Abhijeet Rao

abhijeetrao.com

EDUCATION

The University of Edinburgh – BSc Honours Applied Mathematics   **3rd Year**
- First Class Honours 1st – A2

University of California Los Angeles   **Year Abroad 2023/2024**
Selected after a lengthy review process of academic performance and a personal essay.

WORK EXPERIENCE

Draup – Machine Learning Intern   **June 2023 – August 2023**
ML model that parses job descriptions to identify skills required. Model to be implemented into HR platform for better hiring processes.
- Created two Named Entity Recognition(NER) models; one using LSTM RNN architecture, and another using transformer (BERT) architecture.
- Implemented: Word embedding layers, IOB Tagging, Batching/Padding for efficient training, Decoder Transformer, and multi-headed attention.
- Presented a final project report to the ML engineer supervisors.

Tata Technologies – Data Science Intern   **June 2022 – August 2022**
Anomaly detection for faulty battery sensor data that caused unwanted power cut off to motors in electric vehicles.
- Optimised raw time-series charge cycle data for machine learning in Python.
  - Cleaned and pre-processed raw EV charge cycle using the Python pandas library.
  - Time series data analysis and feature extraction/engineering to aid the ML model in finding anomalies.
- Implemented algorithm to do feature extraction which prevented bugs, increased efficiency, and ran faster.
  - Previously the code used TSFresh which was extremely inefficient for this dataset.

Endeavour Rocketry – Controls and Simulations Engineer   **Oct 2022 – May 2023**
Implement a reaction wheel in a rocket to cancel rotational velocity in flight for stable video footage relay.
- Implemented and prototyped motor control code C++ with SimpleFOC an open source library.
- Constructed PID and Kalman Filter systems in Python for reaction wheel control.
- Identified most power to size efficient motor and battery configuration to fit design spec.

PROJECTS

AI Safety at UCLA – Implementing Next Token Prediction – GitHub Repo.
Trained a LM on the complete works of Shakespeare for autogenerative next token prediction.
- Converting text information into tensors for PyTorch ML.
- Decoder transformer Model architecture construction from scratch following Andrej Karpathy.
  - Implemented Self-Attention, Multi-headed Attention, Feed Forward N.N. and self projection into BiGram model to mimic popular transformer architecture.

IDS at University of Edinburgh – Ideal Characteristics of an Olympian – Presentation
Analysed TidyTuesday's "Olympics" dataset to find the ideal height, weight, age in male and female olympic sports.
- Implemented functions in R that generated 6 faceted ggplot based on sport and sex input, and created tibbles.
- Analysed data on specific sports and overall data, for example:
  - Female olympic swimming medalists tended to be 1.7% taller than non-medalists;

SKILLS

- **Environments:** VSCode, Jupyter Notebook, R Markdown/Studio
- **Languages:** LaTeX, Python, MATLAB, R, SQL(MySQL), C++, Git
- **Libraries:** PyTorch, Pandas, MatPlotLib, NumPy, TSFresh, ggplot2
- **Soft skills:** Analytical thinking, algorithm implementation, data wrangling, fast/independent learner