Gedeon Muhawenayo

gedeonmuhawenayo@gmail.com github.com/Gedeon-m-gedus gedeonmuhawenayo.github.io +250788365398

Work Experience

01.2022–Present **Geospatial Analyst**
Rwanda Space Agency (RSA), Kigali, Rwanda
- **Project**: Geospatial Compute Engine Python package (A library for geospatial data preprocessing, remote sensed image preprocessing, basic machine learning tasks and interactive maping)
- **Project**: Crop/Non-crop classification dataset from Satellite images
- **Project**: Crop versus all classification models and deployment workflows.

12.2020–01.2022 **Research Engineer**, *INRIA (Institut National de Recherche en Informatique et en Automatique)*
INRIA Thoth team - Grenoble, France
- **Research**: Hyperspectral Image Unmixing (extracting objects' spectral signature from satellite images)
- **Engineering**: GPU and CPU cluster management & monitoring, Open source development and maintenance (Cyanure Toolbox)

04.2020–08.2020 **Computer Vision Intern**, *Remote*
Spectrum AI - Amsterdam, Netherlands
- **Research**: Binary Graph Convolution Neural Network Research Project.
- **Project**: Applied deep-compression that improved the speed of their Object tracking model by 8.5 % while maintaining the mean average precision (mAP).

Education

2019–2020 **MSc. Mathematical Sciences**, *Machine Intelligence*
African Institute for Mathematical Sciences (AIMS), Accra,Ghana

2015–2019 **B.Sc Electrical and Electronics Engineering**
University of Rwanda, Kigali, Rwanda

Graduate Coursework

Mathematics for Machine Learning, Data structures and algorithms, Machine Learning Intro, Convex Optimization, Deep Learning, Speech and Natural Language Processing, Reinforcement Learning, Gaussian Processes, Computer Vision, Kernel Methods, Matrix Factorization, AI for Computational Biology, Social and Ethical aspects of Machine Learning

Publications

Entropic Descent Archetypal Analysis for Blind Hyperspectral Unmixing,
Alexandre Zouaoui, Gedeon Muhawenayo, Behnood Rasti, Senior Member, IEEE Jocelyn Chanussot, Fellow, IEEE, and Julien Mairal, Senior Member, IEEE

Compressed Object Detection, , Black in AI workshop, NeurIPS 2020
Gedeon Muhawenayo, Georgia Gkioxari

Technical Skills

1 **Programming Languages**: Python, C++
2 **Deep Learning Frameworks**: PyTorch, PyTorch-Lightning, TorchGeo
3 **Research and ML**: Git, scikit-learn, NumPy, pandas, LaTeX, Hydra
4 **web & cloud compute**: Google Cloud Platform (GCP), Colab, Heroku
5 **Geospatial & remote sensing**: Google Earth Engine (GEE), Rasterio, gdal, ArcPy, geo-pandas, folium
6 **OS**: Unix/Linux

Projects and reproduced research papers

Endmember-Guided Unmixing Network (EGU-Net),

Reproduced EGU-Net using pyTorch: General Deep Learning Framework for Self-Supervised Hyperspectral Unmixing

Explored Visual Recognition tasks using Detectron2 ,

Object Detection and Segmentation in Images, Human pose estimation, Object Tracking in Video.

Signals and Functions Analyzer,

Developed a native Graphical User Interface(GUI) for Analysing Electrical and Electronic Signals, more specifically Electromagnetic Waves. All implementation were done using Python and C++

Cassava Disease Classification,

Classify Cassava leaves as belonging to one of 4 various disease classes or healthy

DNA Sequence Classification ,

Predict whether DNA sequence region is binding site using Kernel methods. Experimented with different kernels such as mismatch kernel, gaussian kernel, weighted-degree kernel

Churn Prediction (My Team won this competition),

Predict when an airtime customer will move to another provider

Training & Workshops

2021 Training of Trainers: Machine Learning for Earth Observation (ML4EO) Bootcamp, by Randiant ML, 2021

2020 Volunteered at The Conference on Computer Vision and Pattern Recognition, CVPR 2020

2020 Machine Learning Summer School, Max Planck Institute of Intelligent Systems, Germany - Virtual

2019 Small Satellite for Earth Observation Mission Design. Nihon University - Chiba, Japan

2018 Introduction to Internet of Things (IoT), Remote Sensing and Cloud Computing. Kobe Institute of Computing - Kobe, Japan