

MATOME MBOWENE

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PROFESSIONAL SUMMARY

Recent **BSc Computer Science & Computer Engineering graduate (Dec 2025)** from the University of Cape Town with production experience in **computer vision, OCR document automation, RAG systems, and full-stack AI**. Delivered **100% accurate PDF autofill system** for South African government forms and built a **RAG-powered networking agent** for African entrepreneurs.

Dell Young Leader | Immediately available | Passionate about impactful AI.

EDUCATION

BSc Computer Science and Computer Engineering Feb '20 - Dec '25
University of Cape Town
Relevant Coursework: Computer Vision, Machine Learning, Embedded Systems, Algorithms & Data Structures, Software Engineering

PROFESSIONAL EXPERIENCE

Computer Vision & Document Automation Developer Present
Collaboration with Aaron Kisten (UCT Geomatics) | Cape Town, South Africa

- Built production OCR + LLM system achieving **100% field-mapping accuracy** on scanned surveying diagrams and
- Implemented **6-layer validation**, confidence scoring, and OpenAI GPT-4 context-aware mapping with colour-coded debug highlighting
- Created editable AcroFields, robust fallbacks, and enterprise-grade logging

AI Developer (Equity-based) Nov '25 - Present
Beetroot | Cape Town, South Africa

- Developed RAG conversational agent using **FAISS + sentence-transformers + GPT-4o / Claude-3.5-sonnet** to connect African entrepreneurs
- Delivered full ML pipeline: CSV ingestion → embeddings → persistent index → retrieval-augmented generation → Streamlit demo
- Fixed CI/CD, dependency management, and production safeguards

Junior ML & Embedded Systems Engineer Dec '25 - Present
RoadMind AI | Cape Town, South Africa

- Developing sensor fusion pipelines and edge-AI models for **real-time hazard detection** on motorcycles
- Contributing to firmware and data pipeline architecture for LIDAR, IMU, and camera integration

ACADEMIC / CAPSTONE PROJECTS

Image Processing Project Feb '25 - Feb '25
University of Cape Town

- Implemented 4-connected **component analysis and real-time image segmentation in C++** for resource-constrained embedded devices (40% memory/performance improvement)
- Built bounding-box detection and PGM-to-slide-puzzle converter with randomized generation

Machine Learning Project Mar '25 - May '25
University of Cape Town

- Engineered PyTorch feedforward neural network achieving **89.33% accuracy on FashionMNIST** (top 15% of cohort)
- Developed Q-learning agent reaching **optimal reward of 0.96 in 5 steps**
- Created end-to-end **ML pipelines** with preprocessing, visualization dashboards, and statistical analysis

Systems Programming & Networking Project

Jan '25 - Apr '25

University of Cape Town

- Optimized CPU scheduling algorithms (FCFS, SJF, Round Robin) delivering **35% efficiency** gains
- Built secure peer-to-peer file-sharing system using UDP/TCP + SHA-256 encryption

Full-Stack Software Engineering Project

Jul '24 - Sep '24

University of Cape Town

- Led 3-person agile team delivering **MyAdvisor (Spring Boot + MySQL web app)** used by 800+ students
- Designed RESTful APIs, optimized SQL queries (40% faster), and implemented CI/CD pipelines

Embedded Systems Project

Feb '23 - May '23

University of Cape Town

- Developed STM32 communication protocols with **100% message integrity** and LCD integration for real-time display

TECHNICAL SKILLS

- **Languages & Frameworks:** Python (Advanced), C/C++, Java, JavaScript, PyTorch, Spring Boot
- **AI/ML & Vision:** Computer Vision, OCR (Tesseract), RAG, FAISS, sentence-transformers, OpenAI/Anthropic APIs, FAISS, LLM prompting
- **Data & Tools:** SQL/MySQL, Pandas, NumPy, Git, Docker, Streamlit, CI/CD (GitHub Actions)
- **Document Processing:** PyMuPDF, ReportLab, PDF form field creation, AcroFields
- **Embedded:** STM32, FreeRTOS concepts, sensor fusion

ACHIEVEMENTS & CERTIFICATIONS

- **Dell Young Leaders Scholarship** (2020-Present)
- **Google Cloud Career Launchpad - EMEA Scholar**
- **89.33% accuracy** on FashionMNIST neural network (top 15% of class)
- Multiple production-grade private repositories (RAG agent, PDF autofill MVP)

LANGUAGES

English (Fluent) • Sepedi (Native)

References available on request