

## Experience

### Google Research

Accra, Ghana

- Sept. 2023 - Present
- AI Resident**
- Multilingual Instruction Backtranslation (MIB) extends [instruction backtranslation](#). The approach is to extract multilingual pieces of text from the web, generate plausible instructions out of it and filter the most aligned tuples with self-critique. The data is later used for instruction tuning of PALM-2 and Gemini. As part of MIB here are some highlights of my contributions:
    - Added a language identifier model to the pipeline allowing to keep only data in the target language.
    - Suggested and implemented a module to paraphrase text extractions to look like an answer of an AI assistant.
    - Resulted in a 16% increase in win rate against previous best multilingual mixture in automatic side by side evaluation.
    - MIB is going to be included in the Gemini mixture in Q1 2024.
- April. 2023 - Sept 2023
- Multilingual instruction tuning aims to fill the performance gap of LLM in English and other languages. As part of this effort, I extended [Self Instruct](#), a recent instruction tuning methodology to the multilingual context. Multilingual Self Instruction uses LLMs to generate multilingual data tailored to improve performance on specific use cases like essays writing, poems, short stories, etc. In the following I detail my contributions:
    - Created a Multilingual Creativity test set based on the Bard Creativity test set with translocalization.
    - Generated data using PALM-2 hosted and served on my server.
    - Finetune PALM-2 on my dataset.
    - Evaluated trained model with automatic side by side evaluation.
- Sept. 2022 - March 2023
- XTREME-UP is a user centric multilingual and multimodal benchmark for under-represented languages. As part of the team I was in charge of the autocomplete task. In the following I detail my contributions:
    - Created a dataset including 23 languages from Universal Dependencies.
    - Finetuned mT5 and ByT5 baseline using T5X and SeqIO.
    - Added top-k decoding to [public library SeqIO](#) in order to compute top-3 accuracy for mT5 and ByT5.
    - Contributed to the writing and analysis of the [paper](#).

### Research and Development Institute

Dakar, Senegal

- Dec 2017 - Dec 2018
- Machine learning research intern**
- Benchmarked machine learning algorithms: Random Forests, Convolutional Neural Networks, Fully connected neural networks for bottom sea estimation in West African waters using multispectral acoustic data.
  - Tuned Hyperparameters (learning rate and numbers of neurons in a hidden layer) automatically with Bayesian Optimisation techniques using the library GyOpt
  - Wrote paper: [Complex data labeling with deep learning methods: Lessons from fisheries acoustics](#)

### Oceanographic Research Center of Dakar-Thiaroye

Dakar, Senegal

Dec 2015 -  
Dec 2016

## Data analyst intern

- Implemented Generalized Linear Models (GLM) and Generalized Additive Models (GAM) in the field of fisheries to estimate the effect of climatic indices (MEI, AMO, SST, CUI) on abundance indices (recruitment, biomass, fertile biomass, etc) of the Octopus vulgaris.
- Result presented in : Kamarel BA, Jean Michel Amath SARR, et al. Fishing effects on Senegalese Octopus stock in the context of climate variability. International conference ICWA 2016 : extended book of abstract : the AWA project : ecosystem approach to the management of fisheries and the marine environment in West African waters.(p 65)

## Education

### Sorbonne University, Cheikh Anta Diop University

Paris, France

2019-2023

#### PhD, Computer Science

- Investigated the role of data augmentation to improve robustness of neural networks under distribution shift. The thesis is available [here](#).

### Cheikh Anta Diop University

Dakar, Sénégal

2015-2017

#### Master of Research, Applied Mathematics

### Paul Sabatier University

Toulouse, France

2009-2012

#### Bachelor, Fundamental Mathematics

## Skills & Interests

- Python, tensorflow, keras, pytorch, jax, flax,
- Fine-tuning and evaluation of Large Language Models, statistical methods, research methods
- Interests: I like to dance (afrobeat, salsa, kizomba, bachata), I read a lot (psychologie, biologie, investment, health).

## Awards & Honors

- My project Djehuty was selected in the [UNESCO Top 100 outstanding projects using Artificial Intelligence for Sustainable Development Goals \(2021\)](#)
- I was selected by the [Google PhD Fellow](#) (2020)
- I was selected by the [Programme Doctoral International Modélisation des Systèmes Complexes](#) (2019)