

MEHUL NILESH FURSULE

Sydney, Australia | Australian Citizen | +61 451 344 315 | mehulfursule@gmail.com
linkedin.com/in/mehul-fursule | github.com/Mehul72 | mehulfursule.vercel.app

SUMMARY

Final year Computer Science and Commerce student at UNSW, graduating November 2026. Software Development Engineer Intern at TikTok on Search and large language model (LLM) infrastructure in Python and Go. Promoted from intern to Software Developer at FUJIFILM, and selected to present my work there company-wide in Singapore.

EDUCATION

Bachelor of Commerce / Computer Science, University of New South Wales (UNSW) Expected Nov 2026
Coursework: Data Structures & Algorithms, Algorithm Design, Computer Systems, Software Engineering, Databases, AI

EXPERIENCE

TikTok *Sydney, NSW*
Software Development Engineer Intern Jun 2026 – Present
Search & LLM infrastructure / Python, Go, distributed microservices, Apache Thrift RPC

- Designed and shipped an autonomous UI-exploration agent that maps a live admin surface into a graph of pages and actions, ranks journeys against real user click analytics, and emits executable test seeds without hand-written scripts. Took reachable-state coverage from **5.9% to 15.6%** and pinned every fix with a regression test, growing its offline self-test suite from **174 to 895** checks. Adopted by **3+** teams after senior engineer review.
- Hardened the agent after a live run acted on a production record, on a database shared with pre-production: rebuilt the guard fail-closed and view-only by default, blocking mutations on existing entities and gating the final create behind a second flag, each rule pinned by an offline test.
- Built an LLM service that generates executable test cases from requirements documentation, and authored **12** agent skills covering the full project lifecycle for the team's QA bot. Demoed at standup, taken up by other teams, and since used to answer production data questions that previously took a manual investigation.
- Diagnosed failures across a multi-region microservice deployment covered by an **870+** case Python suite, tracing them to ACL configuration, per-data-centre reachability and interface definition drift. Recovered **50+** blocked cases by tracking a broken delete endpoint to an Apache Thrift IDL mismatch between client and server schemas.
- Built and deployed a health-monitoring service across **7** regions and both production and pre-production, polling an operations API and paging on-call engineers via a chatbot. It has caught **5+** multi-region incidents, and I closed a hole where a total outage could report zero targets down.

FUJIFILM Business Innovation Australia *North Ryde, NSW*
Software Developer Dec 2025 – Jun 2026
Java 17, Spring Boot, AWS Lambda, Snowflake, React, Python

- Selected for a company-wide international presentation in Singapore** on the Aurora ERP FP27 upgrade, a major platform migration where I cleared critical defects and restored charge-correction workflows with **zero regressions**, modernised deprecated VBScript into IDS components, and bridged legacy AS/400 programs to a web UI.
- Built the two-phase internal AI engineering system behind that work: a retrieval phase grounding each request against the company knowledge base and legacy source, and an execution phase that plans and runs the task against the target codebase, turning work that took **a week into half a day**.
- Built two production dashboards on REST APIs I designed: a fleet analytics platform over a Snowflake warehouse with RSA key-pair auth on AWS, fronted in React with custom SVG visualisations including a zoomable Australia-wide device map, and a React 19 operations monitor covering **30+** enterprise systems.
- Engineered an event-driven automation platform on AWS Lambda with Java 17 and Spring Boot, scheduled through EventBridge, with **20+** production functions, and replaced a **19-step** manual workflow with a Python pipeline processing **300,000+** records a month through the Salesforce REST API.

Software Engineering Intern Jun 2025 – Dec 2025

- Automated NSW Department of Education contract management and built a Deed of Novation compliance tool, cutting manual processing by up to **40%** and adding safety compliance alerting used by **15+** departments.

PROJECTS

Kerbside NSW: On-Device Parking Sign Reader | [App Store](#) 2026
Swift 6, SwiftUI, Vision, WidgetKit, ActivityKit, Swift Testing

- Built and published to the App Store a solo iOS app that saves where a car is parked and reads NSW parking signs entirely on device, with **zero network calls**: it runs in airplane mode, ships no analytics or third-party SDKs, and cleared review with an empty privacy manifest.

- Built a two-pass Vision pipeline where OCR locates the pole, rectangle detection runs on that crop and colour sampling splits stacked plates, keeping the on-device model subordinate to a deterministic parser: it runs only on panels the parser rejected. Enforced **six** architectural invariants as tests scanning the source tree, so a regression fails the build rather than review.

