Yifei He

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EDUCATION

University of Illinois Urbana-Champaign (UIUC) Urbana, IL, USA
M.S. in Computer Science (Thesis Track) Aug 2021 - May 2023 (expected)
Advisor: Prof. Han Zhao
GPA: 3.92/4.00

University of Michigan (UM) Ann Arbor, MI, USA
B.S.E. in Data Science, minor in Mathematics Aug 2019 - Apr 2021
GPA: 3.93/4.00

Shanghai Jiao Tong University (SJTU) Shanghai, China
B.S.E. in Electrical and Computer Engineering Sept 2017 - Aug 2021

RESEARCH EXPERIENCE

Generative Gradual Domain Adaptation Mar 2022 - Present
Advisor: Prof. Han Zhao, Department of Computer Science, UIUC
The performance of one-off domain adaptation methods degrades when source and target distance is large. This work provides a novel framework to generate intermediate domains useful for gradual domain adaptation.

- Estimate the Wasserstein geodesic connecting the source and target by solving the optimal transport problem
- Use generative models (VAEs and CLIP) to generate intermediate data along the geodesic
- Apply gradual self-training for sequential adaptation from source towards target

Multimodal Learning Aug 2021 - Present
Advisor: Prof. Han Zhao, Department of Computer Science, UIUC
Information is often conveyed by various modalities, such as texts and images. The project aims at theoretically answering how to select the most informative subset of modalities given computational constraints.

- Propose a novel reduction-of-loss framework to quantify the utility of a set of modalities
- Prove that the defined utility function is approximately submodular under proper assumptions
- Implement a classical greedy maximization algorithm and prove the performance guarantee

Reinforcement Learning (RL) for Sequential Conformer Search July 2020 - Apr 2021
Advisor: Prof. Ambuj Tewari, Department of Statistics, UM
Conformer search is a computational chemistry problem aiming at finding the most stable physical structure of large molecules. We apply RL algorithms to efficiently tackle the problem of intractable searching space.

- Improve model interpretability by visualizing the training process with NGLView
- Implement a transformer network to evaluate the sequence of actions performed by the RL agent

Deep Learning for Multi-Event Survival Analysis Apr 2020 - Sept 2020
Advisor: Prof. Jenna Wiens, Department of Computer Science and Engineering, UM
Survival analysis models the probabilities of multiple events occurring at several time points. We apply multi-task and hierarchical learning to better model the inter- and intra-event relations.

- Design a hierarchical multi-task neural network to learn survival curves of related events, which uses coarse predictions to iteratively guide predictions at finer time scales
- Conduct experiments on the ADNI dataset to evaluate model performance

PUBLICATIONS (* denotes equal contribution)

[1] **Yifei He***, Haoxiang Wang*, Han Zhao. "Generative Gradual Domain Adaptation with Optimal Transport." *Under review.*
[2] **Yifei He***, Runxiang Cheng*, Gargi Balasubramaniam*, Yao-Hung Hubert Tsai, Han Zhao. "Greedy Modality Selection via Approximate Submodular Maximization." In *Proceedings of the 38th Conference on Uncertainty in Artificial Intelligence.* (UAI 2022)
[3] Donna Tjandra, **Yifei He**, Jenna Wiens. "A Hierarchical Approach to Multi-Event Survival Analysis. " In *Proceedings of the 35th AAAI Conference on Artificial Intelligence.* (AAAI 2021)

TEACHING EXPERIENCE

CS 357 Numerical Methods I (UIUC)	2022 Fall, 2022 Spring
CS 441 Applied Machine Learning (UIUC)	2021 Fall
EECS 445 Intro to Machine Learning (UM)	20 Fall

HONORS & AWARDS

James B. Angell Scholar (UM), Dean's List (UM), University Honors (UM)

SOFTWARE SKILLS

Programming: Python, Java, C++, Matlab, R, SQL, JavaScript, HTML, LaTeX, Mathematica
Framework: PyTorch, TensorFlow, Gym, Hadoop, Flask