Curriculum Vitae

Maximilian Du

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EDUCATION

Stanford University **Sept 2020—Present**
Bachelor of Computer Science (AI Track) + Creative Writing Minor (Prose)
GPA: 4.103

Fayetteville-Manlius High School **Sept 2016—Jun 2020**
High School Diploma
GPA: 4.0

PUBLICATIONS

- Maximilian Du et al. "Play It by Ear: Learning Skills amidst Occlusion through Audio-Visual Imitation Learning". In: *Robotics: Science and Systems XVIII*. Robotics: Science and Systems 2022. June 27, 2022. URL: https://arxiv.org/abs/2205.14850
- 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

RESEARCH PROJECTS

Rewatching the Lecture: Reweighing Demonstrations through Expert Interventions **Jan 2022—Present**
Advised by Suraj Nair, Chelsea Finn & Dorsa Sadigh
- Demonstrated that we can use state-action embeddings to select relevant demonstrations from a mixed-quality (and potentially adversarial) dataset

Play it by Ear: Learning Skills amidst Occlusion through Audio-Visual Imitation Learning **Jan 2021—Jan 2022**
Advised by Suraj Nair, Chelsea Finn
- 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.

Sixteen Pixels is (Almost) All You Need: Crafting Parameterized Image Uncrumpling Models **Jun 2022**
CS 231N Final Project
- Modified the Pix2Pix algorithm to take in a crumpled image and output its uncrumpled form
- Proposed a smaller PatchGAN architecture that qualitatively outperforms existing PatchGAN architectures
- Procedurally generated crumpled images using Python and Blender (a 3D rendering engine) to efficiently procure large training dataset

Improving LSTM Neural Networks for Better Short-Term Wind Power Predictions **Jun 2018—Nov 2019**
Advised by Joshua Comden, Zhenhua Liu
- Demonstrated that a modified LSTM can be used to accurately predict short-term wind power outputs
- Proposed new metrics to measure performance of time series models
- Collected, processed, and combined large (3TB) databases of wind power and weather forecast data

TECHNICAL SKILLS

Languages and Libraries: Python, PyTorch, Tensorflow, Numpy, Matplotlib, Pandas, Tkinter, C++, C, HTML

Codebase/API Familiarity: Robosuite, Robomimic, DrQ, Oculus Quest, SLURM

Areas: Behavior Cloning, Model-Free RL, Computer Vision, Probabilistic Graphical Models, Variational Inference

Tools: Franka-Emika Panda Robot, Git, Unix, LaTeX, Terminal, Zotero, Adobe Illustrator / Photoshop / Premiere Pro / Lightroom, Autodesk Inventor, THT/SMD Hand Soldering, Oscilloscope, Spectrum Analyzer, Arduino

Other Skills: Narrative Interviews (20+ hours), Audio Production, Educational Presentations, Public Speaking, Creative Non-Fiction, Fiction, Poetry

HONORS AND AWARDS

- CS231N Final Project Winner Spring 2022 (out of 370+ students)
- Finalist of the Stanford Lunsford Award for Oral Presentation of Research (2022)
- CS109 Final Project Winner Spring 2021 (out of 200+ students)
- National Regeneron Science Talent Search Scholar (2020)
- Discovery Education "Making for Good Challenge" National Second Place (2020)
- Finalist of Intel International Science & Engineering Fair, with various special awards (2018 and 2019)

EXPERIENCES

CS 106A/B Section Leader (TA) **Jan 2021—Present**
Stanford Computer Science Department

- 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.

CURIS Participant and IRIS Lab Researcher **Jan 2021—Present**
Stanford Artificial Intelligence Laboratory

- Worked on multiple projects under the supervision of Suraj Nair, Prof. Chelsea Finn, and Prof. Dorsa Sadigh of the Intelligence through Robotic Interaction at Scale (IRIS) Lab. Hosted group meetings for undergraduates.

Stanford Splash Lecturer **Nov 2021—Present**
Stanford Splash

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

Producer & Writer **Jun 2022—Present**
Stanford Storytelling Project

- Doing fieldwork and archival research for a creative nonfiction book and audio story on whale trainers, advised by Stanford DCI fellow Melissa Dyrdahl and Prof. Jonah Willihnganz. Collecting tens of hours of interviews and 3500+ archival documents.

COURSEWORK

Computer Science

- CS 330 Deep Multi-task and Meta Learning (Fall 2022)
- CS 231N Deep Learning for Computer Vision (Spring 2022, A)

- CS 228 Probabilistic Graphical Models (Winter 2022, A+)
- CS 229 Machine Learning (Fall 2021, A)
- CS 285 Deep Reinforcement Learning (Berkeley, self-study)
- CS 109 Introduction to Probability for Computer Scientists (Spring 2021, A)
- CS 161 Design and Analysis of Algorithms (Winter 2022, A)
- CS 110 Principles of Computer Systems (Fall 2021, A)
- CS 107E Systems from the Ground Up (Winter 2021, A+)
- CS 106B Programming Abstractions in C++ (Fall 2020, A)

Mathematics

- Math 115 Real Analysis (Fall 2022)
- Math 113 Linear Algebra and Matrix Theory (Winter 2021, A)
- Math 51 Linear Algebra and Multivariable Calculus (Fall 2020, A+)
- EE 263 Linear Dynamic Systems (self-study)
- Physics 14N Quantum Information (Winter 2021, A+)
- Integral Multivariable Calculus (2019-20, JHU Online, A+)

Psychology

- Psych 30 Introduction to Perception (Fall 2022)
- Psych 50 Cognitive Neuroscience (Winter 2022, A+)
- Psych 1 Introduction to Psychology (Spring 2022, A)

Writing, Literature, & Philosophy

- English 127A Moby Dick & The Role of Animals in Fiction (Spring 2022, A+)
- Phil 2 Ethical Philosophy (Spring 2021, A)
- English 190 Intermediate Fiction (Spring 2022, A+)
- English 91 Introductory Creative Non-Fiction (Spring 2021, A)
- English 92 Introductory Poetry (Fall 2021, A)