MBAYANDJAMBE MASHEKE ALIDOR

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EDUCATION

2023 - 2025
Master in Computer Science double degree:
Vietnam National University, Hanoi, (Vietnam): Intelligent and Multimedia Systems **(SIM)**
University of La Rochelle (France): Enterprise Digital Content Engineering **(ICONE)**

2016 - 2017
Licence, BAC+5: Business Informatics
University of Kinshasa (UNIKIN), Kinshasa-D.R. Congo

CAREER OBJECTIVE

Join a PhD program that will allow me to develop my skills and knowledge while actively contributing to the institution's research objectives, followed by a PostDoc.

MASTER'S AND PERSONNAL PROJECTS

- **Detection and Prediction of Bonded Assemblies Using Machine Learning and Multimodal Analysis**: In this study, we propose a hybrid system combining YOLOv5 for detecting regions of interest, ResNet18 for visual feature extraction, and an MLP for predicting degradations while integrating physical parameters. This approach aims to enhance the detection and prediction of bonded assemblies for improved durability.
- **Detection and Recognition of Cheating Movements in an Exam Room using Deep Learning**: Implementation of an intelligent surveillance system using YOLOv4 and an LSTM model to detect and recognize cheating behaviors in an exam room in real time.
- **Object Detection, Segmentation and Tracking with YOLOv8**: Implementation of an object detection model trained on a custom dataset. Integration of real-time instance segmentation and object tracking with YOLOv8(Dataset: COCO, PotholeImage, PPE-Detection, Pen and Book Detection, BDD100K...)
- **Application of Artificial Intelligence for Automatic Detection of Pneumonia on Chest X-rays**: Development of a classification model based on convolutional neural networks (CNN) to automatically detect pneumonia from chest X-rays. Use of TensorFlow and optimization of hyperparameters to improve model accuracy.
- **Unlabeled Data: Self-Supervised Learning Techniques in Python for AI**: Development of methods to leverage unlabeled data to improve artificial intelligence models without manual labeling, using approaches such as AutoEncoder, MAE, and VAE.
- **Modeling Learning Behaviors with Neural Networks:** Model students' learning behaviors using neural networks to predict their future needs. Methodology: Use recurrent neural networks (LSTM) to model sequences of student activities, and combine these models with process mining techniques to identify recurrent patterns and propose personalized recommendations.
- **Analysis and Classification of Soil Types Using Satellite Imagery and Artificial Intelligence Algorithms**: Development of a classification model based on convolutional neural networks (CNN) and the Random Forest algorithm to analyze and classify soil types from satellite images, contributing to precision agriculture.
- **Classification of Hyperspectral Satellite Images Using 1-D, 2-D, 3-D, and Hybrid CNNs**: Implementation and comparison of 1-D, 2-D, 3-D, and hybrid CNNs for classifying hyperspectral satellite images to determine the most effective method.
- **Analysis and Classification of Soil Types from Satellite Imagery Using Artificial Intelligence Algorithms**: Development of a classification model based on convolutional neural networks (CNN) and

the Random Forest algorithm to analyze and classify soil types from satellite images, in the context of precision agriculture.

- **LangChain Application for AI Agent Construction**: Developed an application using LangChain to orchestrate interactions between various language models and APIs, enabling the creation of an AI agent capable of handling complex dialogues and multi-step tasks.
- **API Integration for AI Agents**: Built an application leveraging the OpenAI API and Gemini API to create intelligent agents capable of processing user queries, showcasing the capabilities of each API in practical scenarios.
- **Exploration of Neo4j, Cypher, and GDS for Graph Modeling and Analysis**: Implemented GraphRAG to enhance language models with structured knowledge from graph databases.
- **Deep Learning for Image Segmentation with Python and PyTorch**: Creation of an image segmentation model using the U-Net architecture and the PyTorch library for semantic segmentation tasks
- **Advanced Natural Language Processing (NLP) System**: This project integrates various NLP techniques, including spam detection, sentiment analysis, and text summarization. It aims to develop a system capable of filtering unwanted emails, assessing opinions in texts, and generating relevant summaries to facilitate reading and information analysis.
- **Development of Retrieval-Augmented Generation (RAG) Applications**: Implementation of a project utilizing RAG to enhance the quality of responses generated by a language model by integrating external data sources to enrich contextual responses.

PROFESSIONAL EXPERIENCE

June 2017 to present

- Teaching Assistant - University of Kinshasa, Kinshasa, R.D Congo - CDI
- Faculty of Sciences, Department of Mathematics and Computer Science

September -December 2022

- **Data Cleaner-**Independent National Electoral Commission (CENI), DRC

June 2016-September 2020

- **IT Manager -** National GIS Office, Kinshasa, DRC

February to June 2018

- **Data Cleaner-** Commission Electorale Nationale Indépendante (CENI), DRC

SKILLS

NLP & Computer Vision : OpenCV, scikit-image, Python(PIL), Transformers(Hugging Face), Spacy, NLTK (Natural Language Toolkit), Yolo, Faster R-CNN,Bi-LSTM, LSTM, CNN, CLIP, ViLT

Programming languages : Python, Vb.net, Java

Project management tools

- Git, GitHub.

