Parham Dehghani Ph.D.

Particle Physicist | ML Engineer

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Profile Overview

Experienced Data Scientist with a strong background in Machine Learning and particle physics, skilled in extracting valuable insights from complex datasets. Proficient in Python, SQL, and data visualization tools, with expertise in statistical analysis, predictive modeling, and data mining techniques. Adept at applying advanced analytics to solve real-world problems and drive data-informed decision-making.

Skills

- Machine Learning: Deep Learning, Transformers, Ensemble Methods, Model Deployment
- Data Engineering: SQL, Relational Databases, Data Manipulation, Apache Spark, Dask
- Cloud & DevOps: AWS (SageMaker, S3, EC2, RDS), Docker, Kubernetes
- Programming: Python (Modular Scripting, NumPy, Pandas, scikit-learn, Flask, PyTorch), Bash
- Problem-Solving & Critical Thinking
- Data Processing & Analysis: Balancing, Scaling, Feature Engineering, Dimensional Reduction, Imputation, EDA
- Algorithms & Data Structures: Dynamic Programming, Arrays, Stacks, Queues, Heaps
- Version Control & Collaboration: Git, GitHub, GitLab, Cross-functional Teamwork
- Data Visualization: Matplotlib, Seaborn, Tableau
- Languages: English (Fluent), French (TEFaQ B1)

Professional and Research Experiences

Machine Learning Specialist — Montreal, Canada 2023/08 - Now

Scale AI

- Working in the RLHF pipeline Quality Analysis (QA) team, where I perform final quality audits before data integration into the Gemini RLHF pipeline. This includes key domains like ATT (audio-to-text), VTT (video-to-text), IR-Only (Ideal Response Replacement), SFT (image generation), MM (image-related competencies), and text-based reasoning. I maintain an internal score of 4.2/5.0 for my technical audits.
- Fine-tuning Google Gemini models in math and data science, leveraging RLHF to iteratively improve model accuracy and user alignment. This involves model deployment, cloud computing integration, big data processing, algorithm optimization, and database management.
- Evaluating and refining Gemini's technical responses through RLHF, ensuring model evaluation aligns with both system instructions and nuanced human feedback, resulting in optimized outputs for data science tasks.
- Contributing to multi-modal projects that utilize RLHF to improve Gemini's understanding of visual and text inputs across reasoning, structured/unstructured information seeking, and creativity. This includes designing and validating complex model prompts with high accuracy before submission to the model API.

Machine Learning Agent — Montreal, Canada 2022/04 - 2023/08

TELUS International AI Data Solutions

Performed NLP data annotation across various competencies, consistently meeting and exceeding quality benchmarks with a satisfaction threshold of 80% or higher through continuous evaluations.

Ph.D. Researcher in Computational Particle Physics — Montreal, Canada 2020/09 - 2024/07

Concordia University

Developed and analyzed BSM and SUSY models, leading to the publication of two research papers (IF>4). Simulated collider traces using specialized software and conducted large-scale computations on the Beluga cluster. Applied advanced ML algorithms for jet tagging, anomaly detection, and background suppression, enhancing the precision of collider simulations. Conducted big data analysis and visualization using Matplotlib. Automated complex data processing tasks with Python and Bash scripting, optimizing parameter space scans.

Education

Data Scientist Nano Degree Program, Udacity, San Francisco, USA, 2023

Ph.D. in Particle Physics, Physics Department, Concordia University, Montreal, Canada, 2024

Inter-University Graduate (Ph.D. Courses), Physics Department, McGill University, Montreal, Canada, 2021