Loïc Kwate Dassi

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Education

INP-Ensimag — Grenoble, France

MSc. in Artificial Intelligence and Data Science — *Sep 2021 – August 2022*

- *Relevant Courses :* NLP, Scientific Methodology and Experimental Evaluation, Information Retrieval, Computer Vision, ML for Multimodal Data, ML Fundamentals, Advanced Algorithms in ML, Reinforcement Learning

MSc. in Information System Engineering — *Sep 2020 – August 2022*

- *Relevant Courses :* Software Engineering, Operating System, Artificial Intelligence, Discrete Optimization, Statistical Analysis, Software Testing

National Advanced School of Engineering — Yaounde, Cameroon

Undergraduate, Computer Science, Mathematics and Physics — *Sep 2016 - June 2020*

- Acceptance rate : 4%(200 selected over 5000+ applicants)
- **GPA: 3.33/4, top 5%**
- **Relevant Courses :** Data Analysis, Numerical Analysis, OOP Java Programming, Information Theory, Data Structure and Algorithms, Theory of Compilation, Linear Algebra, Advanced Calculus, Probability and Statistics

Peer-Reviewed Publications (full list on publications)

- **Identification of Enzymatic Active Sites with Unsupervised Language Modelling**, *Kwate et al.* NeurIPS 2021 AI for Science Workshop [pdf]
- **Legal-BigBird: An Adapted Long-Range Transformer for Legal Documents**, *Kwate.* 5th NeurIPS 2021 Black in AI Workshop [pdf]
- **Semantic-based Self-Critical Training For Question Generation**, *Kwate.* AJIST [pdf]

Awards

- Received an Excellence Scholarship awarded to the students of the National Advanced School of Engineering of Yaounde to study at INP-Ensimag of Grenoble, France, 2020. Acceptance rate: 6% (12 selected out of 200)
- Recipient of the 2020 IndabaX-AI4D Innovation Grants, 11 selected projects out of 109. **Reference**

Work Experience

Research Intern — Feb 2022 – Aug 2022

MILA, Quebec AI Institute — *Quebec, Canada*

- Working on learning latent hypergraph representation using generative flows networks under Prof. Yoshua Bengio

Research Intern — June 2021 – Sep 2021

IBM Research Lab — *Zurich, Switzerland*

- Unsupervised Language Modeling on Enzymatic Bio-catalyzed Reactions for Protein Active Sites Detection. Advised by Dr. Matteo Manica and Dr. Teodoro Laino
- Designed a metric based on the overlapping of amino acid residue segments to assess the aptness of the model to unsupervisedly recognize the protein active sites and corroborated the results with the comparison of the binding free energy computed by following the protein-ligand docking protocol using AutodockVina
- Recovered 31.53% of experimental active sites which outperforms the sequence alignment-based method (24.01%) and baseline (4.93%)

Research Intern — July 2020 – May 2021

WL Research Lab – remote — *Cambridge, MA,USA*

- Worked on a project that consists in finding a subset of approved drugs to treat the tropical Leishmaniasis disease. Advised by Mohamed Hassan Kane and Ebenezer Nkwate
- Implemented a searching pattern of the best medications consists first in using DNN, RNN, CNN (**DeepPurpose**) to predict the affinity score between drugs and proteins then, applied experimental docking methods with Autodock Vina to find the configuration of the drugs when bounded to the proteins disease.
- Reduced by a factor of 600 the drug search using deep learning-based methods for the screening and molecular docking for experimental validation.

Data Engineer Intern — Jun 2019 – Aug 2019

Megasoft — *Yaounde, Cameroon*

- Participated in the development of the ERP of the Ministry of Economy of Gabon.
- Primarily in charge of designing a database to manage the cash exchange and designing SQL scripts to migrate data from one database to another.
- Designed sufficiently generic SQL scripts that cleaned up the original data and analyzed it to produce well-structured data following the final database schema.

Risk Management Intern — Jun 2017 – Aug 2019

Polytech Valor – Part-Time — *Yaounde, Cameroon*

- Learning and application of risk detection strategies in project management.

Projects

Natural Language Inference with Knowledge Graph – **Ongoing** | *PyTorch, Roberta, Spacy, MNLI*

- Blend the dependency tree with the plain text representation learning to address the Recognizing Text Entailment task.
- Used Graph Transformer Convolution to encode the dependency graph of the reference and the candidate sentence, aligned the two graph representations, infused the unique resulting latent representation in Roberta's contextual representation of the reference and candidate pair then, finally performed the multi-class classification with yielding logits.
- **Accuracy on MNLI dev_matched : 87.63**, SOTA of base architecture, **Roberta-base: 87.60**

Legal Information Retrieval | *PyTorch, Transformers, BigBird, Pyserini, tf-idf*

- Experimented the contextual mapping ability of the long Transformer-based model BigBird on legal corpora and used the BigBird's contextual representation of text on a specific downstream task, legal prior case retrieval
- Adapted the pretrained BigBird on two legal corpora. One on the US publicly available legal cases and the other on EU laws. Both models were tested on the legal cases retrieval task and the adapted BigBird models on legal corpora outperform the basic pretrained by 5 in accuracy score.
- Models available on Huggingface: **Legal-BigBird-us**, **Legal-BigBird-Eurlex**
- Paper accepted at the **5th Black in AI Workshop @ NeurIPS 2021**

Neural Question Generation | *PyTorch, Transformers, NUBIA, GitHub, T5, ELECTRA, SQuAD*

- Generation of questions according to a given context and the targeted answer. The challenge was to ensure that the generated questions are syntactically correct and semantically related to the context.
- Implemented a Reinforcement Learning Generator-Evaluator architecture trained with the REINFORCE algorithm wherein the generator is T5 and the evaluator is the mixture of BLEU and ELECTRA.
- Results on the test set : **Logical Agreement = 0.44/1, Semantic Relation = 0.61/1, BERTScore = 52.62/100, BLEU = 22.05**
- Paper accepted as **poster** at the **4th Black in AI Workshop @ NeurIPS 2020**

Lado | *Java 8, MYSQL, JOOQ Query Builder, GitHub, **Php Version***

- Accelerated the development of a multi-user system by designing an OOP framework to automatically manage user permissions for a software in production without additional code lines.
- Improved interaction with a RDBS by writing a unique code to perform CRUD operations on any table.
- Reduced coding time by automatically generating the GUI for a table on which a user will work, and by dynamically building SQL queries using the SQL Query Builder JOOQ. 5000+ code lines.

Skills

Familiar: Pytorch, Numpy, Huggingface Transformers
Python 3, Pytest

Comfortable: Tensorflow, Jax, GCP
SQL, C/C++, Java, JUnit

Volunteer Experiences

- Mathematics and Physics tutoring courses for the first year students of the National Advanced School of Engineering of Yaounde, Cameroon, 2017-2019
- Accountant for the first year study trip of the students of the 2021 promotion of the National Advance School of Engineering of Yaounde, Cameroon, 2017

Language

French: Native, **English**: Intermediate

Certifications

Deep Learning **(*deeplearning.ai*)** : Sequence Models, CNN, Neural networks, Structure Machine Learning Project, Hyper-parameter tuning, Regularization and Optimization.

AI For Medicine **(*deeplearning.ai*)** : AI For Medical Diagnosis, AI For Medical Prognosis, AI For Medical Treatment.

Machine Learning for Trading **(*Google Cloud Platform*)** : Machine Learning & GCP, Using Machine Learning in Trading and Finance, Reinforcement Learning for Trading Strategies.