Braden K. Webb

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WORK EXPERIENCE

Machine Learning Research Associate
May 2023 - Present

AI & Data Analytics Division, Pacific Northwest National Laboratory — *Remote from Boston, MA*

- Fine-tune LLMs and implement RAG pipeline to extract actionable data from cybersecurity threat reports
- Define PostgreSQL schemas for data ingestion into AWS-hosted Elasticsearch indices via Apache NiFi
- Automate mappings between related taxonomies for cyber-physical threat sequence modeling and graph generation
- Pattern-of-life modeling and algorithmic anomaly detection through novel graph analytics for national security threat prevention on the Sigma+ program; sponsors include DARPA and other government agencies
- Develop front-end UI in TypeScript for algorithm result visualization and Android app plugin in Java

Machine Translation Research Assistant
Sep. 2022 - May 2023

MaTRIX Labs, Department of Computer Science, Brigham Young University — *Provo, UT*

- Built data cleaning pipeline for dynamically processing and aligning translation memory files for 90+ languages
- Prepared multilingual machine translation corpus for publication
- Trained 24-language neural MT model to investigate effects of tagging the language family on translation quality
- Harnessed distributed HPC GPUs to train 800M-parameter encoder-decoder transformer from scratch, matching state-of-the-art performance on several language pairs across multiple metrics
- Launched development on transformer-based speech-to-speech translation system

NLP Research Assistant
April 2022 - Jan. 2023

DRAGN Labs, Department of Computer Science, Brigham Young University — *Provo, UT*

- Fine-tuned generative LLMs with domain-specific text obtained through extensive web-scraping
- Developed novel metric for evaluating relevance of procedurally generated NPC dialogue to quest objectives, and validated its correlation to human preferences through surveys and user studies resulting in academic publication

Single Sign-On Technology Consultant
June 2021 - April 2022

Qualtrics International, Inc. — *Remote*

- Provided support integrating SAML, CAS, LDAP, and Google OAuth SSO protocols, successfully completed 50+ B2B client tickets

Computational Research Assistant
Dec. 2020 - April 2022

Department of Mathematics, Brigham Young University — *Provo, UT*

- Evaluated open-source tools for English to IPA transliteration, detected and traced surname transcription errors in historic census data, and processed millions of records using Pandas, NumPy, and Epitran

EDUCATION

B.S. Mathematics | Brigham Young University
April 2023

Minors: Computer Science, Linguistics, & Logic — *Provo, UT*

- GPA: 3.9/4.0, 4-Year Full-Tuition Academic Scholarship, National Merit Scholarship
- Coursework including deep learning, predictive modeling, natural language processing, algorithm design & analysis

PUBLICATIONS

[1] **B. Webb**, R. Meyur, S. Purohit, *Cyber Knowledge Completion Using Large Language Models*. In progress.
[2] A. Shurtz, L. Sorenson, **B. Webb**, et al. *MMMC: A Massively Mult-way-aligned Multilingual Corpus*. Under review.
[3] R. Meyur, S. Purohit, **B. Webb**. *AAAI-24 Workshop on AICS*, Feb 26, 2024, Vancouver, Canada. [Link]
[4] T. Ashby, **B. Webb**, et al. *CHI '23*, April 23–28, 2023, Hamburg, Germany. [Link]

SKILLS

Computer Languages: C++, Python, Java, R, SQL
ML Frameworks: PyTorch, JAX, NumPy, Pandas, SciPy, spaCy, scikit-learn, Hugging Face, OpenNMT, NLTK, Neo4j
Foreign Languages: Slovak (proficient), Czech (proficient), Russian (basic reading ability)
Other Tools: Docker, Unix shell, Git, Android, Azure AI Services, Excel, Slurm, SSO, LaTeX, Qualtrics XM