Kirtan Patel

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Education

University of Michigan Ann Arbor, MI

Bachelor of Engineering in Computer Science, Minor in Statistics

Technical Skills

Languages: C++, Java, Python, SQL, JavaScript, HTML/CSS
Frameworks: Spring, Hadoop, Hive, Spark
Developer Tools/OS: AWS, VS Code, Git, Kafka, Linux, Ubuntu
Libraries: Pandas, Pyspark, NumPy, Matplotlib

Experience

Capital One February 2025 – Present

Software Engineer | Java Spring, GraphQL, AWS ECS Fargate, Jenkins, Splunk *Chicago, IL*

- Owned and operated **7** high-traffic Java Spring APIs supporting millions of in-store transactions weekly across major retail partners including **Kohl's, Menards, BJs, and Bass Pro Shops**.
- Led the modernization of legacy TSYS systems, migrating to **GraphQL**-based services, improving data retrieval efficiency by **30 percent** and accelerating partner integration cycles.
- Directed a payments convergence initiative involving large-scale code refactors, architectural redesign, and endpoint consolidation—impacting **100 percent** of payment traffic APIs.
- Implemented continuous delivery pipelines using **Jenkins** and **AWS Fargate**, achieving zero-downtime deployments and maintaining a **99.99 percent** uptime SLA.
- Developed robust observability solutions with **Splunk**, reducing incident detection time by **50 percent** and enhancing API reliability through proactive monitoring and alerting.

PNC Bank May 2024 - Aug 2024

Software Engineer | Pyspark, Apache Hive, Apache Kafka, Apache Sqoop, Teredata *Cleveland, OH*

- Collaborated with the lending technology division, focusing on scalable data intake and processing within the Machine Analytics and Information ecosystem.
- Implemented complex data workflows using **Pyspark** to process large datasets, improving data reliability and processing time for critical lending operations.
- Utilized **Apache Hive** for querying and managing large datasets warehoused in Hadoop and **Apache Sqoop** for datasets in **Teredata**, ensuring seamless data access for analytics purposes.
- Streamlined data integration tasks with **Apache Kafka**, enabling real-time data feeds and enhancing communication between varied data processing components.

Projects

Multi-Threaded Network File Server | *C++, TCP Sockets, Boost Threads* December 2024 – February 2025

- Created a multi-threaded **TCP** file server capable of handling **1000+** requests, with isolated threads per request.
- Enabled safe parallel access using **Boost shared-mutex** for fine-grained locking on files and directories.
- Maintained **crash-consistent file system** state through carefully ordered disk writes and robust error handling.
- Achieved **sub-50ms response latency** on common operations (FS-READBLOCK, FS-WRITEBLOCK), meeting high-throughput demands without caching.

Virtual Memory Pager | *C++, Page Tables, Virtual Memory* September 2024 – November 2024

- Designed a **memory manager** handling swap and file backed pages using Clock replacement and copy-on-write.
- Managed **512+** physical pages and arenas, with efficient eviction and page fault handling to minimize I/O.
- Reduced memory duplication by **50 percent** through copy-on-write optimizations during process forks.
- Built a custom dirty/reference tracking mechanism, cutting unnecessary disk writes by **30 percent**.

Algorithmic Trading Program | *Python, Pandas, NumPy, Matplotlib, TA-Lib* April 2024 – June 2024

- Created a fully automated Options trading program using **Python**.
- Implemented a trend-based automated trading strategy leveraging **Bollinger Bands** and **Exponential Moving Averages**.
- Monitored paper trading performance in the open market.
- Achieved a **52 percent** return on initial investment in a one-month testing sample.