

KUSUM BHATTARAI SHARMA

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EDUCATION

B.S. in Computer Science (Physics + Math minor), 3.88/4.0 **August 2023 – May 2027**

Texas State University (TXST) *San Marcos, Texas*

- **Coursework:** Data Structures & Algorithms, OOP, Algorithms Analysis, Computer Architecture, Software Engineering, Operating Systems, Parallel Programming
- **Achievements:** WebAI YOLO26 MLX Build Challenge **Winner**, AI Collective Hackathon **Runner-up (\$1000)**, TXST Datathon 2025 **Winner**, TXST Achievement Scholarship (**\$32,000**)

TECHNICAL SKILLS

- **Languages:** C++, Java, Python, C, JavaScript, TypeScript, SQL, Bash, HTML/CSS
- **Frameworks & Libraries:** React, Node.js, FastAPI, Spring Boot, LangChain, Kafka, Redis, PySAL
- **Tools:** Docker, GCP, AWS, Terraform, GitHub Actions, FAISS, Google Benchmark, Linux, CI/CD, Nginx

EXPERIENCE

Undergraduate Research Assistant **December 2025 – March 2026**

Department of Engineering, TXST *San Marcos, Texas*

- Built low-latency voice XR agent for **Magic Leap 2** with async **FastAPI** + **Socket.IO**, achieving **<150ms** audio latency over full-duplex streams.
- Deployed **LangChain** + **ChromaDB** knowledge engine indexing 3 safety manuals to **40 students**, achieving **>90%** user satisfaction.

Student Software Developer **September 2025 – March 2026**

Center of Analytics and Data Science, TXST *San Marcos, Texas*

- Built **Hybrid RAG pipeline** with **FAISS** vector search and cosine similarity ranking for AI-driven grant proposal optimization.
- Reduced faculty evaluation time by **80%** via polymorphic web scraping with **k-means clustering** and weighted 0–10 Fit Score. [GitHub](#)

AI & Data Researcher **January 2026 – Present**

Translational Health and Research Center, TXST *San Marcos, Texas*

- Built a pipeline merging 5 years of **CDC BRFSS** survey data with MSA-level **Distress Community Index** spatial statistics into a master population health dataset.
- Implemented **Global/Local Moran's I** (PySAL, $k=6$ KNN weights) and **LISA clustering** to map health disparity patterns across U.S. metro areas.

PROJECTS

Incremental Dataflow Engine | *C++17, Python, pybind11, Spring Boot, Google Benchmark* **March 2026 – Present**

- **40×** faster than batch recompute at 0.1% change rates on **1M-row datasets** (0.2ms vs 8.2ms); delta updates propagate through a typed operator DAG with retraction semantics.
- **Zero heap allocations** per cycle in **GroupByCount** via pre-allocated buffers + XOR RecordHash; **C++ core** → **Python DSL** → **Spring Boot REST/SSE**, validated with **70 Google Tests**. [GitHub](#)

Clash Royale Trading Exchange | *C++17, React/TypeScript, PostgreSQL, Boost.Beast, Redis* **Nov 2025 – May 2026**

- Built a low-latency C++ matching engine with **Boost.Beast** WebSockets; **411k orders/sec**, **3.7 μs** fill latency, **1.9 μs** snapshots; sustained **353 req/s** at **0.00% 5xx rate** under 100-VU spike. [GitHub](#)
- **Zero races** (ThreadSanitizer, 9 tests × 4 thread counts) and **zero memory errors** (AddressSanitizer, 27 tests); atomic PostgreSQL settlement ensures no partial gold/inventory state.

Virtual Memory Simulator | *C++17, CMake, Google Test* **March 2026 – Present**

- **FIFO / LRU / CLOCK / OPT** replacement with **O(1) LRU** (linked list + hash map); **CoW fork** via reference-counted frames + TLB shutdown on eviction; live **FTXUI** TUI with real-time metrics — validated with **51 Google Tests** across 9 suites. [GitHub](#)

GitHub-to-Portfolio | *Java 21, Spring Boot, Kafka, Redis, PostgreSQL, React* **March – April 2026**

- Parallelizes **7 GitHub API endpoints** via **CompletableFuture.allOf()** before any LLM call, cutting extraction from 3–5s to **<2s**; **Redis + PostgreSQL dual-write** for O(1) polling with durable history. **Live**
- Deployed on **GCP Cloud Run + Terraform**; replaced Kafka with **@Async** in prod to eliminate 30–60s rebalancing on **scale-to-zero** cold starts. [GitHub](#)