Sangraam Patwardhan

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Education

Indian Institute of Technology, Bombay *Aug 2019 - May 2023*
B.Tech. in Mechanical Engineering **CPI: 8.91/10**
Minor in Computer Science & Engineering

Professional Experience

Software Engineer II (R&D) *Apr 2024 - Present*
Livegage AI

- Architected and developed a scalable, high-throughput backend API (**FastAPI**) to serve a Retrieval-Augmented Generation (RAG) engine for analyzing mortgage documents.
- Engineered the data ingestion and retrieval pipeline for the RAG system, implementing and optimizing a **Qdrant** vector database for efficient large-scale semantic search.
- Improved system throughput by **5x** by identifying and resolving key performance bottlenecks related to memory and compute; enhanced user-perceived latency via **HTTP streaming** and strategic **caching**.
- Designed the system to handle high-volume, asynchronous workloads using task queues (**SQS**), ensuring system resilience and scalability under heavy load.

Member of Technical Staff *Jul 2023 - Mar 2024*
ColorTokens Inc.

- Developed **containerized Python scripts** in CI/CD pipelines for automated Vulnerability Assessment & Penetration Testing (VAPT).
- Implemented security scanning (STIG compliance) across **Databases, Docker containers, and Kubernetes (K8s) clusters**.
- Worked on regressions for our **Golang-based** container security product which analyses security vulnerabilities in **microservices**, enhancing container isolation and system integrity.

Key Projects

2D Physics Engine (C++) *Dec 2023 - Present*
Personal Project

- Implemented a 2D **rigid body dynamics** system in **C++** with a modular architecture for extensible force generators (e.g., gravity).
- Structured the codebase to support future integration of broad/narrow phase **collision detection** and resolution.
- Designed a scalable C++ architecture with a roadmap for future work in **soft-body physics/fluid dynamics**.

Chess Engine with Optimized AI Search (Python) *Jun 2022 - Aug 2022*
Personal Project

- Built chess engine (**Python**) with AI using **MinMax algorithm with alpha-beta pruning**.
- Improved AI search efficiency (∼**40%** faster computation) via **Negamax and move ordering heuristics**.

Technical Skills

Languages: Python, C++, Golang
Libraries/Frameworks: PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas, FastAPI
Tools/Platforms: Docker, Kubernetes, CI/CD, Git, Linux, Kafka/SQS (Task Queues)
Concepts: Data Structures, Algorithms, Machine Learning, NLP, System Design, API Design, Object-Oriented Design (OOD), Databases

Selected Achievements

- Secured top ranks in national entrance exams: **JEE Advanced** (Top 0.5%) & **JEE Mains** (Top 0.3%).
- Explored **algorithmic trading** by developing/backtesting a statistical arbitrage bot (Python), investigating execution optimization.
- **Sports:** Participated in **Football** training program (National Sports Organization, IIT Bombay).
- **Martial Arts:** Achieved **8th Kyu Grade** in Traditional Shotokan Karate.