Nomi: On-Device LLM Assistant for macOS | github.com/Mehul72/nomi

2026

Swift 6, SwiftUI/AppKit, MLX, Accessibility API, ScreenCaptureKit, SQLite FTS5, Model Context Protocol

- Built a macOS assistant that lives in the MacBook notch and runs a **14B** model locally on Apple Silicon through MLX, with no API keys or cloud inference. Wrote the model downloader (Hugging Face tree API, ranged resume, SHA-256 verify) and a manager that keeps one model resident, unloading it under memory pressure.
- Implemented the agent loop end to end: streamed tool calls validated against each tool's schema, a confirmation policy applied by risk, and execution bounded by time and step budgets. Tools reach the filesystem, screen OCR, UI automation through the Accessibility API, EventKit and any MCP server added; documentation retrieval fuses cosine and BM25 ranks over SQLite FTS5. **167** tests across **38** suites.

ContractGuard: Breaking-Change Detection for API Contracts | github.com/Mehul72/contract-guard

2026

Go, GraphQL (gqlgen), MongoDB, Redis, Next.js, TypeScript, OpenTelemetry

- Built a GitHub App that blocks breaking API changes before a pull request merges, with semantic diff engines for OpenAPI 3.0/3.1 and GraphQL SDL that grade each difference by severity, so a nullability change is breaking on a request body and compatible on a response. Diffs **1,000-path** documents in **85 ms** at p50.
- Enforced multi-tenant isolation by threading an authenticated principal through every GraphQL resolver and scoping every query to the caller's authorised installations, leaving no unscoped read path. Made webhook ingestion idempotent by committing the delivery and job rows in one MongoDB transaction guarded by unique indexes, so provider retries fail on duplicate key.

HookRelay: Multi-Tenant Webhook Delivery Platform | github.com/Mehul72/hookrelay

2026

Go, Kafka, PostgreSQL, Redis, Docker Compose, k6

- Built a webhook delivery platform handling HMAC signing, retries, distributed rate limiting, dead letters and replay. Made accepted events durable by writing event, delivery and outbox rows in one PostgreSQL transaction, scaling publishers with **FOR UPDATE SKIP LOCKED**, and committing Kafka offsets only after durable writes.
- Made worker crashes recoverable with delivery claims carrying an owner and lease expiry, owner fencing so a slow worker cannot overwrite its replacement, and retries routed through the outbox with full-jitter backoff off a durable index. Fault-tested crashes at three points, lease-expiry races, duplicate claims and Kafka, Redis and Postgres outages; benchmarked at a median **1,888 events/s** ingestion and **164 deliveries/s**.

Also built: [Crossbar](#), a VS Code extension running two coding-agent runtimes in one conversation, each driven through its own local process and SDK rather than an API key; [Switchboard](#), a macOS menu bar utility shipped as a signed DMG over **five** releases, with per-app routing on Core Audio; [iOS Location Simulator](#), a Python/asyncio tool overriding an iPhone's GPS over the iOS 17 RemoteXPC tunnel; and [30 portable engineering skills](#) installable into any repo with one command.

TECHNICAL SKILLS

Languages: Python, Java, Go, Swift, TypeScript, JavaScript, C, C++, C#, SQL

Backend & Distributed Systems: Spring Boot, FastAPI, .NET, REST and GraphQL API design, OpenAPI, microservices, Apache Thrift RPC, Kafka, event-driven architecture, transactional outbox, idempotency, multi-tenant authorisation, concurrency, system design

Cloud, Data & Tooling: AWS (Lambda, EventBridge, S3, API Gateway), Docker, CI/CD, GitHub Actions, Git, Linux, OpenTelemetry, PostgreSQL, Snowflake, MongoDB, Redis, SQLite, JPA/Hibernate

Client: SwiftUI, AppKit, Vision, WidgetKit, Core Audio, Accessibility API, App Store release, React 19, Next.js, Tailwind CSS, VS Code Extension API

AI & Testing: Retrieval augmented generation (RAG), autonomous agents, Model Context Protocol (MCP), on-device ML (MLX), pytest, Vitest, Swift Testing, Playwright, fault-injection testing

LEADERSHIP

Events Subcommittee, UNSW Indian Society (Jan 2025 – Dec 2025). Organised events for **500+** attendees, presenting to **100+** and growing attendance **30%** year on year.

Administration Assistant, Australian Electoral Commission (Aug 2023 – Jun 2025). Led polling teams through the 2023 referendum and was selected for a sensitive electoral-integrity project.