Mohamed Elbeltagi

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Portfolio: m-elbeltagi.github.io

education

CARLETON UNIVERSITY

• Ph.D. in Particle Physics — *Sep 2018 - Feb 2024*

• BSc Honours (Theoretical Physics, Mathematics) — *Sep 2014 - Apr2018*

languages **PYTHON, SQL, JAVASCRIPT, C++, JAVA, HTML, LABVIEW**

libraries/tools **NUMPY, PANDAS, SCIKIT-LEARN, MATPLOTLIB, SEABORN, PLOTLY, PYTORCH, TENSORFLOW, KERAS, HUGGING FACE TRANSFORMERS, APACHE AIRFLOW, JUPYTER NOTEBOOKS, FLASK, AWS, GCP, GIT, SELENIUM, TABLEAU, DOCKER**

professional experience

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

Carleton University – Physics Department, Ottawa, ON

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

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

- Applied innovative Monte Carlo methods 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

- Reasearched latest papers to engineer and integrate custom metrics to meticulously evaluate **NLP** tasks, including clustering and summarization, ensuring high-quality model output.

- Actively engaged in **MLOps** practices, orchestrating the seamless operation of **NLP** production pipelines on **AirFlow** (using **Git**), significantly minimizing downtime and bolstering continuous delivery of **machine learning** solutions.

COURSE INSTRUCTOR — *Sep 2021 - Apr 2024*

Carleton University – Math Department, Ottawa, ON

- Led full-year physics courses on mechanics and electrostatics for high school students, developing and delivering lecture materials, coordinating with TAs for optimal student support.

applied projects

TWITTER TROLL DETECTION

- Developed an NLP solution utilizing fine-tuned transformers and SetFit (contrastive learning) to detect and mitigate the influence of Twitter bots on political discourse and misinformation spread. **See project →**

achievements

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

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

publications

Google Scholar profile: **Mohamed Elbeltagi →**