LOÏC COYLE

Machine Learning Engineer | Software Engineer

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ABOUT ME

Machine Learning Engineer with 6+ years of experience at CERN developing advanced ML solutions for complex systems. With expertise in full-stack development (Python/TypeScript/Rust), I excel at solving complex problems through data-driven strategies. Passionate about open-source and continuous learning, I thrive on tackling challenging problems and building innovative tools that bridge cutting-edge machine learning with robust software engineering.

WORK EXPERIENCE

Associate Researcher - Applied Machine Learning

European Organization for Nuclear Research (CERN)

2019 – 2024 | Geneva, Switzerland

- Used Machine Learning techniques to model, improve the understanding of and minimize particle losses occurring in the Large Hadron Collider (LHC).
- Designed, trained and evaluated a number of Machine Learning models targeting various aspects of the LHC:
  - GAN based surrogate model of the LHC's dynamic aperture.
  - Multivariate time series surrogate modelling of the LHC's instantaneous particle loss rate.
  - Anomaly detection models to identify and cluster LHC instabilities.
  - Machine Learning models for Unidentified Falling Object event detection.
- Developed purpose built, open-source, Python tooling to build ETL pipelines and visualisations.
- Performed large scale LHC dynamic aperture particle tracking simulations.
- Developed particle tracking simulation job management software.
- Built a comprehensive particle accelerator simulation and design software.

Tensorflow | PyTorch | Spark | Pandas/Numpy/SciPy | Jupyter | Matplotlib | ARMA Models | CNNs | Autoencoders | Transformers | Generative Models

Research Intern - Applied Machine Learning

European Organization for Nuclear Research (CERN)

Feb 2018 – March 2019 | Geneva, Switzerland

- Developed surrogate models of the LHC instantaneous particle losses with the goal of optimizing LHC operations.
- Analysis of LHC experimental data to further the understanding of particle losses and develop models of the LHC using both statistical analysis and Machine Learning techniques.

Tensorflow | Pandas/Numpy/SciPy | Matplotlib | Jupyter | XGBoost

Research Intern

UK Atomic Energy Authority - Culham Center for Fusion Energy

May 2017 – August 2017 | Culham, UK

- Developed and benchmarked a novel nuclear reaction database using a variety of nuclear interaction simulation software.
- Developed Python tooling to build nuclear interaction simulation pipelines involving GEF, Talys and Geant4.

Pandas/Numpy/SciPy | Jupyter | Matplotlib | Fortran | Geant4

PERSONAL PROJECTS

Ethergraph - Graph based crypto-forensics web platform (WIP)

TypeScript | React | Next.js | Front-end dev. | web3 | CD | PostgreSQL

ethergraph.vercel.app

TinyTicker - Raspberry Pi powered e-paper financial data ticker

Python | Flask | Linux | CI/CD | Front-end dev. | Numpy | TDD

loiccoyle/tinyticker | loiccoyle.com/tinyticker

Phomo & Strandify - Rust/Wasm photo mosaic & string art web apps

Rust | Wasm | Front-end dev. | TypeScript | React | Vite | CI/CD

loiccoyle.com/phomo-rs | loiccoyle.com/strandify

Find my other open-source projects at loiccoyle

EDUCATION

Master's in Reactor Physics and Nuclear Engineering

Grenoble Institute of Technology - Phelma

2015 – 2018 | Grenoble, France

- Includes an ERASMUS student exchange with the Ecole Polytechnique Fédérale de Lausanne in Switzerland.

Bachelor's in General Engineering

Grenoble Institute of Technology - Phelma

2015 – 2016 | Grenoble, France

SOFTWARE SKILLS

Python | Typescript | Rust | C/C++ | bash | Software Engineering | Git | Linux | CI/CD | Machine Learning | Deep Neural Networks | Data Science | Data Engineering | Statistics | Data Visualization | DB Design | SQL | Docker | Kubernetes | Cloud Computing | AWS | Fullstack Dev. | GPU Programming

SOFT SKILLS

Rigour | Autonomy | Result Oriented | Active Listening | Analytical Thinking | Scientific Communication | Team Spirit | Independent | Continuous Improvement | Problem Solving | Time Management | Adaptability | Creativity | Curiosity

LANGUAGES

English
French
German

EXTRA TRAINING

US Particle Accelerator School

Accelerator & Beam Physics

Jan – Feb 2021 | Remote

Cern Accelerator School

Numerical Methods for Analysis, Design and Modelling of Particle Accelerators

Nov 2018 | Thessaloniki, Greece

REFERENCES

Available on request.