Mohamed Elbeltagi

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Portfolio: m-elbeltagi.github.io

Education

CARLETON UNIVERSITY

- PhD in Particle Physics — *Sep 2018 - Feb 2024*
- BSc Honours (Theoretical Physics, Mathematics) — *Sep 2014 - Apr2018*

Languages

PYTHON, SQL, JAVASCRIPT, C++

Technical Skills

NUMPY, PANDAS, SCIKIT-LEARN, MATLAB, MATPLOTLIB, SEABORN, PLOTLY, PYTORCH, TENSORFLOW, KERAS, HUGGING FACE TRANSFORMERS, APACHE AIRFLOW, JUPYTER NOTEBOOKS, FLASK, AWS, GCP, GIT, OPENAI API, SELENIUM, TABLEAU, DOCKER

Work Experience

RESEARCH ASSISTANT/DATA ANALYST — *May 2018 - present*

Carleton University – Physics Department, Ottawa, ON

- Headed the collection, storage and analysis of laboratory sensor data using **Python** and LabVIEW, enhancing the operational efficiency of particle physics experiments through uninterrupted monitoring and maintenance of a complex detector system.

- Developed a **Python** package for signal processing and time series analysis (with **visualizations** and **reports**), enabling pattern recognition and predictive analysis, reducing the risk of dielectric breakdowns in HV equipment.

- Applied an innovative Monte Carlo method in **machine learning** to improve probability density estimation for detector events, which sharpened the precision of measurement uncertainty.

NLP ENGINEER INTERN — *Summer 2023*

Advanced Symbolics, Ottawa, ON

- Actively engaged in **MLOps**, orchestrating the operation of **NLP** production pipeline on **AirFlow** (utilising **Git**), and updating tasks to speed up the output by up to 5 times faster.

- Researched latest papers to engineer and integrate custom metrics to evaluate **NLP** tasks (including **clustering** and **summarization**), leading to 2× the intra-cluster relevance scores.

Applied Projects

TWITTER TROLL DETECTION

- Developed an **NLP** solution utilizing **fine-tuned BERT** and a **few-shot leaning** technique (without prompts) to detect and mitigate the influence of Twitter bots on political discourse and misinformation spread, achieving over 90% accuracy. →

- Designed and implemented in PyTorch a deep convolutional generative adversarial neural network (DCGAN), trained to generate images of natural landscapes with 3 color channels.

- Fine-tuned a medical **chatbot** (**extractive QA**) to answer questions about a patient, given their medical history, as a proof of concept for the applications of this technology in optimizing doctor/patient time.

Achievements

- Won 3rd place for the "Twitter Troll Detection" project at **Data Day 9.0 competition →**

- Implemented and presented a research plan (to a judging committee) as part of the successfully awarded academic grant proposal (nEXO NSERC 2022 grant valued at 930,000$).

- Fast-tracked into PhD program (skipping Master's) after displaying high academic performance, and strong research potential.

Publications

Google Scholar profile: **Mohamed Elbeltagi →**