

# Aryan Ghate

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## Skills

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**Languages:** Python, Java, Go, HTML/CSS, JavaScript, SQL, C, C++, Flutter, R

**Tech Stack:** AWS, Docker, Flask, FastAPI, PyTorch, Hugging Face, LangChain, Git, GitHub

## Experience

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**AI Engineering Intern**, RediMinds, Inc – Southfield, Michigan, United States      June 2024 – September 2024

- Built an AI-driven marketing system that applied predictive models to customer behavior, lifting engagement by 35% and improving satisfaction by 40% through automated segmentation and campaign targeting.
- Integrated NLP-based feedback analysis into the marketing workflow to personalize recommendations, raising retention by 30% within six months.
- Ran 50+ A/B tests on AI-generated campaign content and evaluated competitor offerings, uncovering 15 viable AI features that improved click-through by 20%, conversion rates by 15%, and market share by 25%.

## Projects

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### Flux DB - Redis-inspired Key-Value Store [↗](#)

- Developed a Redis-inspired key-value store in C++17 with a non-blocking poll()-based event loop, a pthreads worker pool, and AOF persistence, all built from scratch with zero external dependencies.
- Implemented incremental rehashing across two live hash tables, migrating keys in fixed batches of 128 per operation to eliminate the stop-the-world latency spikes present in naive resize strategies.
- Designed a sorted set backed by a parallel AVL tree and hash map sharing nodes via intrusive structs, enabling  $O(\log n)$  range queries and  $O(1)$  point lookups on the same underlying data.
- Achieved 110k–150k ops/sec at p50  $\sim 1\mu\text{s}$  across core operations, with 93–99% of requests completing under 100 $\mu\text{s}$  even with fsync-based AOF persistence enabled.

### x86 Bootable Kernel [↗](#)

- Developed a bootable x86 kernel in C and Assembly that writes directly to VGA memory at 0xb8000, implementing direct memory-mapped I/O without operating system abstraction.
- Built a Multiboot-compliant kernel binary using NASM and GCC with custom linker script positioning code at physical address 0x100000, enabling GRUB bootloader compatibility.
- Implemented low-level hardware initialization including interrupt disabling via CLI instruction and 8KB stack allocation in BSS section for bare-metal execution.
- Designed VGA text mode interface writing 2-byte character-attribute pairs directly to video memory, demonstrating understanding of hardware-level display protocols.

### TCP Chat Server using Golang [↗](#)

- Designed a centralized, channel-driven command processor to handle concurrent client commands, preventing race conditions and simplifying concurrency management across goroutines.
- Implemented per-client goroutines and line-delimited TCP parsing to support scalable, real-time messaging across multiple concurrent chat rooms.
- Architected map-backed room registries and broadcast logic for  $O(1)$  member lookups, enabling efficient fan-out delivery and improved modularity for maintainability.

## Achievements

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**MumbaiHacks 2025** – Finalist out of 2000+ Teams

**Neural Spark Ideathon** – Winner

## Education

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**Ramrao Adik Institute of Technology** – B.Tech in Artificial Intelligence and Machine Learning      Expected 2026