Mandy Lu

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EDUCATION

Stanford University   Stanford, CA
M.S, Computer Science   Dec 2021
Thesis: *Vision-Based Estimation of MDS-UPDRS Gait Scores for Assessing Parkinson's Disease Motor Severity*
Advisors: Prof. Fei-Fei Li, Prof. Juan Carlos Niebles

Stanford University   Stanford, CA
B.A., Mathematics   Jun 2020
B.S., Computer Science   Jun 2020
Advisors: Prof. Ehsan Adeli, Prof. Kilian M. Pohl

WORK AND RESEARCH EXPERIENCE

Google   Mountain View, CA
Research Software Engineer, Google Research   Aug 2021 – Present
- Technical lead of ML operations for an agriculture foundation model to accelerate the development of climate-resilient crops (partial assignment in Nairobi, Kenya)
- Data analysis and development of predictive models for anticipatory aid distribution

Full Stack Software Engineer, Google Scholar
- Launched first generative AI/LLM features in Google Scholar, leading the full product lifecycle from research to production, resulting in 40%+ increase in user engagement.
- Optimized search efficiency for review-seeking and short queries, impacting over 50% of user searches, and introduced a new filter for reviews

Software engineering intern, Google Search   Jun 2020 – Sep 2020
- Developed extension of Knowledge Graph models using topic encoding

Software engineering intern, Google Medical Brain   Jun 2019 – Sep 2019
- Implemented an API to manage medical labeling databases
- Identifying physician bias when labeling retina lesions

Stanford Vision Lab   Stanford, CA
Graduate Researcher (Lab of Prof. Fei-Fei Li)   Sep 2019 – Dec 2021
- Investigated statistical techniques and modeling methods to remove the effect of dataset bias and confounding variables during ML model training

Computational Neuroscience Lab
Graduate Researcher (Lab of Prof. Kilian M. Pohl)   Sep 2019 – Aug 2021
- Explored the use of computer vision and machine learning methods for quantitative assessment of Parkinson's disease on small and noisy medical datasets with multiple labels.

Center for AI in Medicine and Imaging (AIMI)   Stanford, CA

Undergraduate Researcher (Lab of Prof. Andrew Ng)   Sep 2018 – Dec 2019
- Explored deep learning for abnormality detection in lower body radiographs, evaluating its potential for clinical application

Apple   Cupertino, CA
Software Engineer   Jun 2018 – Sep 2018
- Developed ML algorithms for video analysis with prototypes for macOS and iOS

Nvidia   Santa Clara, CA
Software Engineer   Jun 2017 – Sep 2017
- Designed and implemented GPU-facing systems for Jetson TX2 embedded AI device
- Built C/C++ backend for pixel-level process to support deep color in Tegra's camera drivers

PEER-REVIEWED PUBLICATIONS

1. **Metadata Normalization.**
   Conference on Computer Vision and Pattern Recognition (CVPR), pp. 10917-10927, 2021.
   Mandy Lu*, Qingqyu Zhao, Jiequan Zhang, Kilian M Pohl, Li Fei-Fei, Juan Carlos Niebles, Ehsan Adeli.
2. **Quantifying Parkinson's Disease Motor Severity Under Uncertainty Using MDS-UPDRS Videos.**
   Medical Image Analysis, vol 73, 102179, 2021.
   Mandy Lu*, Qingyu Zhao, Kathleen L Poston, Edith V Sullivan, Adolf Pfefferbaum, Marian Shahid, Maya Katz, Leila Montaser Kouhsari, Kevin Schulman, Arnold Milstein, Juan Carlos Niebles, Victor W Henderson, Li Fei-Fei, Kilian M Pohl, Ehsan Adeli.
3. **Automatic Estimation of MDS-UPDRS Gait Scores from Videos with Multi-Rater Disagreements.**
   Movement Disorders Society Congress, 2021.
   Ehsan Adeli, Edith V Sullivan, **Mandy Lu***, Qingqu Zhao, L Montaser Kouhsari, Maya Katz, Adolf Pfefferbaum, Kilian M Pohl, Victor W Henderson, Kathleen Poston.
4. **Vision-based Estimation of MDS-UPDRS Gait Scores for Assessing Parkinson's Disease Motor Severity.**
   Medical Image Computing and Computer-Assisted Intervention (MICCAI), Springer-Verlag, Lecture Notes in Computer Science, vol. 12263, pp 637-647, 2020.
   Mandy Lu*, Kathleen Poston, Adolf Pfefferbaum, Edith V Sullivan, Li Fei-Fei, Kilian M Pohl, Juan Carlos Niebles, Ehsan Adeli.
5. **Automated abnormality detection in lower extremity radiographs using deep learning.**
   Nature Machine Intelligence, vol. 1, issue 12, pp 2019.
   Maya Varma, **Mandy Lu***, Rachel Gardner, Jared Dunnmon, Nishith Khandwala, Pranav Rajpurkar, Jin Long, Christopher Beaulieu, Katie Shpanskaya, Li Fei-Fei, Matthew P Lungren, Bhavik N Patel.