Library Machine Learning

- Scikit-learn, Numpy, Matplotlib, Pandas, Seaborn, Scipy.

Library Deep Learning and XAI

- PyTorch, TensorFlow, Grad-cam, LIME, SHAP

CERTIFICATIONS & TRAINING

- Python for financial data analysis at DataSciente-France 2024
- Data Science: CNN & OpenCV : Chest XRAY-Pneumonia Detection: Udemy 2024
- Mastering Image Segmentation with PyTorch : Udemy 2024
- Power BI for Finance training at DataSciente-France 2024
- The basics of Machine Learning: Linkedln in Feb 2023
- Mastering OCR using Deep Learning and OpenCV-Python: Udemy in Oct 2023
- The basics of data extraction for documents and images with OCR and NER: Udemy in Oct 2023

- MACHINE LEARNING IN ACTION: Boost your career with Machine Learning 2024 with Damien Chambon

LANGUAGES

French: Native Speaker
English : Intermediaire(**B2**)

INTERNSHIPS

- **Internship at the IFI- Internationale School Research Center, Hanoi, March 2025-August 2025**

  Subject: *Fact-checking multimedia content: Exploiting multimodal fusion models and explainable artificial intelligence.*

- **Alternating Internship at AICR-ITI Laboratory, Hanoi (October 2023)** *Summer Intern* While attending university courses, I also completed an internship at the laboratory. I actively participated in the **Smart Classroom** project, titled *"Action Recognition in Images or Videos: Smart Classroom Application."* In this project, I played a key role in developing and implementing action recognition models using deep learning and computer vision techniques.

- **Online Internship**

  Virtual Introduction to AI, Data Science, and Statistics – UtKarsh Minds Institute, India (2024) During this online internship, I played a key role in acquiring and applying fundamental concepts of **Artificial Intelligence, Data Science, and Statistics.**

PUBLICATIONS

1. **Mbayandjambe, A. M.**, Kasereka, S. K., Kyamakya, K., & Ho, V. T. (2025). Enhancing Printed Lingala Script Recognition Using Deep Learning Techniques. *Procedia Computer Science, 257*, 111–118. https://doi.org/10.1016/j.procs.2025.03.017
2. **Mbayandjambe, A. M., Nkwimi, G. B., Nguemdjom, D. K. T., Oshasha, F., Muluba, C., & Kutuka, X. F.** (2025, April). *AI-Generated Sneaker Detection: Leveraging GANs and Convolutional Neural Networks for Image Classification*. International Journal of Innovative Science and Research Technology, **10**(4). https://doi.org/10.38124/ijisrt/25apr1963
3. **Nguemdjom, D. K. T., Mbayandjambe, A. M., Nkwimi, G. B., Oshasha, F., Muluba, C., Mbengandji, H. I., & Bazie, I. G.** (2025, April). *Explainable AI (XAI) for Obesity Prediction: An Optimized MLP Approach with SHAP Interpretability on Lifestyle and Behavioral Data*. International Journal of Innovative Science and Research Technology, **10**(4). https://doi.org/10.38124/ijisrt/25apr1962
4. Alain M. KUYUNSA, Alidor M. MBAYANDJAMBE, Val Awoopeur, Grevi B. NKWIMI, Dieudonné M. BYAOMBE, Xavier. F. Kutuka, Darren Kevin T. NGUEMDJOM, & Hermann KANDOLO. (2025). *Deep Learning-Enhanced Automatic License Plate Recognition: A CNN-Based Framework for Real-Time Traffic Management Systems*. In Revue Internationale de la Recherche Scientifique (Revue-IRS) - ISSN : 2958-8413. Zenodo. https://doi.org/10.5281/zenodo.15657392
5. **Alidor Mbayandjambe**, Kevin Nguemdjom, Grevi Nkwimi, Fiston Oshasha, Heritier Mbengandji. *Multi-Model Optimization for Telecom Churn Prediction: A Complete Data Science Approach from Theory to Python Implementation*. **International Journal of Future Management Research**, Vol. 7, No. 2, March–April 2025. DOI: https://doi.org/10.36948/ijfmr.2025.v07i02.41263
6. Alain M. KUYUNSA, Alidor M. MBAYANDJAMBE, Grevi B. NKWIMI, Dorotha K. TSHIBOLA, Jacques B. TSHINGAMBU, & Blanchard M. KANGULUMBA. (2025). *Contrasting Classical and Symbolic Approaches to Classification in Data Warehousing Systems: Application to Metabolic Health Profiling*. Revue Internationale De La Recherche Scientifique (Revue-IRS), 3(3), 2913–2929. https://doi.org/10.5281/zenodo.15657368
7. Darren Kevin T. Nguemdjom; Alidor M. Mbayandjambe; Grevi B. Nkwimi; Fiston Oshasha; Célestin Muluba; Héritier I. Mbengandji; Ibsen G. BAZIE; Raphael Kpoghomou; Alain M. Kuyunsa. (2025). *Enhancing the Robustness of Computer Vision Models to Adversarial Perturbations Using Multi-Scale*

