

# Kaustubh Rai

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## EDUCATION

Carnegie Mellon University (CMU) | School of Computer Science

PA, USA | Dec. 2025

Master of Software Engineering, Scalable Systems

Coursework: Distributed Systems, Software Architecture, Cloud Computing, Microservice Designs, Design Patterns

Teaching Assistant: Cloud Computing

Shiv Nadar University

Gautam Buddha Nagar, India | May 2022

Bachelor in Technology, Computer Science and Engineering

## WORK EXPERIENCE

eParts Services LLC

PA, USA | Jun. 2025 - Aug. 2025

Software Development Intern

- **Engineered Product-Pricing functionality** (.NET, C#) for a B2B e-commerce platform serving **100k+ daily users** across multiple clients by decoupling search logic from pricing retrieval and eliminating redundant Elasticsearch queries, reducing **p95 latency** by **82%** and significantly improving product lookup reliability.
- **Reduced redundant database requests** by implementing targeted protection on guest checkout endpoints, blocking **20K+ bot requests/day** and restoring full guest checkout functionality.
- **Enabled schema auditability and traceability** in an open-source Electronic Data Interchange (EDI) system by externalizing SQLite schemas into version-controlled JSON files.
- **Migrated a legacy EDI system from Python 2 to Python 3** by porting custom grammar parsers and schema-mapping logic, preserving compatibility with existing EDI formats and downstream integrations.

UnitedHealth Group

Gurugram, India | Jun. 2022 - Jul. 2024

Software Engineer - Medicare & Retirement portals

- **Rebuilt** a SQL-based ETL pipeline in Azure Data Factory **powering a nationwide pharmacy search** (~1M daily user requests) by optimizing inefficient transformations, reducing overall **processing time** by **73%**.
- **Re-architected a location search service** (Spring Boot, Java) serving **~30M+ customers annually** from a synchronous to a reactive architecture, reducing median latency by **47%**.
- **Remediated high-severity vulnerabilities** across production container images on Azure Kubernetes Service by updating base images and dependencies, reducing security findings by **~70%**.
- **Introduced unit and integration testing** across Java microservices using Mockito, increasing test coverage from near-zero to **~90%**.

## PROJECTS

Telegram Web Self-Destructing Photos Extension (Chrome) [🔗](#)

Dec. 2025

- Built a Chrome extension enabling self-destructing photos on Telegram Web by **reverse-engineering client behavior** and cache flow.
- Modified **photo lifecycle handling** by intercepting and patching Telegram's **cached service worker** to inject custom **time-to-live (TTL) parameters** at send time.

Distributed Bitcoin Miner

CMU | Oct. 2025

- Designed an event-based server to implement a reliable **HTTP/3-inspired communication protocol** over UDP using goroutines, supporting **100+ concurrent connections**.
- Built a distributed Bitcoin mining system on top of this protocol with **Shortest Remaining Job First (SRJF)** scheduling and automatic **job reassignment** on worker failure.

Uber Simulation Stream Processing | Teaching Assistant

CMU | Apr. 2025

- Built and owned a driver-rider matching system using Kafka-Samza on AWS EMR, ingesting **~7M+ real-time events** across 5-partitioned topics.
- Developed targeted rider ad-delivery using multi-stage Samza jobs and RocksDB, applying multi-factor scoring across **~20K+ user** and **~1K+ business** datasets.

## SKILLS

**Languages:** Go, Java, Python, C#, C/C++, JavaScript

**Frameworks:** Spring Boot, .NET, Node.js, Express

**Systems & Data:** Spark, Kafka, Samza, Hadoop (HDFS, YARN), MySQL, MongoDB, Redis, Elasticsearch

**Cloud:** AWS (EMR, EC2, S3, Lambda, CloudWatch), Azure (Data Factory, Bot Service, HDInsight), GCP

**DevOps:** Docker, Kubernetes, Helm, Terraform, Jenkins

**Practices & Tools:** Agile (Scrum), Jira, TDD, Git, Maven, Mockito