Aidan Bradshaw

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Education

***Carnegie Mellon University**, Pittsburgh, PA* *Expected graduation: May 2025*

- Masters of Science in Applied Data Science(In Progress)

***San Diego State University**, San Diego, CA* *Graduation: May 2024*

- Bachelor of Science in Computer Science; Minor in Applied Mathematics
- Coursework: Algorithms(A), Data Structures(A), Artificial Intelligence(A), Advanced Programming Languages(A)

Work Experience

Carnegie Mellon University, *Pittsburgh, PA* *August 2024 – Present*

Research Assistant – School of Computer Science - Human Computer Interaction Institute

- Generative text-to-image machine learning modeling in healthcare applications.
- Text-to-image model inferencing to generate conditioned computed tomography(CT) scans from input prompts.
- Operationalize model usage for specific use cases to help patients and doctors understand anatomical diseases.
- Explaining diffusion models using cross-attention maps to understand how text condition prompts affect image generation, in collaboration with Boston University EECS and University of Pittsburgh Medical Center(UPMC).
- Implementing sparse attention and modeling pruning to manage memory consumption and inference speed.

Carnegie Mellon University, *Pittsburgh, PA* *August 2024 – Present*

Teaching Assistant (TA) – Reasoning with Data Course

- Hosting weekly lab sessions, office hours and meetings to advise and work with undergraduates to reason with data.

Massachusetts Institute of Technology, *Cambridge, MA* *May 2024 – Present*

Visiting Researcher – Machine Learning Engineer

- Working in Responsive Environments group to architect, test, and benchmark machine learning(ML) models for invasive and native bee species/buzz and no buzz classification in samples from Patagonia, Argentina.
- Porting existing animal call audio classification frameworks to our data while enhancing the underlying architecture to produce higher accuracy levels with a smaller memory footprint.
- Creating custom frameworks and residual network architecture with additional parameter count reduction, quantization, and memory footprint compression, while maintaining high accuracy.
- Implemented hyperparameter searching and visualization platforms such as wanb for metric tracking.
- Compressing ML model to run tiny ML on microcontrollers, for bee species and buzz/no buzz real-time classification based on buzz signatures.
- Collaborating with MIT PhD Candidate, Kioxia R&D research scientist and ETH Zurich PhD Candidate.

AirHop Communications AI, *San Diego, CA* *June – August 2023*

Intern – Software Engineer

- Collaborated with the head program manager to design and develop various documentation, figures, and software files on the overall system architecture of enhanced self-organizing network (eSON) technology
- Collected and analyzed data on differences between past and present system components to upgrade and streamline an administration site and User manuals distributed to current clients and OSS (operating support system) engineers
- Analyzed alert logs from large sets of collected data to diagnose tower outages, system breakdowns, data transmission and network algorithm performance and usage.

San Diego State Research Foundation*, San Diego, CA* *May 2023 – Present*

HCI and Machine Learning Researcher – Computer Architecture and Systems Laboratory

- Lead, design, and develop a cross platform medical application for analysis of patients with Raynaud's disease to collect data for diagnostic purposes
- Built multi-modal machine learning models from wearable health and physiological data for symptom prediction.
- Fine-tuned and re-worked the React Native speech-to-text engine to develop reliable device assisted human interaction, aiding in satisfying requirements for doctors and patients.
- Created a full stack framework with React Native, AWS, AWS autoscaling, PostgreSQL.
- Working directly with the Department Chair of Computer Science at SDSU and doctors from Yale school of medicine and Rollins College UK.

Publications

Conference Papers

- **Aidan B.**, Ramaz T., Shangping R., Ben S. A Tailored Health Application: Monitoring the Etiology of Raynaud's Disease. Full paper presented at *CSCSU* 2024.

- **Aidan B**, Weicheng D., Katelyn M., Adam P., Motahhare E., Kayhan B., Counterfactual Cross-Attention Maps for Explainable High-Fidelity 3D Radiology Image Generation in Text-to-Image Diffusion Models (In Preparation) *International Conference on Medical Image Computing and Computer Assisted Intervention(MICCAI) 2025.*
- Katelyn M., Motahhare E., **Aidan B.** Adam P. Exploring Synthetic Image Generation in Radiology Work: Benefits, Perspectives, and Challenges. (In Preparation) *ACM Designing Interactive Systems Conference (DIS) 2025.*

Journals

- Patrick Chwalek, Marie Kuronaga, Marco Giordano, **Aidan Bradshaw**, Isamar Zhu, Marina Arbetman, and Joseph A. Paradiso. Autonomous Low-Power Distributed Acoustic System for Detecting Endangered *Bombus Dahlbomii* In Suit. (In Preparation), *Nature 2024.*

Selected Projects

College Scorecard

- Developed a Python tool to analyze educational data, leveraging API integration and data visualization to identify performance trends and institutional insights

Health Audit-GPT

- Auditing low-parameter generative transformers (FLAN-T5, GPT-Neo) for healthcare diagnostics, red-teaming their reliability in zero shot prompt diagnosis.

Multi-layered-Python-scripting

- Engineered Python scripts to enable seamless integration of five programming languages that visualizes the image rotation capacities of each language.

Software-engineer-salary-prediction

- Built a Recurrent Neural Network(RNN) – Long short term memory(LSTM) backbone machine learning model to predict software engineer salaries, applying regression, statistical analysis, and visualization to industry datasets.

Mobile app

- Created a single player clicker game for with abilities to change environment and increase difficulty
- Developed in C++

Accident prediction

- Created a model from a large data set on teen car accidents to make different predictions based on data analysis techniques such as linear regression and principal component analysis.
- Cleaned, trained and tested data to finally comprehend it using k means clustering along NumPy and pandas libraries.

Vacuum Agent

- Built an artificial intelligence learning program model a self-sustained vacuum predicting where to clean next.
- Developed in Python and Scikit Learn

Git hub: Abradshaw1 (github.com)

Skills

- Interpersonal: analytical thinking, methodical planning, perceptive, project planning, budgeting, problem-solving, personable, communication, effective in teams, pressure handling, team leadership
- Software environments: Java, Python, JavaScript, C++, SQL, R, RStudio, NumPy library, Pandas packages, Git, React, React Native, Node.js, Xcode, Android studio, Object-oriented design, Vite, Vue.js
- MS Office: Word, Excel, PowerPoint Bi-lingual Spanish speaker

Interests

- Volunteer Work: Someone Cares Soup Kitchen, Aztec Rock Hunger, Breast Cancer Awareness Carnival, Orange County OCD support Group, OCD Southern California Group, Gateway therapeutic group
- Lacrosse player: Division 1 Club Men's Lacross at SDSU, high school player on national travel teams and team captain
- Music: Paid DJ at large events, and self-taught piano player both classical and current songs
- Technology/Philosophy: Quantum Computing, autonomous machines, deep learning, the Will of man, language games, the philosophy of logic