

YIFEI HE

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EDUCATION

University of Illinois Urbana-Champaign (UIUC)

M.S. in Computer Science (Thesis Track)

Advisor: Prof. Han Zhao

GPA: 3.83/4.00

Urbana, IL, USA

Aug 2021 - May 2023 (expected)

University of Michigan (UM)

B.S.E. in Data Science, minor in Mathematics

GPA: 3.93/4.00

Ann Arbor, MI, USA

Aug 2019 - Apr 2021

Shanghai Jiao Tong University (SJTU)

B.S.E. in Electrical and Computer Engineering

Shanghai, China

Sept 2017 - Aug 2021

RESEARCH EXPERIENCE

Multimodal Representation Learning

Aug 2021 - Present

Advisor: Prof. Han Zhao, Department of Computer Science, UIUC

Information is often conveyed by various modalities, including text, image and sound. The project aims at theoretically answering why more modalities are better and how to select the most useful modalities.

- Propose a reduction-of-loss framework to prove that including more modalities of an object always helps improve performance and quantify the improvement by mutual information
- Perform submodular optimization to efficiently select a near-optimal subset of modalities using a greedy algorithm
- Conduct experiments on multivariate time-series dataset

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. RL algorithms can efficiently tackle the problem of intractable searching space.

- Visualize the training process with NGLView to improve interpretability of the model so that domain experts can intuitively understand and guide the training accordingly
- Implement a transformer network with PyTorch and Gym to output a score of the RL agent based on its previous actions, which can enhance its self-adjustment ability

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 (survival curves). Deep learning approach can avoid assumptions on underlying distributions.

- 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 the model performance, obtaining a 16% increase in C-index compared with the current state-of-the-art models

PUBLICATION

[1] Tjandra, D., He, Y., & Wiens, J. (2021). "A Hierarchical Approach to Multi-Event Survival Analysis. " *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI 2021)*.

TEACHING EXPERIENCE

CS 357 Numerical Methods I (UIUC)

Jan 2022 - May 2022

Graduate Teaching Assistant

Instructor: Prof. Mariana Silva

CS 441 Applied Machine Learning (UIUC)

Aug 2021 - Dec 2021

Graduate Teaching Assistant

Instructors: Prof. Marco Morales Aguirre

EECS 445 Intro to Machine Learning (UM)

Aug 2020 - Dec 2020

Instructional Aide

Instructor: Dr. Sindhu Kutty

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

Framework: PyTorch, