Arham Chopra [in]

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EDUCATION

- **Masters in CS**, Carnegie Mellon University (CMU) — **4.13/4.33** — *Aug 2022 - Dec 2023*
- **MBA**, Indian Institute of Management Ahmedabad (IIMA) — **3.612/4.33** — *Aug 2020 - May 2022*
- **Bachelors in CS**, Indian Institute of Technology Kanpur (IITK) — **9.7/10** — *Aug 2014 - July 2018*

EXPERIENCE

- **Salesforce**, Software Engineer Intern, San Francisco, USA — *May 2023 - Aug 2023*
  - **Argo Workflows**: Improved scalability and stability of **SalesforceDB** (SDB) service by redesigning SDB deployments to Kubernetes in Argo Workflows. Designed a framework to transition other lifecycle management pipelines to Argo Workflows.
  - **Pipeline Improvement**: Simplified existing pipelines by removing unnecessary stages reducing end-to-end deployment time.

- **Tower Research Capital LLC**, Software Engineer, India — *July 2018 - July 2020*
  - **PnL Infrastructure**: Redesigned the PnL infrastructure in Python to support a larger number of exchanges, including crypto markets. Improved the performance & resource needs of the system to achieve **3x reduction in time** & **2x reduction in memory usage**. Added caching to reduce resource wastage & enable real-time PnL status monitoring.
  - **Strategy Framework**: Pioneered an easy-to-use strategy building framework to support dynamic deployment & modification of strategies during live trading using trader inputs in C++. Used the factory pattern to extend the reflection system for all strategy components. Achieved **within 80% performance** of the original optimized system.
  - **Cautious Times**: Revamped the cautious time framework to detect & monitor high volatility times during trading as a preprocessing step in Python. The new design provided **10% gain in performance & 20% improvement in accuracy** of results by pre-processing and caching all available data, & removing redundant entries and false positives.
  - **Responsibility**: Took ownership of the global PnL infrastructure (30+ exchanges), leading accuracy & performance projects. Overlooked market summary reconciliation by post-trade team, & maintained the historical PnL database.

- **Nutanix**, Member of Technical Staff Intern, India — *May 2017 - July 2017*
  - **Kafka Benchmark**: Pioneered an automated config-based benchmarking framework to track CPU & memory metrics.
  - **Kafka Library**: Designed Python module to fully manage a running Kafka cluster. Further added support for reading messages through different modes using the confluent-kafka-python module or streaming messages using web sockets.

- **The Red Brick Summit (TRBS)**, Web Comm. Head, IIMA — *May 2021 - Nov 2021*
  - **Website**: Revamped the architecture to full dynamically control the content from an admin page making new updates easier. Shifted to newer web frameworks realizing **40% reduction** in latency & **80% reduction** in maintenance costs.
  - **Responsibility**: Led a team of students to redesign the event website reaching **50K+ footfall & 2.7M+ visibility**.

SELECTED PROJECTS

- **Flattening Laterals in DuckDB** | Prof. Andy Pavlo, CMU — *Spring'23*
  Added planning & flattening support for arbitrarily nested LATERAL joins to DuckDB, making it the first open-source system to support efficient execution of arbitrarily nested LATERALs & UDFs (with Apfel), substantially improving performance over the nested loop implementation found in other systems like PostgreSQL. (PR currently in progress).

- **C0 Compiler** | Compilers, CMU — *Spring'23*
  Designed multiple compilers to incrementally support features like branching, functions, & heap for the C0 language. Added various optimizations, including register allocation/coalescing, loop invariant code motion, dead code elimination, strength reduction, & tail optimization to achieve comparable performance to GCC at $-O1$ optimization level.

- **CloudFS** | Storage Systems, CMU — *Fall'22*
  Designed a distributed filesystem in FUSE that uses local disks & cloud for storage. Supported extensive snapshot features for backups. Optimized storage costs with deduplication & transfer costs with caching for S3-like cost model.

- **Distributed Systems** | CMU — *Fall'22*
  Implemented a consistent distributed replicated log with Raft protocol using RPCs to communicate between replicas in Go. Implemented a simpler variant of TCP & used it to build a fair & efficient distributed Bitcoin miner in Go.

- **NachOS** | Operating Systems, IITK — *Fall'16*
  Implemented system calls, process scheduling & memory management, replacement algorithms for an instructional OS.

SKILLS & RELEVANT COURSEWORK

- **Languages**   C++, C, Python, Rust, Go, Shell Scripting
- **Courses**   Adv. Databases, Storage Systems, Adv. Cloud Computing, Distributed Systems, Compilers, Databases (IITK), Computer Architecture, Networks (IITK), Operating System (IITK), Data Structure & Algorithms (IITK),

ACADEMIC & TECHNICAL ACHIEVEMENTS

- **IIMA:** Recipient of 1970 Batch Merit Industry scholarship & IIMA Merit Industry scholarship totalling $3700 in 2022.
- **IITK:** Awarded Certificate of Merit for Academic Excellence (within **top 10%ile**) for two consecutive years, 2016 & 2017.
- **ACM-ICPC:** Ranked $30^{th}/2400$ in the Preliminary Qualifiers across India & 2nd in the IITK institute in 2018.