Brian Tufts

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EDUCATION

Carnegie Mellon University – Language Technologies Institute, School of Computer Science Pittsburgh, PA
Master of Science in Artificial Intelligence and Innovation | GPA: 4.0/4.0 May 2025
Coursework (Grade): Deep Learning (A+), Advanced NLP (A), Code Generation (A+), Machine Learning (A), AI Engineering (A+)
Graduate Research Assistant: [Lei Lab], Responsible AI, Generated content detection

University of Virginia - School of Engineering and Applied Sciences Charlottesville, VA
Bachelor of Science in Computer Science, Bachelor of Arts in Physics | Major GPA: 4.0/4.0 December 2022
Teaching Assistant (TA): Machine Learning, Data Structures and Algorithms, Computer Architecture
Research Assistant: [Mu2e experiment], Fermilab's $271 million particle physics experiment

PROFESSIONAL EXPERIENCE

Leidos Reston, VA
AI/ML Research Scientist (Part-time) May 2024 – Present
- Enhancing the management of semi-autonomous aircraft using **multi-agent** and **multi-objective** reinforcement learning
- Enabled training of conflict resolution agents using a **time series algorithm** to model futures states of a busy airspace
- Improved reliability of a separation system by **10%** using model based and physics-informed **reinforcement learning**

AI/ML Research Intern May 2023 – July 2023
- Deployed YOLOv5 **object detection** on the edge by reducing computational costs by **70%** using a **split learning** design
- Implemented privacy and compute flexibility for **supervised learning** on edge devices by designing a multi-stage server

IBM Durham, NC
Backend Development Engineer Intern May 2022 – August 2022
- Optimized **cloud deployment** of IBM Z environments, improving start up time by **90%** using a custom **DHCP client** in C

Amazon Web Services Seattle, WA
Software Development Engineer Intern May 2021 – August 2021
- Assisted **20+** internal teams identify server health issues using a **web tool** to query and display data from a **DynamoDB**

PUBLICATIONS & RESEARCH EXPERIENCES

Publication @ NeurIPS 2024 SGA| NLP: AI Detector Evaluation | [Paper] | [GitHub] Pittsburgh, PA
Generative AI Research | Advisor: Prof. Lei Li, CMU Language Technologies Institute August 2024 – December 2024
- Evaluated 7 **AI text detectors** across 7 tasks and 4 languages using unseen models and built a new dataset of **10k+** texts
- Exposed limitations of AUROC, advocating TPR@FPR for a more practical evaluation of machine-generated text detectors

Deep Learning Final Project | NLP: Quantification of LLM Confidence | [Paper] | [GitHub] Pittsburgh, PA
Generative AI Research | Advisor: Prof. Bhiksha Raj, CMU Language Technologies Institute January 2024 – May 2024
- Improved AUROC by **37%** and ECE by **85%** by developing three new methods to robustly evaluate LLM self-confidence

Adv. NLP Final Project | NLP: Knowledge Graph QA | [Paper] Pittsburgh, PA
Generative AI Research | Advisor: Prof. Graham Neubig, CMU Language Technologies Institute January 2024 – May 2024
- Designed models combining **knowledge graphs** with text-based **encoders**, achieving a **2.5%** higher F1 than baseline

PROJECTS

Algorithmic Trading | [GitHub] August 2024 – December 2024
- Developed an **algorithmic trading** toolkit and optimized **4** trading strategies across **10** currency pairs using backtesting
- Achieved multiple profit factors above **1.5** with thorough **Monte Carlo,** out of sample, and vs. random robustness testing

Pruning Neural Networks | [Paper] January 2024 – May 2024
- Implemented three state-of-the-art network pruning techniques, achieving a **2%** increase in accuracy with **95%** sparsity

Bloons TD6 AI | [GitHub] August 2022 – December 2022
- Directed a team of 3 to develop an AI agent using genetic algorithms and **Q-learning**, reaching round **98** in Bloons TD 6
- Improved start time by **50%** through **multithreading** game state retrieval, reducing training time by **20%** per episode

SKILLS

Programming Languages: Python | JavaScript | C/C++ | Java | HTML/CSS
Libraries: PyTorch | TensorFlow | Scikit-Learn | Hugging Face Transformers | vLLM | LangChain | Keras | Flower | NumPy
Frameworks/Tools: AWS | Azure | Spark | Pandas | PostgreSQL | Git | Unix/Bash | Docker | NodeJS | ReactJS | CUDA