

Curriculum Vitae

Maximilian Du

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phone number redacted

Education

*September 2020—
Present* **Degree:** Bachelor of Computer Science, AI Track
Where: Stanford University, Stanford, CA
GPA: 4.093 of 4.0
CS Major Candidate (AI Track), Creative Writing Minor Candidate

*September 2016—
June 2020* **Degree:** High School Diploma
Where: Fayetteville-Manlius High School, Manlius, NY
GPA: 4.0 of 4.0

Relevant Courses

- ★ CS231N Deep Learning for Computer Vision (Spring 2022)
- ★ CS228 Probabilistic Graphical Models (Winter 2022, A+)
- ★ CS161 Design and Analysis of Algorithms (Winter 2022, A)
- ★ Psych 50 Cognitive Neuroscience (Winter 2022, A+)
- ★ CS110 Principles of Computer Systems (Fall 2021, A)
- ★ CS229 Machine Learning (Fall 2021, A)
- ★ CS109 Introduction to Probability for Computer Scientists (Spring 2021, A)
- ★ CS107E Computer Organization and Systems (Winter 2021, A+)
- ★ Math 113 Linear Algebra and Matrix Theory (Winter 2021, A)
- ★ Physics 14N Quantum Information (Winter 2021, A+)
- ★ CS106B Programming Abstractions (Fall 2020, A)
- ★ Math 51 Linear Algebra and Multivariable Calculus (Fall 2020, A+)
- ★ Integral Multivariable Calculus (2019-20, JHU Online, A+)
- ★ CSE488 Internet Security (2018-19, Syracuse University, A)
- ★ CSE484 Computer Security (2017-18, Syracuse University, A)

Relevant Skills

Artificial Intelligence and Robotics

Research Experience: Behavior Cloning, DAGGER, Model-Free RL, Franka-Emika Panda Robot, Oculus Quest Robot Control, MuJoCo, Robosuite

Other Academic Experience: Probabilistic Graphical Models, Image Models, Adversarial Generation, Variational Inference, Inverse RL, Meta-Learning, Model-Based RL

Languages and Libraries

Experienced: Python, Numpy, Matplotlib, PyTorch, L^AT_EX

Knowledgeable: C, C++, Tensorflow

Cursory Knowledge: HTML, CSS, JavaScript, SQL

Writing and Content Delivery

Experienced: Research & Educational Presentations, Narrative Interviews

Knowledgeable: Research Writing, Creative Non-Fiction, Poetry

Software and Content Creation

Experienced: Audio Recording, Large Archival Databases (Zotero), Photography & Photoshop

Knowledgeable: Video Editing (Premiere Pro), Autodesk Inventor

Cursory Knowledge: Autodesk Eagle, Graphic Design

Electronics

Experienced: THT Soldering, PCB Design, Rapid Prototyping, Arduino

Knowledgeable: Analog Circuit Theory, SMD Soldering, Raspberry Pi

Work, Teaching, and Volunteer Experience

January 2021— **Position:** CS 106A/B Section Leader
Present **Where:** Stanford University

Led weekly instructive “sections” for the popular CS106A/B Stanford course series. Answered conceptual questions and guided students through coding problems. Also helped grade assignments and exams.

January 2021— **Position:** CURIS Participant and IRIS Lab Researcher
Present **Where:** Stanford University

Worked on a Model-Free Reinforcement Learning project under the supervision of Suraj Nair and Prof. Chelsea Finn of the IRIS (*Intelligence through Robotic Interaction at Scale*) Lab

November 2021— **Position:** Stanford Splash Lecturer
Present **Where:** Stanford University

Gave lectures to high school students on the connections between animal training and reinforcement learning.

October 2020— **Position:** Student Advisory Board
Present **Where:** Stanford University

Helped give feedback on the institutionally-required courses given to first-year students

Selected Research

Project: Learning Smarter from Mistakes: Reweighing Demonstrations through Expert Interventions [tentative title]

When: January 2022—Present

Where: Stanford University

Advisors: Suraj Nair / Chelsea Finn

Contributions/Accomplishments:

- Intends to show that we can increase data efficiency by using expert interventions to reweigh existing expert demonstrations and retraining on the weighted dataset

Project: Play it by Ear: Learning Skills amidst Occlusion through Audio-Visual Imitation Learning

When: January 2021—January 2022

Where: Stanford University

Advisors: Suraj Nair / Chelsea Finn

Contributions/Accomplishments:

- Demonstrated that audio data can augment visual and proprioceptive data to improve success rates in certain tasks, like extracting keys from a bag
- Used MuJoCo, Robosuite, and Pytorch to run reinforcement learning & behavior cloning algorithms in simulation and on a Franka-Emika Panda robot
- Proposed an encoder architecture that incorporates audio spectrogram data
- Developed a data pipeline for Oculus Quest demo collections that was later adopted by other researchers.

Project: Monitoring Human Activity with Wi-Fi Metadata

When: June 2019—March 2020

Where: Manlius, NY

Contributions/Accomplishments:

- Used Channel State Information from normal Wi-Fi transmissions to infer the status of a person inside a room (working, sleeping, walking, and fall accident)
- Trained convolutional neural networks (CNNs) to use the phases and magnitudes of the signal subcarriers to make reasonable inferences

Project: Improving LSTM Neural Networks for Better Short-Term Wind Power Predictions

When: June 2018—November 2019

Where: Stony Brook University, Stony Brook, NY

Advisors: advisors redacted

Contributions/Accomplishments:

- Demonstrated that a modified LSTM can be used to accurately predict short-term wind power outputs

- Proposed a metric to measure the amount of “Naiveity” of the trained models
- Collected, processed, and combined databases of wind power and weather forecast data (totaling to around 3 terabytes of raw information)

Project: Breath Detection and Monitoring System Through Recurrent Neural Networks

When: June 2017—May 2018

Where: Manlius, NY

Contributions/Accomplishments:

- Designed and trained a machine learning model to detect breathing sounds and run statistical analyses to detect abnormal breathing cycles
- Designed and fabricated a low-cost parabolic microphone assembly and denoising amplifier circuit

Publications

- ★ Submission to RSS 2022 (results pending)
- ★ Maximilian Du. “Improving LSTM Neural Networks for Better Short-Term Wind Power Predictions”. In: *2019 IEEE 2nd International Conference on Renewable Energy and Power Engineering (REPE)*. 2019, pp. 105–109
- ★ Maximilian Du. “Application of Autoencoder-Assisted Recurrent Neural Networks to Prevent Cases of Sudden Infant Death Syndrome”. In: (2019). DOI: 10.13140/RG.2.2.28868.48002. eprint: [arXiv:1904.12386](https://arxiv.org/abs/1904.12386)

Relevant Honors and Awards

- ★ Stanford Lunsford Award for Oral Presentation of Research Finalist (2022)
- ★ National Regeneron Science Talent Search Scholar (2020)
- ★ Discovery Education “Making for Good Challenge” National Second Place (2020)
- ★ American Invitational Mathematics Examination (AIME) Qualifier (2020)
- ★ Finalist of Intel International Science & Engineering Fair, with various special awards (2018 and 2019)

Extracurriculars

Creative Non-Fiction Writing & Oral History

Member of Stanford Storytelling Project. Doing fieldwork and archival research for a narrative nonfiction book on captive killer whales, advised by Stanford DCI fellow Melissa Dyr Dahl and Professor Jonah Willihnganz.

Photography

Experimentative and classical photographic techniques. Specializes in nature and night photography. Portfolio can be found on personal website.