Jean de Dieu Nyandwi

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Education

Carnegie Mellon University Aug 2022 - May 2024

MS in Engineering Artificial Intelligence; GPA: 3.82/4.00

Deep Learning, Large Language Models, Vision Language Models(VLMs), Research and Engineering

Relevant courses: 11777 Multimodal Machine Learning, 11785 Introduction to Deep Learning, 18661 Introduction to Machine Learning for Engineers, Applied Stochastic Processes, AI System Design, Trustworthy AI, Data Inference and Applied Machine Learning

University of Rwanda Sep 2017 - Jan 2022

BS in Electronics and Telecommunication Engineering, Kigali - Rwanda

Research Experience

Graduate Student Researcher, CMU September 2023 - Present

Adviser: Graham Neubig, Language Technology Institute(LTI)

- Worked on compositionality in visual language models(VLM) and improved the performance of popular VLMs by using synthetic dataset of hard-negatives that was used to study the cross-modal interactions in VLMs. Also designed the pipeline for generating synthetic visual language dataset.
- Studied the multimodal evaluation and designed a unified codebase that evaluate over 35 Multimodal Large Language Models(MLLMs) on various benchmarks. The codebase was used for evaluating the performance of MLLMs on the recently introduced multimodal benchmark(under review now).

Scientific Author, Deep Learning Revision July 2023 – Present

- Introduced a research publishing platform "Deep Learning Revision" for writing in-depth and deeply researched articles about various AI topics. The platform is accessible here: https://deeprevision.github.io/.
- Research, curate and write about state of the art models in areas like multimodal machine learning, robotic learning, among others.

Projects

Complete Machine Learning Package | *GitHub* | *Website*

- Designed a practical machine learning curriculum that contains over 32 end-to-end notebooks covering Python programming, data analysis and visualization, data cleaning, classical machine learning algorithms, foundations of machine learning and deep learning, computer vision, and natural language processing.
- The package is built with Python, TensorFlow, Keras, Scikit-Learn, NumPy, Pandas, Matplotlib, and Seaborn. It also contains real-world projects on real-world datasets.
- The package has gathered over 4300 stars on GitHub and has helped many people to practice various machine learning concepts and techniques.
- Designing Complete Machine Learning repository deeply enhanced my understanding of different machine learning models.

ModernConvNets - Revision and Implementation of Modern CNNs Architectures | *GitHub*

- Studied, summarized the designs and implemented the following modern CNN architectures: AlexNet, VGG, GoogLeNet, ResNet, ResNeXt, DenseNet, Xception, MobileNet-v1, MobileNet-v2, EfficientNet, RegNet, ConvMixer, and ConvNeXt.
- The goal of the project was to deeply understand how those networks work, the design principles that led to their performance, and the factors that guide the choice of architectures in real-world image recognition tasks.

Deep Learning for Computer Vision Package| *GitHub*

- Designed a comprehensive repository comprising technical topics and projects around several topics in deep learning and computer vision.
- The repository covers foundations of computer vision and deep learning, state-of-the-arts visual architectures in visual recognition such as Convolutional Networks and Vision Transformers, various Computer Vision tasks such as image classification, object detection and segmentation, tips and tricks for training and analyzing visual recognition systems.
- The goal of the project was to study computer vision foundations, how computer vision models are trained, and recent advances in the field.

Teaching

- Teaching Assistant, Introduction to Machine Learning for Engineers(18661), CMU, Spring 2024
- Teaching Assistant, Introduction to Deep Learning(11785), CMU, Fall 2023
- Introduction to Deep Learning, Mbaza NLP, 2022
- Deep Learning with TensorFlow Bootcamp, The Python Academy, 2021

Data Experience

VIEBEG Technologies Ltd Kigali, Rwanda

Data Scientist *Jan 2021 – Feb 2022*

- Performed analysis of sales data to provide insights that supported stock and products prioritization and received feedback that sales increased up to more than 20%.
- Designed, developed, and continually optimized data-driven analytical dashboards to inform and guide strategic business decisions on a daily basis.

Skills

- **Programming:** Python, Matlab, Linux
- **Frameworks:** PyTorch, TensorFlow, Keras, Transformers, Detectron2, Scikit-Learn, NumPy, Pandas, Matplotlib, Seaborn
- **Technical skills:** Deep learning, computer vision, large language models(LLMs), multimodal LLMs, data structures and algorithms, data visualization and cleaning, version control with Git, technical writing

Research Articles

- July 2023: The Transformer Blueprint: A Holistic Guide to the Transformer Neural Network Architecture | Over 20K views | *Blog*

Academic and Community Services

- Reviewer - ICLR 2024/Tiny Papers Track
- Volunteer - ICLR 2023
- Reviewer - ICLR 2023/Tiny Papers Track
- Organizer - IndabaX Rwanda 2023
- President of Data Science Club at CMU, 2022-2023

HONORS AND AWARDS

- DeepLearning.AI Ambassadors Spotlight - 2022
- Shortlisted in top 50 AI influencers by Onalytica - 2022
- African Students' Education(ASEF) scholar, 2014-2016
- Nyanza Technical School(Senior High-school): Graduated with top grade in 2016 advanced level national exams in Electronics and Telecommunication in the country

Online Learning

- Deep Learning for Computer Vision - University of Michigan
- CS231n - Convolutional Neural Networks for Visual Recognition
- Deep Learning Specialization - DeepLearning.AI
- Machine Learning - Stanford Online
- Machine Learning in Production - DeepLearning.AI
- TensorFlow Developer Professional Certificate - DeepLearning.AI