# Ian Wu

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## EDUCATION

**University of Southern California** **Aug. 2022-May 2024**

*Master of Science in Applied Data Science* GPA: 3.96/4.0

- Relevant Coursework: Advanced NLP, Data Mining and Recommendation Systems, Fairness in Artificial Intelligence, Foundations of Data Management, Machine Learning for Data Scientists, Machine Learning for Medical Data, Probability & Statistics for Data Scientists, Computer Security and Privacy

**Cleveland State University** **Aug. 2018-May 2022**

*Bachelor of Science in Computer Science, Minor in Mathematics* GPA: 3.84/4.0

- Jack, Joseph, & Morton Mandel Honors College graduate with scholarships totalling 100% of tuition
- Relevant Coursework: Artificial Intelligence, Big Data, Data Structures & Algorithms, Database Concepts, Deep Learning, Discrete Mathematics, Linear Algebra, Internet Programming, Multivariate Calculus

## EXPERIENCE

**Software Engineering Intern (Machine Learning)** **May. 2024-Sep. 2024**

*Gridspace* *Los Angeles, CA*

- Improved the dialogue manager system for voice bots to reduce LLM calls by 50% for certain tasks
- Fine-tuned Llama 3 for several data parsing tasks using LoRA, reducing errors by 23% when compared with the previous model
- Developed tooling to allow users to automatically create voice agents (bots) to collect information based on a web form URL, simplifying the customer onboarding process

**Course Producer (TA)** **Jan. 2023-Present**

*University of Southern California* *Los Angeles, CA*

- Assisted in course production for over 400 students enrolled in DSCI 552: "Machine Learning for Data Scientists"
- Held weekly office hours to provide additional instruction on topics such as linear & logistic regression, SVMs, KNN, decision trees, ensemble methods, hidden markov models, etc.

**Student Worker (Machine Learning Research Intern)** **May 2023-Aug. 2023**

*USC Institute for Creative Technologies (ICT)* *Los Angeles, CA*

- Researched methods for augmentation of LLMs for multi-issue negotiation; Created a custom code base to evaluate the negotiation capabilities of custom agents in both agent-agent and human-agent interactions
- Utilized PyTorch to train GRU/LSTM models with reinforcement learning for strategy planning in negotiations
- Performed human evaluation experiments and statistical analysis on the performance of several custom negotiation agents; Created REST APIs using Flask to serve agent responses for evaluations

**Data Science Intern** **May 2022-Aug. 2022**

*AI Camp* *Palo Alto, CA*

- Mentored students in data science and machine learning; Oversaw groups of 4-6 students in rapid creation and iteration on original projects
- Aided students in applying data analysis/visualization techniques and machine learning models such as linear & logistic regression, SVMs, neural nets/MLPs, etc, to a diverse set of datasets

**Volunteer Researcher** **Jan. 2022-May 2022**

*Cleveland Clinic Lerner Research Institute* *Cleveland, OH*

- Developed an algorithmic CT scan augmentation process using OpenCV to improve cross-domain performance of an MRI segmentation model
- Tested algorithm using a dataset of 176, 3D DESS (double-echo steady-state) images collected from 16 patients at multiple hospitals; Improved Jaccard/IoU (intersection over union) score from 0.27 to 0.78

**Engineering Peer Teacher (TA)** **Jan. 2021-May 2022**

*Cleveland State University* *Cleveland, OH*

- Organized and led weekly study and review sessions and developing additional course materials to aid students
- Led lectures for "Introduction to Programming" and "Data Structures & Algorithms" at the professors' requests
- Awarded "EPT of the Month" for excellent student feedback and going above and beyond normal responsibilities

**Software Engineering Intern (Machine Learning)** **Jun. 2021-Aug. 2021**

*Tailwind* *Oklahoma City, OK*

- Created an image background removal tool which was used to add a custom background replacement feature to the company's flagship product
- Implemented the U2-Net model to perform foreground segmentation using TensorFlow
- Implemented an image background removal API using Amazon Web Services (AWS) Lambda functions in both TypeScript and Python

**IT Intern** **Jun. 2020-Jul. 2020**

*Dominion Energy* *Cayce, SC*

- Worked with a team to research and present on opportunities for Dominion Energy to become involved in electric vehicle charging
- Adapted to a sudden change of responsibilities due to Covid-19

## PUBLICATIONS

**Be Selfish, But Wisely: Investigating the Impact of Agent Personality in Mixed-Motive Human-Agent Interactions**
*EMNLP 2023*

- Investigated the impact of agent personality in mixed-motive human-agent negotiation interactions
- Developed a novel reinforcement learning based training methods for GRU models to elicit different negotiation personalities