Attention Mechanisms. International Journal of Innovative Science and Research Technology, 10(4), 3565-3578. https://doi.org/10.38124/ijisrt/25apr2118.

8. Alain M. KUYUNSA, Alidor M. MBAYANDJAMBE, Grevi B. NKWIMI, Darren Kevin T. NGUEMDJOM, Dorotha K. TSHIBOLA, Jacques B. TSHINGAMBU, & Blanchard M. KANGULUMBA. (2025). *A Hybrid Approach to Vehicle Price Prediction: Combining PCA and Supervised Learning*. In Revue Internationale de la Recherche Scientifique (Revue-IRS) - ISSN : 2958-8413. Zenodo. https://doi.org/10.5281/zenodo.15657326
9. Pintoa, J. K., Kasereka, S. K., Muchapa, P. T., Ilunga, G. W. K., Mbayandjambe, A. M., Olanig, J. K., Tashev, T., & Kyamakya, K. (2025). *Enhancing Healthcare in Africa: A Brief Review of Lung Cancer Prediction and Detection*. The 22nd International Conference on Mobile Systems and Pervasive Computing, Leuven, Belgium. **Accepted – Camera-ready submitted**.
10. Mukungu, M. T., Mbayandjambe, A. M., Kasereka, S. K., Tashev, T., & Kyamakya, K. (2025). *Breaking Barriers: A Deep Learning Approach for Lingala Sign Language Translation in Inclusive Education and Communication*. ARIAL@IJCAI2025: 8th Workshop on AI for Aging, Rehabilitation and Intelligent Assisted Living, Montreal, Canada. **Accepted – Camera-ready submitted**.
11. Mbayandjambe, A. M., Kasereka, S. K., Tshakwanda, P. M., Nguemdjom, D. K. T., Batubenga, J. D. M., Tashev, T., Kyamakya, K., & Ho, V. T. (2025). *Integrating Hybrid Attention Mechanisms into Convolutional Neural Networks to Enhance Image Classification on CIFAR-10*. **In submission, IEEE.**
12. Mbayandjambe, A. M., Tchangang, K., Nkwimi, G., Batubenga, J. D. M., & Kuyunsa, A. M. (2025). *Generation and Transfer Learning from Synthetic Medical Data via GANs for Biomedical Image Classification*. **In preparation**.
13. Mbayandjambe, A. M., Kasereka, S. K., Batubenga, J. D. M., & Ho, V. T. (2025). *Unmasking the Virtual: Advanced AI-generated Image Detection Techniques*. **Manuscript in preparation for ELSEVIER submission, 2025**.
14. Kabukala, H. K., Mbayandjambe, A. M., Bounleutay, P., Vongsavath, S., & Yang, X. (2025). *Comparison of Deep Learning Methods for Tomato Freshness Stage Recognition*. **Manuscript in preparation for ELSEVIER submission, 2025**.
15. Byaombe, D. M., Mbayandjambe, A. M., Kasereka, S. K., Ilunga, W. K., Tashev, T., Kyamakya, K., & Ho, V. H. (2025). *From Convolution to Spikes: A Neuromorphic Approach to Facial Emotion Recognition with SpikingJelly and SEWResNet*. **Manuscript in preparation for ELSEVIER submission, 2025**.

HONOURS AND AWARDS

- Best research project at the Symposium Smart City: Experiences and Innovations ISSCEI 2023 & Smart Campus Asia Pacific Competition SCAPA 2023, The University of Danang January 12th, 2024
- Institut Francophone International (IFI) Excellence Scholarship for Master in Computer Science, 2023
- Excellence scholarship awarded by the University of Kinshasa for my academic distinction, 2018
- Best research project at the Symposium young researchers in Computer Science, University of Kinshasa, 2016

REFERENCES

- Dr. HO Tuong Vinh, Teacher, Researcher at Institut Francophone International- National University of Vietnam: Hanoi, Vietnam: vinhht@vnu.edu.vn
- Dr. Selain Kasereka, Teacher, Researcher at University of Kinshasa, Kinshasa, DR. Congo: selain.kasereka@unikin.ac.cd