Aaron Broukhim

aabroukh@ucsd.edu | San Diego, CA | (310) 867-3564 | github & linkedin: @aabroukh | aabroukh.github.io

Education

University of California San Diego 2022 - Present
Ph.D. in Computer Science
Relevant Coursework:
Deep Learning, Unsupervised Learning, Generative Models, Information Visualization, Recommender Systems, Human-Robot Interaction, Computational Photography, Neural Networks for Pattern Recognition, Probabilistic Reasoning and Learning

University of California San Diego 2019 - 2021
B.S. in Cognitive Science: Machine Learning & Neural Computation
Minor in Computer Science & Engineering
Relevant Coursework:
Supervised/Unsupervised/Reinforcement/Deep Learning, Genetic Algorithms, ML in Music, ML in Brain Computer Interfaces, Human-AI interaction

Santa Monica College 2015 - 2019
Computer Science & Visual Communications
Relevant Coursework:
Physics, Data Structures, Assembly,
3D Animation, Typography, Photography, Color Theory, Art

Research

Contestability
Addressed inaccessibility in content moderation for everyday users by creating an intuitive web page that enables non-technical users to find biases in an intentionally faulty model.

Community Based Content Moderation
Explored the benefits and drawbacks of community based labeling over the traditional approach of top down labeling in the context of content moderation.

Explainability
Created consistency in the XAI space with a survey on papers that conducted user studies: the survey categorized quantitative metrics for experts to reference when choosing a metric for their studies.

Privacy
Introduced privacy interdependence to participants by showing them a simple example with their own Facebook data. Participants are then interviewed about changes to their perception of privacy and how that might impact their future sharing.

Actionable Visual Explanations
Users were shown a recommendation profile consisting of an interactive radar chart, where they were able to switch out the axes of the chart, as well as filter their recommendations through thresholds on the chart.

Mixture of Experts
Modified an existing mixture of experts large language model by experimenting with weight averaging to create a shared expert to boost performance and decrease both training and inference computational costs.

Experience

University of California San Diego July 2021 - August 2022
Undergraduate Research Assistant

-Web Scraped Facebook using Selenium to make inferences on a user's connections
-Designed logistic regression models capable of detecting hate speech on Twitter & used word embedding (Word2Vec) to bin dataset into different types of hate speech
-Designed and implemented a UI in React with a Node and Flask backend to help non-tech savvy users identify faulty ML systems
-Created SQL databases on an AWS server and conducted queries to support UI backend
-Built Balltree with various similarity metrics to show similar tweets that may be mislabeled

Virufy January 2022 - August 2022
Associate Audio Machine Learning Engineer

-Peer review ML research involving cough audio classification in Tensorflow and SK-Learn
-Retrained existing models via transfer learning to conduct audio classification
-Utilize Sagemaker to explore new feature and architecture combinations with novel data

The Hammer Museum February 2016 - October 2017
Visual Experience Representative

-Protected artwork, worked front-desk, & trained other employees

Hotpoint App & Samuels Advertising Summer of 2015, 2016 & 2017
Graphic Design Internships

-Prototyped logo designs and for-print magazine spreads
-Crafted one sheet designs for prospective buyers
-Designed geotags for a photo booth app

Teaching

TA - COGS 107B (Systems Neuroscience) Summer 2023
Course Development - DSC 266R (Human-Centered AI) Fall 2023
TA - DSC 266R (Human-Centered AI) Winter 2024
TA - COGS 17 (Neurobiology of Cognition) Spring 2024

Projects

Vehicle Motion Forecasting

-Explored various model architectures (MLP, LSTM, CNN, Transformer) to predict motion of a car
-Selected and normalized relevant features (position, velocity, lanes) from the Argoverse dataset
-Achieved highest performance via an MLP with a **RMSE of 1.48**

Reddit Fake News Detector

-Classified news headlines as fake news based off article headlines run through tf-idf and PCA
-Considered various models & unsupervised methods such as K-Means, SVMs, and random forests
-Best resulting model was an SVM that achieved a **95% accuracy,** eventually utilized by a Reddit bot that provided warnings about potentially false content

Snake Reinforcement Learning

-Utilized N-Step Temporal Difference and SARSA methods to play snake and compared performance
-Designed a custom Open-AI gym environment and deep Q-Learning agent in keras that reached **level 20** consistently (max 40) with a small state space of 10 and action space of 3

Generalizable Deep Speech Anonymization

-Leveraged Generative Adversarial Networks or Denoising Diffusion Implicit Models to learn a distribution over language agnostic speaker embeddings
-Used a modified loss to bias the generative model towards an anonymized distribution

DJAI

-Scraped Spotify for emotion based playlists to create a dataset of music with emotion labels
-Built a SVM model to classify songs by emotion
-Retrained an existing audio to emotion model on the RAVDESS dataset

Machine Learning Gridsearch

-Utilized SK-Learn to compare different machine learning algorithms and their various parameters through pipelines and gridsearching

-KNN, SVM, and LOGREG algorithms were compared on different datasets

Homework Schedule Discord Bot

-Created a Discord bot that allows users to keep track of assignment due dates and notified users when deadlines were approaching by storing relevant information in firebase

Image Denoising Comparison

-Implemented and compared different denoising algorithms such as BM3D, Non-Local Means, Wavelet Denoising, and Total Variation Denoising to a CNN on the SIDD-Medium dataset.

Skills

Programming Languages - Python, SQL, Java, CSS, HTML, C++, C, Javascript
Frameworks - Pandas, NumPy, SK-Learn, TensorFlow, Keras, PyTorch, Selenium, React, Node, Flask
Spoken Languages - English, Spanish, Farsi, Hebrew
Misc - Git, Sagemaker, MySQL, AWS, Illustrator, Lightroom, Photography, Firebase