RAVI KUMAR | 22MA10047

B.S.(Hons.) in MATHEMATICS AND COMPUTING

EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2026	4YRS B.S	IIT Kharagpur	7.37 / 10
2021	Central Board of Secondary Education	Swami Keshwanand Convent School, Sikar, Rajasthan	86%
2019	Central Board of Secondary Education	Dundlod Public School, Dundlod, Rajasthan	91%

INTERNSHIPS

Local Narratives, Bangalore | SDE Intern *May 2025 - Jul 2025*

- Deployed and managed backend services & tools with **PostgreSQL** and **Traefik** on a self- hosted **VPS** for improved reliability and control
- Built & optimized scalable Next.js features with **SSR, ISR,** & code-splitting on key routes for improved **TTFB** and **LCP** page performance
- Integrated **Razorpay** with robust idempotent webhooks & retry logic on the backend to reduce failures and ensure strict **ACID** workflows
- Added an automated **CI/CD** pipeline using GitHub Actions on a self- hosted VPS to automate build and deployment for consistent delivery

PROJECTS

Twitter Subgraph Classification | Course Project | Prof. Arindam Banerjee *Feb 2025 - Apr 2025*

- Built **4-hop** neighbourhood graphs from **5.3M Twitter nodes**, generating **500-D vectors** based on the top node degrees in each subgraph
- Applied unsupervised **PCA for dimensionality reduction**, retaining **99% variance in 263 PCs** with visualization of the top 3 components
- **Labeled graphs** by detecting **maximal cliques** (>11), balancing sparsity and built **binary classifier** to predict dense community presence
- Achieved **97.38% accuracy** with **Logistic Regression** on PCA-reduced data, supported by **scree plots**, **3D plots** and **decision boundary**

Linear Programming (LP) Solver | Course Project | Prof. Geetanjali Panda *Aug 2024 - Nov 2024*

- Developed C++ LP solver, implementing the **Simplex** and **BigM** algorithms to solve the standard and artificial-variable based LP problems
- Optimized pivot selection using **inplace matrix modifications** to minimize memory usage & reduce computation performance overhead
- Implemented detection for special LP cases including **infeasibility**, **unboundedness** & alternate optimal solution for completeness check

Controlia Cloud | Self Project *May 2024 - Sep 2024*

- Built a full-stack cloud platform with Nodejs, React, MongoDB, **Docker, Redis**, featuring **microservices, JWT auth,** and **SSL/TLS** security
- Designed automated Docker control using **Dockerode** with **dynamic CPU/ memory**, load balancing, service discovery, & rollback support
- Developed secure CI/ CD pipeline integrating **GitHub OAuth,** token- based repo access, fully automated container deployment workflows
- Added distributed **BullMQ/ Redis job queue** system with concurrent processing, retries, error handling, and live performance monitoring
- Designed multi-tenant development platform with **JupyterLab** and **VS Code**, Traefik reverse proxy, persistent volume data management

Translator Using Self-Built Transformers | Self Project *May 2025 - Jun 2025*

- Built a Transformer model from scratch, inspired by the **'Attention is All You Need'** paper, emphasizing on core neural attention concepts
- Developed key transformer components, including the **encoder and decoder** modules, ensuring an end- to- end operational architecture
- Applied the model to develop a functional translator system, showcasing its capabilities in practical NLP areas such as text generation task

C++ HTTP Server | Self Project *Apr 2024 - Jun 2024*

- Developed a high-performance C++ HTTP server with **Boost.Asio**, dynamic thread pool, REST APIs, &concurrent client handling for speed
- Implemented a **WebSocket** framework enabling **bidirectional streaming**, session management, and efficient broadcast delivery for scale
- Added **RSA encryption** with **OpenSSL** and **bcrypt** authentication to secure file transfers and sensitive data with an audit logging system
- Containerized services with **Docker**, added K6 load testing, and automated builds via **Makefile/ CMake** for all cross-platform deployment

COMPETITION/CONFERENCE

Open-Soft'25 Inter Hall General Championship Tech, IIT KGP | Vice Captain *Feb 2025 - Mar 2025*

- Added Retrieval Augmented Generation **(RAG)** to ground chatbot responses within HR dataset for contextual & reliably accurate insights
- Connected and synchronized multiple diverse data sources including slack, teams, feedback, rewards, leave, and activity tracker datasets
- Built a HR dashboard using **Next.js** and **Chart.js** to monitor evolving mood trends, review chatbot summaries, and manage flagged cases

Competitive Programming

- Ranked **609th** in Codeforces Educational Round 176 &750th in CF Round 1012 (Div 2) among **20,000**+ global competitive coders worldwide
- Secured global **ranks 12** & **138** in CodeChef Starters 185 & 178 (Div 2) and **13** & **419** in Starters 173 & 168 (Div 3/4) among 20,000+ coders

AWARDS AND ACHIEVEMENTS

- **Expert on Codeforces** (max rating **1647**), ranking **1315th** nationally out of 83,000+ active competitive coders under the handle **retrostoat**
- **5-star** on CodeChef (max rating **2009**) under the handle retrostoat, ranked **1445th** nationally and **2054th** globally among 205,000+ coders
- **JEE Advanced 2022:** secured All India Rank **2823** (GE), placing among top **0.03%** out of one million candidates that appeared in the exam
- **JEE Mains 2022:** secured **99.02 percentile** out of one million total candidates who appeared for the exam, placing among the top **0.08 %**

SKILLS AND EXPERTISE

Programming and Databases: C/C++, Python, JavaScript, TypeScript, Bash, Matlab, HTML/CSS, MySQL, Mongo, PostgreSQL, SQLite, Redis
Frameworks and Libraries: React, Next.js, Django, Node.js, Express, Boost.Asio, NumPy, Drizzle, Axios, Plotly, SymPy, Matplotlib, FastAPI
Tools and Development: RESTful APIs, WebSockets, Authentication, Authorization, Payment Integrations, RS-256, OAuth2.0/JWT, Nginx, GitHub, Git, Postman, VS Code, UML, Jupyter, Colab, Docker, Traefik, Azure, VPS, Linux, CI/CD, Makefile, CMake, n8n

COURSEWORK INFORMATION

Programming & Data Structures* | Computer Architecture* | Database Systems | Big Data Analysis | Stochastic Processes | Linear Algebra | Mathematical Modelling & Simulation* | Probability &Statistics | Numerical & Complex Analysis | Optimization Techniques* | Real Analysis Modern Algebra | Transform Calculus | Design & Analysis of Algorithms* | File Organization & Database Systems* | *(with lab)

!Self declared by the student, CDC could not verify the relevant documents