JIZHOU HUANG

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EDUCATION

PhD Candidate in Computer Science *Sept. 2019 – now*
Washington University in St. Louis, St. Louis, Missouri

Visiting Scholar at Simon's Institute *Aug. 2022 – May 2023*
University of California, Berkeley, California

MS in Computer Science and Electrical Engineering *Sept. 2016 – May 2019*
Washington University in St. Louis, St. Louis, Missouri

BE in Automation *Sept. 2011 – May 2015*
Beijing Jiaotong University, Beijing, China

RESEARCH EXPERIENCE

Doctor's Research *Jan. 2020 – now*
Fairness Auditing, Washington University in St. Louis *Supervisor: Brendan Juba*

- Studied the problem of "fairness auditing" for statistical subgroups, e.g., historical minorities.
- Proved that auditing for subgroups defined by Linear Threshold Functions (halfspaces) is computationally hard even under Gaussian distribution. (in collaboration with Daniel Hsu)
- Developed a nearly polynomial-time auditing algorithm for subgroups on homogeneous halfspaces under Gaussian distribution with provable guarantees. (in collaboration with Daniel Hsu)

Master's Research *Oct. 2016 – May 2019*
Learning Low-Energy Neural Networks, Washington University in St. Louis *Supervisor: Brendan Juba*

- Studied the learnability of the threshold-gate neural networks with low energy complexity.
- Modeled the low-energy neural networks as a quadratic boolean-real programming of polynomial size.
- Designed an novel algorithm based on clustering methods and geodesic optimization, which is able to learn the low-energy neural networks efficiently.

PROFESSIONAL SKILLS

Python, Pytorch, Presto, MySQL, Bash, MATLAB, C/C++

Work Experience

Machine Learning Engineer Intern at Meta *May 2023 – Aug. 2023*
Path-Based Trigger Network, MRS AI Recommendation - Retrieval *Mentor: Na Zhang*

- Created a trigger net retrieval model to enhance Facebook Reels recommendations, facilitating user engagement with items by analyzing their previously engaged items.
- Established a corresponding serving module for the trigger net, enabling the generation of user-specific recommendations. Additionally, developed an offline testing system to validate the model's accuracy and effectiveness.
- Proposed and implemented a novel variant of the trigger net using Gram-Schmidt decomposition, resulting in reduced training loss compared to the baseline model.
- Orchestrated Quality Enhancement (QE) experiments for both models and refined them based on valuable user feedback.

Machine Learning Engineer Intern at Meta *May 2022 – Aug. 2022*
Multi-interest Retrieval, Recommendation Core ML team *Mentor: Wei Chang*

- Worked on building new deep learning models to capture different human interests at retrieval stage for Facebook reels recommendation.
- Built and trained a deep learning model consist of multiple sparse neural networks using PyTorch.
- Wrote a Presto script to analyze the pair-wise correlations between individual neural networks.
- Built and evaluated other state-of-art models using multiple neural networks, such as attention networks.

Teaching Assistant *Aug. 2021 – Dec. 2021*
Washington University in St. Louis *Mentor: Brendan Juba*

- Taught a few lectures in the class CSE 513T, Theory of Artificial Intelligence and Machine Learning.
- Graded students' homework and held weekly TA sessions to answer students' questions.

PUBLICATIONS

- D. Hsu, **J. Huang**, and B. Juba. Distribution-Specific Auditing For Subgroup Fairness. The 5th annual Symposium on Foundations of Responsible Computing, Cambridge, MA, USA, 2024.

WORKSHOPS

- Daniel Hsu, **Jizhou Huang**, and Brendan Juba. Auditing Subgroup Fairness on Nice Distributions. In *NSF Fairness in AI PI Meeting*, Arlington, VA, USA, 2023.

PROJECTS (at Washington University in St. Louis)

An Approximation Algorithm for Metric Labeling Problem *Spring 2018*

- Deisgned an efficient approximation algorithm based on an state-of-art optimization method to solve the Metric Labeling Problem of binary labels.

Semidefinite Programming Solver *Spring 2018*

- Implemented a semidefinite programming solver which combined Phase-I and Barrier methods to solve semidefinite programs with infeasible start points in MATLAB.

Intelligent Game Agent by Reinforcement Learning *Fall 2017*

- Partially designed and implemented an intelligent Pac-Man player using a modified Q-learning algorithm in Python, which could play and win multiple types of Pac-Man games.

Spine Position Prediction for CT Volume Scans *Spring 2017*

- Tried several models to learn a predictor for estimating relative location of human spines using 3500 CT images for the "relative location of CT slices on axial axis" dataset on UCI.
- Implemented a Bayesian algorithm to learn a two-layer Gaussian Process network on MATLAB, and achieved a test error $2.12mm$ (in $180mm$ scale) on a dataset of 1350 images.