PATENTS

U.S. Patent Application 63037526.

Estimation of Parkinson's Disease Gait Impairment Severity from Videos Using MDS-UPDRS. Ehsan Adeli-Mosabbeb, **Mandy Lu***, Kathleen Poston, Juan Carlos Niebles, filed June 10, 2020. Patent Pending.

HONORS & AWARDS

Runner-up of Elsevier Medical Image Analysis Best Paper Award	2021
Best Paper Award at MICCAI 2020 (1800 submissions)	2020
Student Award at MICCAI (STAR)	2020
Stanford Writing in Major (WIM) Fellow	2019
Presidential Scholar	2016
National Merit Semifinalist	2015
Hoar Prize for Excellence in American History	2015

TEACHING EXPERIENCE

Stanford University   Stanford, CA

Graduate Teaching Assistant - Computer Science

CS231N: Deep Learning in Computer Vision	Spring 21
CS224N: Natural Language Processing	Winter 19, Winter 20
CS224U: Natural Language Understanding	Spring 20
CS161: Design and Analysis of Algorithms	Spring 20
CS109: Probability	Fall 20

Undergraduate Teaching Assistant - Bioengineering

BIOE131: Bioengineering Ethics	Spring 19

Undergraduate Section Leader - Computer Science

CS106B: Programming Abstractions	Winter 18, Spring 18
CS106A: Programming Methodology	Fall 18

PUBLICLY AVAILABLE SOFTWARE

Algorithms Accompanying Publications.
Lu M* et al.: Metadata Normalization   2021
Conference on Computer Vision and Pattern Recognition (CVPR)
https://github.com/mlu355/MetadataNorm

Lu M* et al.: Quantifying Parkinson's Disease Motor Severity Under Uncertainty Using MDS-UPDRS Videos   2020
Medical Image Analysis (MEDIA) and
Lu M* et al.: Vision-based Estimation of MDS-UPDRS Gait Scores for Assessing Parkinson's Disease Motor Severity,
Medical Image Computing and Computer-Assisted Intervention (MICCAI)

PROFESSIONAL AFFILIATIONS AND SERVICE

HandsOn Bay Area Volunteer   2022 – Present
- Actively engaged in diverse volunteer projects supporting local nonprofits and schools, including food distribution and supporting elementary school initiatives.

Women in Computer Science (WICS) - Stanford   2016 – 2021

Rewriting the Code - Student Council   2017 – 2019
- Founding member and student ambassador of the RTC student council, a peer-to-peer network of women in tech that has grown to over 25,000 members across 110+ countries.
- Supported and provided opportunities for college women in tech, helping to pave the way for sustainable careers, professional advancement, and equal opportunities.

Code in Place Teacher   2020 – 2021
- Volunteered as a teacher for Stanford's Code in Place initiative, offering a free online introduction to programming with Python. Contributed to a program that has reached over 30,000 students in three years to making coding education accessible to everyone.

ESSO (Exeter Student Service Organization) - Club Head   2013 – 2016
- Ran an organization providing free tutoring in a variety of subjects to support development of local children in New Hampshire. Personally tutored kids in math, chess, and piano.
- Established and ran a free local chess club, fostering a love for the game and providing a space for children to connect and develop strategic thinking skills.

Little Stars Foundation   2007 – 2016
- Founding member of a 501(c)3 non-profit focused on enriching the lives of children and seniors through music, mentorship, and technology initiatives.
- Coordinated music outreach programs, bringing performances and companionship to elderly residents at nursing homes and senior centers.

PROJECTS

Medical Device Report Classification Using Deep Covariance Resolution / SNORKEL   2019
- Applied research project with Stanford HAZY Lab using weakly supervised programmatic labeling techniques via to perform text classification on FDA medical device reports.
- Collaborated with the International Consortium of Investigative Journalists (ICIJ).

DeformSketchNet: Using Deformable Convolutional Networks for Sketch Classification   2018

AI Music Generation (with Generative Adversarial Networks)   2017
- Created a convolutional generative adversarial model that takes as input a genre (represented as a list of MIDI tracks) and generates music of that genre.

Built Computer from Logic Gates   2014
- Used logic gates to build a computer from its basest levels of abstraction.
- Built RAM, Memory, CPU with physical components by hand.

Animatronic Hand   2014
- Engineered an animatronic hand to mimic the motions of a sensor glove up to 50 feet away through Bluetooth from an Arduino, fishing line, flex sensors, rotors and plastic pipes.