

Machine Learning Engineer and researcher specializing in responsible AI for low-resource languages. Experienced in developing speech, vision, and identity systems that are secure, fair, and reproducible under real-world constraints. My work bridges practical ML deployment with research on alignment, multilingual NLP, and AI safety. Experienced collaborating with NGOs, startups, and governmental partners in Africa.

## EXPERIENCE

### Machine Learning Engineer

*Truststamp.ai*

Kigali - Rwanda

OCT 2023 – Present

- Designed and deployed AI-based identity verification systems serving 100 K+ users monthly.
- Built Presentation-Attack Detection (PAD) pipelines using computer vision to handle occlusions (hats, glasses, beards).
- Strengthened model security through encryption, watermarking, and obfuscation to ensure provenance and reduce misuse.
- Automated document-fraud detection, transitioning from rules to ML classifiers and improving precision while cutting manual review.
- Fine-tuned vLLMs for identity workflows, implementing evaluation harnesses (faithfulness, hallucination) and MLflow-based reproducibility.

### Engineering Consultant

*RICOS Engineering*

Sharjah - UAE

DEC 2020 – OCT 2023

- Led technical design of renewable microgrids for refugee camps and rural communities in eastern Sudan.
- Created and maintained databases and automation pipelines improving project transparency and decision-making.
- Conducted feasibility studies and built analytical dashboards to guide humanitarian infrastructure projects.
- Applied data-driven optimization and energy modeling to reduce operational costs by 20%

### Teaching Assistant and Researcher

*Carnegie Mellon University*

Kigali - Rwanda

SEP 2021 – DEC 2022

- Co-developed coursework and assignments for Introduction to Deep Learning, supporting 300+ students.
- Supervised student research projects in speech recognition and NLP for social good.
- Authored educational materials and tutorials on experiment tracking, ensemble methods, and scientific writing, published on CMU's YouTube channel (16 K+ subscribers).

## EDUCATION

### Carnegie Mellon University

3.64/4.0

*Masters of Science in Engineering Artificial Intelligence*

- **Thesis:** Developed a state-of-the-art speech-to-text system for Rwanda's Digital Transformation Center, enabling linguistic inclusivity and aligning with national digital transformation goals.

### University of Khartoum

7.60/10.0

*Bachelor of Science Electrical & Electronic Engineering*

- **Thesis:** Optimizing energy trading between independent microgrids using RL; enabling significant cost savings in building and operating the microgrids and improving energy stability and sustainability.

## HIGHLIGHT PUBLICATIONS

*ArabicNLP 2025 @ EMNLP 2025 - Enhancing Arabic Readability Prediction with Hybrid BERT and Linguistic Features*

*IST-Africa 2024 - Generating African Artistic Styles Using Textual Inversion*

*Africa NLP @ ICLR 2023 - Multilingual Automatic Speech Recognition for Kinyarwanda, Swahili, and Luganda: Advancing ASR in Select East African Languages*

*ICCCEEE 2020 Comparison of Deep Reinforcement Learning Algorithms in Enhancing Energy Trading in Microgrids*

*Practical ML for Low Resource Settings @ ICLR 2020 - Modeling, Visualization, and Analysis of African Innovation Performance*

## TECHNICAL SKILLS

- **Languages & Frameworks:** Python, PyTorch, TensorFlow
- **Domains:** NLP, Speech Recognition, Reinforcement Learning, Computer Vision, Low-resource Languages, Tabular ML
- **Infrastructure:** Docker, MLflow, AWS, GCP, CI/CD, Model Security, Privacy-preserving ML