Robel Gebrehiwot Brhane

Software & AI Engineer
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PROFESSIONAL SUMMARY

Software and AI engineer who takes products from requirements to release. I have led two production client systems end to end in Vue, Node.js and MongoDB, built real-time GraphQL tooling for an AI field-robotics company in Germany, and shipped Vue 3 features for a live booking marketplace. I bring machine learning into software, from a local-LLM medical assistant that answers only from cited evidence to diffusion-model research at York University. Three years of university teaching shaped how I work: clear specifications, tested code, and honest reporting of what a system cannot do yet.

PROFESSIONAL EXPERIENCE

International Visiting Researcher – *York University* Apr 2026 – Nov 2026
Toronto, Canada

- Research diffusion models that change one clinical finding in a chest X-ray and keep the rest of the anatomy intact, to test whether diagnostic classifiers rely on shortcuts instead of the finding itself.
- Build reproducible training and evaluation pipelines in PyTorch Lightning and Hugging Face Diffusers.

Frontend Developer (Vue.js), Freelance – *Upwork client, bus-rental marketplace* Nov 2025 – Apr 2026
Remote

- Owned 4 feature iterations for a live bus-with-driver booking marketplace, from requirements with the client through implementation, Vitest unit tests and release support.
- Designed reusable Vue 3 components with documented props and events, and restructured Pinia state and computed flows to remove redundant re-renders.

Frontend Developer, Part-time Contract – *Farming Revolution GmbH* Oct 2025 – Jan 2026
Remote, Germany

- Built React and Ionic tools that ML and field-operations teams use to tag images, assign crops and evaluate the vision models behind Farming GT, an autonomous weeding robot operating in 10+ countries.
- Integrated Apollo GraphQL queries, mutations and subscriptions on Hasura so tagging and evaluation updates reach every user in real time, and added bulk operations for large labelling jobs.

Senior Software Engineer – *Tekeze Technologies PLC* Jul 2020 – Oct 2024
Mekelle, Ethiopia; part-time from Apr 2023

- Led two client systems from requirements to delivery: Messebo, a sales, inventory and client management platform, and an indigent case-management system, each with a Vue front end, Node.js and Express REST APIs, and MongoDB.
- Secured the APIs with JWT authentication and role-based access, and documented them with Swagger so front-end and back-end work could proceed in parallel.
- Built real-time analytics dashboards and dynamic reports that reduced manual reporting work for client managers, and reviewed pull requests and maintained CI for a small team.

Assistant Lecturer, Computer Science – *Mekelle Institute of Technology* Jun 2021 – Sep 2024
Mekelle University, Ethiopia

- Taught Python, Distributed Systems and Artificial Intelligence, and designed hands-on programming labs for undergraduate engineering students.
- Supervised 10+ final-year projects, coaching teams on software design, version control and debugging until delivery.

Software Developer, Contract – *Guna Trading House PLC* Aug 2019 – Jul 2020
Shire, Ethiopia

- Built a cement queue management application in Python, with a Tkinter desktop interface and a MySQL database.
- Designed the MySQL database and the desktop screens that staff use to register and manage the queue.

Software Developer, Internship – *Malam Engineering PLC* Sep 2018 – Feb 2019
Mekelle, Ethiopia

- Built a web application in PHP with a SQL database as part of the development team.
- Built an Android mobile app in Kotlin.

SELECTED PROJECTS

Hospital Management System (2026) *Vue 3, Spring Boot, PostgreSQL, Keycloak, FastAPI, Docker*

- Defined and led a self-initiated hospital platform covering patients, clinical records, lab, pharmacy, billing, inventory and HR, delivered with AI coding agents under my specifications, acceptance tests and review.
- Shaped it as a modular monolith of 21 domain modules with Keycloak sign-in, server-side permission checks on every action and append-only audit records; CI runs Testcontainers, frontend and Playwright end-to-end tests against the full Docker stack.

Tigrigna Keyboard (2026) *Kotlin, Swift, ML Kit*

- Built a system-wide Tigrigna and English keyboard for Android and iOS. Handwriting models download on demand with a local fallback so typing never waits, and clipboard history is encrypted and skips password fields. In internal testing on Google Play with 11 testers.

Clinical RAG Assistant (2025) *Python, Ollama, Sentence-Transformers, Streamlit*

- Built a medical Q&A assistant that answers only from cited WHO guideline evidence and says so when it finds none. Hybrid BM25 and dense retrieval feed a draft, critique and revise agent loop on a local LLM, so questions never leave the machine.

Keke AI Competition, 2nd place (2025) *Python, A* and IDA* search*

- Co-designed a search agent for a puzzle game whose rules can be rewritten; it solved 94% of hidden test levels and placed second among the competing student teams.

TECHNICAL SKILLS

Languages	Python, JavaScript, TypeScript, Java, SQL, Kotlin, Dart, PHP
Web & APIs	Vue 3, Pinia, React, Ionic, Node.js, Express, Spring Boot, FastAPI, REST, GraphQL (Apollo, Hasura), WebSockets
AI & Data	PyTorch, PyTorch Lightning, Hugging Face Transformers and Diffusers, RAG, FAISS, Ollama, Apache Spark, Neo4j
Infrastructure	PostgreSQL, MySQL, MongoDB, Docker, GitHub Actions, Keycloak, Playwright, Vitest, Linux

EDUCATION

MSc in Artificial Intelligence and Computer Science Sep 2024 – Present
University of Calabria Rende, Italy
Courses: Deep Learning, Intelligent Systems, Neurosymbolic AI, Optimization for Machine Learning, Big Data Analytics and Reasoning.

BSc in Computer Science and Engineering, CGPA: 3.93/4.00 Sep 2014 – Jul 2019
Mekelle Institute of Technology, Mekelle University Mekelle, Ethiopia
Thesis: *Digital Equb*, a peer-to-peer FinTech web application.