MOHAMED ABITH HUSSAIN S

SENIOR SOFTWARE ENGINEER | FRONTEND ARCHITECTURE | PERFORMANCE & SYSTEMS ENGINEERING

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PROFESSIONAL SUMMARY

Senior Software Engineer specializing in frontend architecture, browser performance, and systems engineering. Builds high-throughput data processing, visualization, and storage systems using TypeScript, Rust, and WebAssembly, with a focus on concurrency, memory optimization, and large-scale data processing.

TECHNICAL SKILLS

Languages: TypeScript, JavaScript, Rust, SQL

Frontend & Browser: React, Svelte, HTML, CSS, Tailwind CSS, Web Workers, WebAssembly, Canvas API, DOM APIs

Backend & Infrastructure: Node.js, AWS Lambda, REST APIs, Redis, PostgreSQL, SQLite, IndexedDB

Systems & Performance: Data Structures & Algorithms, concurrency, asynchronous programming, persistent data structures, memory optimization, profiling, benchmarking

Data & Storage: LSM trees, query processing, indexing, parsing, serialization, caching, typed-array processing

Tools: Git, npm, pnpm, Vite, Playwright, Vitest, Docker, CI/CD

PROFESSIONAL EXPERIENCE

Independent Software Engineer — Independent Engineering & Open-Source Development

Sep 2021 – Present

- Design and ship performance-critical libraries, developer tools, browser applications, and systems across TypeScript, JavaScript, Rust, and WebAssembly.
- Build and benchmark data structures and processing engines, evaluating trade-offs across latency, throughput, memory use, and real-world workloads.
- Develop browser applications that ingest, query, and visualize large datasets using Web Workers, typed arrays, Canvas rendering, and asynchronous pipelines.
- Engineer systems spanning persistent data structures, storage engines, AST fingerprinting, peer-to-peer messaging, query execution, and deterministic ranking.

Tekion India Private Limited — Software Engineer

Jan 2021 – Sep 2021

- Took end-to-end ownership of architecting and delivering a rich-text editor for Tekion's automotive retail platform, extending a basic editing experience to support structured @mentions, URL and website embeds, and inline image attachments within an urgent release timeline.
- Engineered custom editing behavior with browser-native contenteditable, Selection, and Range APIs, including caret management, structured entity serialization, and asynchronous media uploads.
- Built reusable, keyboard-accessible components for mention autocomplete and inline attachment previews, supporting complex content-insertion and media-interaction flows.

Freshworks Technologies Private Limited — Software Engineer - Frontend

Aug 2018 – Jan 2021

- Re-engineered Freshcaller's multi-call timer architecture, replacing independent per-call setTimeout chains with centralized Web Worker scheduling backed by monotonic performance.now() timestamps, eliminating timer drift caused by browser throttling while keeping scheduling work off the main thread.
- Implemented Page Visibility API-driven lifecycle management to suspend unnecessary timer scheduling and background work in inactive tabs, recalculating elapsed durations on foreground resume to reduce idle CPU overhead while preserving timer accuracy.
- Built internal operational dashboards and data-querying tools that enabled non-engineering teams to inspect application state, visualize data, and independently investigate customer issues.
- Improved frontend delivery workflows through framework-aligned refactoring, automated linting, CI quality checks, standardized Git commit conventions, and npm ci adoption, reducing CI build times. Recognized as a **Key Contributor** in the July 2020 performance appraisal.

ValeurHR Solutions — Deployed at Mindtree — Software Engineer

May 2018 – Aug 2018

- Owned end-to-end backend architecture and delivery for P&G's Gillette Shave Advisor, building the production application on Node.js and AWS Lambda while contributing to the React frontend to resolve API integration and state-management bottlenecks.
- Engineered a composite-keyed, TTL-backed Redis caching layer with asynchronous background revalidation (stale-while-revalidate) over latency-sensitive upstream APIs, reducing recommendation response times from **1.5–2 seconds to 20–50 ms**.
- Diagnosed and eliminated serverless memory leaks caused by unclosed database connections across AWS Lambda warm invocations, stabilizing memory consumption under concurrent load.

Concentrix Technologies India Private Limited — Web Developer

Nov 2016 – May 2018

- Maintained and enhanced Samsung's global storefront pages across regional locales and languages, including right-to-left Arabic and Hebrew layouts; implemented feature updates and resolved responsive layout and localization issues across screen sizes.
- Diagnosed JavaScript-driven animation glitches, DOM behavior, event handling, and rendering issues across viewports, serving as the team's primary point of contact for script-level defect resolution.

FEATURED ENGINEERING PROJECTS

01 BROWSER & FRONTEND PERFORMANCE

Vehicle Signal Workbench (VSW) — Browser-based data processing and visualization | GitHub · Demo

- Built an in-browser workbench for ingesting, querying, comparing, and visualizing vehicle measurement recordings, with worker-based processing, deterministic reference/comparison drives, viewport querying, and synchronized analysis across five vehicle signals.
- Demonstrated workloads of up to **10 million samples per recording** and approximately **62.5 million data points** in a mobile experiment on an iPhone SE (2020).

PixelFlow — Browser image exploration and rendering | GitHub

- Built a Canvas-based image explorer for approximately **25,000 images**, keeping DOM usage independent of dataset size through viewport-driven rendering.
- Implemented worker-based data access, bounded image-fetch and decode concurrency, viewport-priority loading, and LRU caching for decoded ImageBitmap objects.

Chronos — Browser timer scheduling engine | GitHub · Demo

- Designed a centralized timer scheduler using a min-heap, typed-array registry, monotonic clock, and dedicated Web Worker; elapsed-time execution preserves accuracy despite callback delays and browser throttling.

02 SYSTEMS, DATA & PERFORMANCE ENGINEERING

Columnar — Typed-array data processing engine | GitHub

- Built a typed-array-native processing engine with fused filtering and aggregation, selection, projection, adaptive index buffers, and multi-aggregate execution.
- At 10 million rows, measured a fused query at **29.67 ms**, compared with **190.91 ms** for materialized typed-array filtering and reduction.

ArrayForge — Persistent data structures | GitHub · Benchmarks

- Implemented persistent vectors using B+ tree and RRB tree architectures, with structural sharing and immutable snapshots.

StructAura — Rust AST fingerprinting and WebAssembly | GitHub

- Built JavaScript/TypeScript AST fingerprinting in Rust using Tree-sitter, canonicalization, and Merkle hashing (native + WASM), processing **64 KB JS inputs in 11.57 ms median**.

TinyLSM — Rust LSM storage engine | GitHub

- Implemented an LSM storage engine with memtables, sorted runs, tombstones, flushing, compaction, and recovery.

Pairwire — Peer-to-peer browser messaging | GitHub · Demo

- Built WebRTC peer-to-peer messaging with transactional persistence, durable outboxes, deduplication, application-level acknowledgements, and backpressure-aware communication.

AlgoKit — Algorithms and data structures | GitHub

- Implemented graph algorithms, augmented trees, treaps, Bloom filters, HyperLogLog, and consistent hashing; typed-array CSR graph storage cut **100k-node BFS from 6.501 ms to 0.489 ms**.

ADDITIONAL ENGINEERING PROJECTS

Discover — Roblox game discovery and deterministic ranking engine · GitHub
QueryX — Dependency-free query-string parser, serializer, and selective lookup · GitHub
Signaling — Encoding, compression, validation, fragmentation, and reconstruction · GitHub

EDUCATION

Bachelor of Engineering — Computer Science and Engineering
Aalim Muhammed Salegh College of Engineering · Anna University