
  - \* **Matrix reconstruction:**  $\|PA - LU\|_{\infty} = 3.45 \times 10^{-11}$
  - \* **RHS vector reconstruction:**  $\|\mathbf{x}_{\text{true}} - \mathbf{x}\|_{\infty} / \|\mathbf{x}_{\text{true}}\|_{\infty} = 2.05 \times 10^{-14}$
  - \* **Residual error:**  $\|\mathbf{b} - A\mathbf{x}\|_{\infty} = 4.12 \times 10^{-11}$
  - \* **Maximum difference between computed and true solution:**  $2.60 \times 10^{-14}$
- Investigating **memory management optimizations**, **scalability improvements**, and **advanced GPU optimizations** for next phases.

## TECHNICAL SKILLS AND INTERESTS

**Languages:** C/C++, JavaScript, TypeScript, Python,

**Libraries:** C++ STL, React.js, Express.js, Next.js, Python Libraries, OpenMP, CUDA

**Web Dev Tools:** Node.js, VS Code, Git, GitHub, Docker

**Frameworks:** React.js, Express.js, Next.js

**Cloud/Databases:** MongoDB, PostgreSQL, Firebase, MySQL, Prisma, Redis

**Relevant Coursework:** Data Structures & Algorithms, Operating Systems, Object-Oriented Programming, Database Management Systems, Software Engineering, Parallel & Distributed Computing, Machine Learning, Deep Learning (NN, NDL), Natural Language Processing (NLP), Computer Vision (CV), Reinforcement Learning (RL)

**Areas of Interest:** Web Design and Development, Frontend, UI & UX, GPU Programming, High-Performance Computing, Distributed Systems

**Soft Skills:** Presentation, Adaptability, Communication Skills, Teamwork

## POSITIONS OF RESPONSIBILITY

### •Co-Lead, Corporate Relations and Affairs TantraFiesta'24 - IIIT Nagpur

Aug 2022 – Dec 2022

- Attracted over 300 attendees to the event through effective outreach and engagement strategies.
- Secured sponsorships worth **5.45 lakh** and onboarded 43 sponsors, contributing 25% of the total fest budget.
- Led a team of 15 members, ensuring seamless coordination and successful event execution.
- Set a benchmark in fundraising and corporate partnerships, enhancing the event's success.