

ISAACK JOSHUA LUKUMAY

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PROFESSIONAL SUMMARY

Machine learning and backend engineer. Builds models in PyTorch and TensorFlow and the production systems that serve them: FastAPI APIs, PostgreSQL schemas, Celery workers, deployed on Linux with nginx. Work spans medical imaging with on-device ONNX inference, LLM tool-use agents, and payment infrastructure built to OWASP guidance.

EDUCATION

BSc (Hons) Computer Science <i>St. Joseph University in Tanzania — Dar es Salaam, Tanzania</i>	2023 – 2026 (expected)
Advanced Certificate of Secondary Education (ACSEE) <i>Kongwa Secondary School — Dodoma, Tanzania</i>	2021 – 2023

EXPERIENCE

Machine Learning Intern (Industrial Practical Training) <i>Emerging Technologies for Healthcare (ETH) Lab, Muhimbili University of Health and Allied Sciences (MUHAS) — Dar es Salaam, Tanzania</i>	March 2025 – Present
- Designed and deployed Mwana AI, a breast cancer ultrasound classification system (PyTorch, HuggingFace Transformers, ONNX Runtime) built for offline use in Tanzanian clinics where radiology expertise is scarce; mobile interface delivered in Flutter. - Built a CNN-based TB/HIV co-infection detection system from chest X-rays, applying Grad-CAM explainability to surface decision regions for clinical stakeholders and evaluating generalisation across demographic subgroups via ROC/AUC analysis. - Led data extraction and structuring for a multi-institution respiratory disease study (Aga Khan University, University of Warwick, NTL) in Iringa, Tanzania — converting scanned intake forms and echocardiogram TIFF images into structured, analysis-ready datasets. - Assisted in training, fine-tuning, and optimising the RETFound foundation model for diabetic retinopathy detection. - Applied transfer learning to cardiac imaging and ejection-fraction data to support prediction of dilated cardiomyopathy. - Designed data preprocessing pipelines for medical imaging and audio datasets — cleaning, normalisation, augmentation, and feature engineering to improve downstream model performance. - Performed exploratory data analysis and data-quality assessment supporting model development across multiple healthcare AI research projects. - Communicated methodology and results to research and clinical stakeholders through technical presentations and written documentation.	

SELECTED PROJECTS

Lyceum — Cross-Platform AI Teaching App <i>Electron · TypeScript · React · Multi-LLM (Claude, GPT, Kimi, local models)</i>	github.com/Isaackjoshua/Lyceum
- Built a cross-platform desktop application that turns any LLM into a structured, interactive tutor — teaching through explanation, worked examples, and adaptive questioning rather than one-shot answers. - Designed a vendor-agnostic architecture: users bring their own API key and choose from Claude, GPT, Kimi, or a locally hosted open-weight model — no vendor lock-in and no bundled API key.	
Triage — AI Machine-Diagnostics Agent <i>Python · LLM tool-use · System diagnostics · Cross-platform</i>	github.com/Isaackjoshua/Triage
- Developed a transport-agnostic AI agent that autonomously diagnoses faulty computers — running system checks, applying safe software fixes, and escalating hardware or high-risk issues to a human operator. - Engineered a modular action pipeline with built-in safety boundaries, ensuring the agent only executes repairs within a defined low-risk scope and generates structured reports for anything beyond its authority.	

- Architecting a modular, extensible AI platform for predicting disease outbreaks in Tanzania, designed to ingest health-facility, climate, and mobility data and surface early-warning signals for public-health decision-makers.
- Built with a plug-in data-source architecture so the system scales across regions and disease categories without re-engineering the core pipeline.

- Architecting a multisignature escrow platform to secure mobile money transactions for small merchants and gig workers across East Africa who lack formal financial protection.
- Designed a PostgreSQL schema supporting the full transaction lifecycle (initiation, hold, dispute, release) with atomicity guarantees and Selcom mobile money integration.
- RESTful API built in FastAPI following OWASP security guidance; deployed on a Linux VPS with nginx and Certbot.

- Built and trained an ultrasound image classification model for breast cancer screening, designed for offline deployment in low-resource Tanzanian clinical settings.
- Exported the model to ONNX for on-device inference; mobile frontend built in Flutter targeting Android.
- Developed under the ETH Lab at MUHAS as part of Industrial Practical Training.

TECHNICAL SKILLS

Languages & Tools	Python, TypeScript, Git/GitHub, Linux environments, nginx, Streamlit, Electron
Machine Learning & AI	Deep learning, transfer learning, model fine-tuning, ONNX export and on-device inference, LLM tool-use and agentic systems
Frameworks	PyTorch, TensorFlow/Keras, HuggingFace Transformers, Scikit-learn, FastAPI, Celery, React
Computer Vision	Image preprocessing, augmentation, segmentation, classification, Grad-CAM explainability
Data	Data cleaning and preprocessing, exploratory data analysis, feature engineering, PostgreSQL, data visualisation
Reporting	Power BI, Microsoft Excel, Microsoft Word, Canva
Mobile & Desktop	Flutter (Android deployment), Electron (cross-platform desktop)
Professional	Technical communication, cross-team collaboration, problem solving, adaptability

LANGUAGES

English — Professional working proficiency | Swahili — Native

REFERENCES

References available on request.