BRANDONE FONYA

https://fonyabrandone.github.io/
bfonya@andrew.cmu.edu

SUMMARY

I am a graduate research assistant and a final year Masters student in Engineering Artificial Intelligence under the College of Engineering at Carnegie Mellon University, where I focus on machine learning and computer vision. My research interest is Deep Learning for computer vision and its applications in medical image analysis, healthcare and autonomous intelligence.

EDUCATION

M.Sc. in Engineering Artificial Intelligence — August 2024-Present
Carnegie Mellon University
Specialization: Machine learning & Applied Computer Vision

B.Sc. (Hons) Software Engineering — October 2022-May 2024
ICT University
CGPA: 3.65 / 4, ranked 1st in department

HND in Computer Engineering — September 2020- July 2022
Siantou University Institute
Specialization: Software Engineering
Grade: Distinction

PROFESSIONAL EXPERIENCE

Research Assistant — September 2025 – Present
The Upanzi Network
Kigali, Rwanda
Working with the Upanzi AI research team on advancing precision oncology through a generative pipeline for breast cancer generation for Africa. Our work integrates multi-omics, clinical and environmental data for synthetic dataset generation using Variational Autoencoders (VAE), Bayesian networks and diffusion models.

Graduate Teaching Assistant — August 2025 – Present
(18-751) Applied Stochastic Processes, Carnegie Mellon University
Kigali, Rwanda
Graduate teaching assistant for CMU Engineering's graduate level ECE course, (18-751)
My roles include:
- Grading assignments and exams to assess student performance.
- Hold weekly office hours, lead recitations solving set of exercises and problems
- Help students understand the course concepts and problems.

Research Intern — July 2025 – September 2025
Autonomous Intelligence Lab, Westlake University
Hangzhou, China
- Developing MedBLIPNet3D, a framework for text-prompted segmentation of 3D Prostate MRI with pretrained MedicalNet 3D ResNet-18 for image encoding, PubMedBERT for text encoding, a cross-attention fusion module (MedQFormer) and a prompt-conditioned segmentation head.

Graduate Research Assistant — June 2025 – September 2025
Carnegie Mellon University – Makerere University CHS (Joint Research)
Rwanda, Uganda, Hybrid
- Conducting research on low-cost, non-invasive tuberculosis screening using deep learning models trained on solicited cough sounds. This work enables early Tuberculosis (TB) detection in low-resource settings through audio-based classification directly from cough.

Graduate IT Associate - Full Stack developer — August 2024 – May 2025
Carnegie Mellon University
Rwanda, Hybrid
- Leveraged the MERN stack to develop, manage and enhance the performance and scalability of Carnegie Mellon University Africa's job board, migrating existing Java backend infrastructures to Node/Express.JS
- Working with a hybrid team, integrated data visualization and actionable insights into the CMU-Africa opportunities job board to enhance decision-making and user engagement

Systems Automation Engineer Intern — October 2023 – February 2024
ORION Inter-African Insurance and Reinsurance LTD
Yaounde, Cameroon
- Designed and implemented desktop software in Visual Basic to streamline insurance data workflows, optimize document retrieval, and embed data visualization for insight-driven operations.
- Enabled efficient data access and improved decision support through automated processing and visual analytics.

Founder — December 2022 – June 2024

ESchools LMS

Yaounde, Cameroon

- Led the development of ESchools LMS, an AI-powered learning management platform integrating AI chatbots and automation to support full online learning for students, teachers, and administrators in Cameroon through a learning management system.

RESEARCH & PROJECTS

CAM-FD: Improving Adversarial Robustness without Sacrificing Generalization in Medical Imaging

Carnegie Mellon University (MSc Research Capstone) *Supervisor: Prof. Prasenjit Mitra*

- CAM-FD is a Curriculum Adversarial Mixup with Feature Denoising technique, designed to improve model adversarial robustness while maintaining generalization across domains via a carefully proposed loss function.
- To achieve this, CAM-FD strategically integrates four complementary components into a single loss: Cross-entropy with mixup, TRADES KL Divergence, Feature denoising and adversarial weight perturbation (AWP), creating a balanced objective that jointly improves robustness, accuracy and generalization

From Maps to Models: Analysis and Predictive Allocation of Healthcare Facilities in Rwanda

Carnegie Mellon University, (Spring 2025, Research) *Supervisor: Prof. Emily Aiken*

Accepted at European Public Health Conference (EPH), 2025

- Analysed healthcare facility distribution in Rwanda, using geospatial analysis and machine learning to address disparities in Malaria, TB, and HIV care.
- Proposed a data-driven model to optimize healthcare resource allocation, enhancing accessibility and health outcomes across sub-Saharan Africa, applicable to other countries.

Real-Time Sign Language Recognition and Speech Transcription using Deep Learning

Carnegie Mellon University, (Spring 2025, Project)

- This project employs a Convolutional Neural Network (CNN) trained on the Sign Language MNIST dataset to classify American Sign Language (ASL) hand signs from live video input via Mediapipe.
- The classified gestures are then converted into spoken words using a text-to-speech engine, enabling real-time audio feedback.

Adaptive Behavioral Planning for Autonomous Vehicles in Unstructured Urban Environments

Carnegie Mellon University, (Spring 2025, Project)

- Developed a vision-based system using computer vision (OpenCV, MMDetection, MMAction2) to estimate pedestrian crossing intent in African cities enhancing Autonomous Vehicle safety.
- Proposed an adaptive framework with a PCB algorithm, leveraging the PIE dataset and real-time probabilistic modelling to improve motion prediction in high-uncertainty settings.

MindArt: AI Image Generator

ICT University (Fall 2024, Project)

- Developed a text-to-image generation application using OpenAI's GPT-3.5 model to convert natural language prompts into AI-generated images.
- Built and deployed the model unto a user-friendly web application using a NodeJs and Handlebars

Brain Tumor Screening

ICT University, (Spring 2024, Project)

- Detection of brain tumors in MRI images through a deep Convolutional Neural Networks (CNN), implemented in TensorFlow, with datasets from Kaggle.
- Achieved 99.0% model accuracy, surpassing previous benchmarks on Kaggle, built a web app which enabled brain tumor detection from uploaded MRI scan images

SKILLS & CERTIFICATIONS

- Skills: Problem solving, collaboration, communication, Software, machine learning, deep learning
- Technologies : Python, C/C++, JavaScript, Java, Git, Jupyter, Matlab, LaTex
- Libraries and frameworks: Pytorch, Tensorflow, NumPy, pandas, Open-CV, CMake, Flask, Scikit-learn, GeoPandas, NodeJS, ExpressJS, ReactJS, React Native, Angular
- Languages: English (Native), French (Advanced)
- Certifications: AWS Cloud foundations, Secure full stack MEAN developer (EC-Council), Project Management (Google), Machine learning Specialization (Stanford)

INTERESTS & ACHIEVEMENTS

- Interest: Deep Learning, Computer Vision, Medical Image Analysis, Generative AI
- Achievements: AMLD Africa 2026 Conference Reviewer, B.Sc. department Valedictorian, Cameroon national PremierDev tech award winner 2023, ICT University fellowship of excellence