## PROJECTS

**Preferential Accent Bias in Automatic Speech Recognition Models** **Jan. 2024-May 2024**

- Designed and executed experiments to analyze the impact of audio containing multiple accents on bias in modern ASR models
- Performed statistical analysis proving that while there is clear bias in ASR models, it is not exacerbated in the case multi-accent audio samples
- Implemented multiple large state-of-the-art ASR models (Canary, Wav2Vec2, Whisper) using Hugging Face and PyTorch to transcribe over 1500 hours of audio from the Common Voice 16 dataset

**Reproduction Study: MaRCo Text Detoxification - Controllable Revision with Experts and Anti-Experts** **Aug. 2023-Dec. 2023**

- Performed a reproduction study of the paper "Detoxifying Text with MaRCo: Controllable Revision with Experts and Anti-Experts", showing that reported results were not reproducible and highlighting issues with the original methodology
- Fine-tuned 2 instances of BART-Base to create toxic/non-toxic expert and anti-expert models using Hugging Face and the USC HPC Cluster
- Performed additional experiments to evaluate the efficacy of using smaller language models in the MaRCo algorithm

**Whole Slide Image Cancer Classifier** **Jan. 2023-May 2023**

- Developed a novel method for cancer classification in WSIs using multiple instance learning and graph convolutional networks
- Achieved an improvement of 10% in recall (0.86-0.96) and 4% in accuracy (0.91-0.95) for cancer detection compared to state-of-the-art methods

**Restaurant Recommender System** **Apr. 2023-May 2023**

- Developed a hybrid (feature combination) recommendation model using the Yelp Dataset to predict a user's rating for a given resturaunt
- Achieved 0.957 MSE in resturaunt rating (1 to 5 stars) prediction across users by training XGBoost, SVD, Co-clustering, KNN, and item-based collaborative filtering models; Implemented the item-based collaborative filtering model from scratch in Apache Spark (PySpark)

**Negotiation Agent with Custom Transformer Models** **Aug. 2022-May 2023**

- Led research project with 3 grad students, designed and trained transformer models for negotiation prediction
- Developed custom transformer-based model using Hugging Face library; achieved an F1-BERTScore of 0.88 and a BLEU-2 Score of 0.21 in dialogue response prediction for the CaSiNo negotiation dataset

**Reci-Pic Kitchen Assistant** **May 2022-Aug. 2022**

- Collaborated on the creation of AI-driven kitchen assistant app for ingredient recognition
- Trained YOLOv5 model with 73% accuracy to recognize 20 common kitchen ingredients
- Coded a cross platform (IOS and Android) application using React Native

**Cartoons vs. Real Life Image Classifier** **Jan. 2022-May 2022**

- Designed and implemented a novel deep learning model based on Feature Pyramid Networks with TensorFlow
- Collected an original dataset of over 16k cartoon and photographic images; Achieved 91% classification accuracy

**Congressional Bill Sentiment Analysis System** **Aug. 2021–May 2022**

- Created an automated system to gauge public sentiment on congressional bills using Twitter data
- Collected and stored over 14 million relevant tweets from the Twitter API using Python and MariaDB
- Utilized the Hugging Face library to train BERT model for sentiment analysis (classify tweet as positive, negative, or neutral), achieving 62% accuracy; Leveraged distant supervision to improve results to 78%
- Aggregated sentiment scores to generate quantitative metrics for public opinion on different congressional bills by population segment and other criteria (verified/unverified users, like-to-comment ratio, etc.)

## TECHNICAL SKILLS

**Languages:** Python, JavaScript/TypeScript, Java, C/C++ (exposure)
**Machine Learning/Data Science:** Deep Graph Library (DGL), Hugging Face (Accelerate, Transformers, Datasets), Matplotlib, NLTK, NumPy, OpenCV, Pandas, Pickle, PyTorch, Scikit-Learn, SciPy, TensorFlow, XGBoost
**Web Development:** Django, Flask, HTML/CSS, React
**Databases:** MongoDB, Redis, SQL (MySQL, PostgreSQL, SSMS)
**Other:** AWS (EC2, Lambda, S3), Conda, Docker, GCP, Git/GitHub, Hadoop, Kubernetes (exposure), LaTeX, Slurm, Spark

## LEADERSHIP AND INVOLVEMENT

**Society of Asian Scientists and Engineers (SASE)** **Jan. 2021-May 2022**

- Established a SASE chapter at Cleveland State University; Elected as Vice President
- Coordinated with fellow officers and representatives from sponsor company, FirstEnergy, to organize meetings and networking opportunities for members

**NCAA Division 1 Fencing Team** **Aug. 2018-May 2022**

- Managed a full-time course load while training 20 hours per week with the Cleveland State Varsity Fencing Team
- Qualified for and competed in NCAA Regional Championships in all 4 years