

SONAL SINGH

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Skills

Languages:	C++, Python, JavaScript, TypeScript
Frameworks:	HTML and CSS, React, Node.js
Databases:	MongoDB, MySQL
Core CS Concepts:	Algorithms Analysis, Operating System(OS), Data Structures, Networking, Database (DBMS).
Miscellaneous :	Linux, Shell (Bash), Git, Vs code, Prompt Engineering, Docker.

Projects

Coding Platform Backend System. [\[LINK\]](#)

Jan 2025

- Microservices Architecture:** Engineered a scalable, high-availability platform deployed on AWS with auto-scaling and load balancing.
Problem Management: Developed a Problem Admin Service (JavaScript, Express, MongoDB) for efficient problem CRUD operations with test cases and code stubs.
- Executor Service:** Conceived a multi-language code execution service (TypeScript, Docker) using Strategy and Factory patterns for optimized execution environments and TLE handling.
- Asynchronous Communication:** Implemented a high-performance Submission Service (Fastify) with Redis queues and WebSocket integration for real-time feedback.
AWS Deployment: Ensured reliability and performance through monitoring, fault tolerance, and auto-scaling.
- Tech Stack:** Node.js, Express.js, TypeScript, Fastify, MongoDB, Redis Queue, Docker, WebSocket, JWT Authentication.

Uber Ride Booking Backend. [\[LINK\]](#)

Nov 2024

- Scalable Architecture:** Designed a high-performance backend supporting real-time ride booking and driver notifications.
- Distance-Based Ride Matching:** Devised a progressive radius expansion algorithm that prioritizes drivers within 5 km and gradually extends the search up to 50 km if no driver is available.
- Location-Based Matching:** Utilized driver coordinates and leveraged geospatial queries to efficiently match riders with nearby drivers.
- Secure Authentication:** Implemented JWT authentication with RBAC to regulate access for customers and drivers.
- Performance Optimization:** Improved API response time through caching, indexing, and optimized database queries.
- Tech Stack:** Node.js, Express.js, MongoDB, Redis, Socket.io, RESTful APIs.

Mall Customer Segmentation.

Oct 2024

- Customer Segmentation with K-Means:** Built a clustering model to group customers based on spending patterns and demographics. Employed data preprocessing for cleaning and normalization, enhancing accuracy.
- Behavioral Analysis:** Investigated customer trends using PCA, uncovering insights for targeted marketing strategies.
- Data Visualization:** Produced insightful visual representations of cluster distributions with Matplotlib, aiding businesses in refining segmentation approaches.
- Tech Stack:** Python, K-means Scikit-learn, Pandas, Matplotlib.

Certification

Certification in Cloud Computing (NPTEL)	Nov 2024
Design and Analysis of Algorithms (Coursera)	May 2024
Generative AI for Everyone (Coursera)	May 2024

Extracurricular Activity

GitHub Student Club | Active Member:

- Contributed to 5+ open-source projects and participated in coding workshops.

DSA Contests & Coding Challenges:

- Tackled 350+ LeetCode problems, consistently participated in contests to enhance efficiency and algorithmic skills.

Active Participant in Campus Sports Events:

- Showcased strong sportsmanship and commitment by participating in college-level tournaments.

Education

Lovely Professional University, Punjab, India

Aug 2022 – July 2026

- Branch: Computer Science and Engineering | CGPA:7.07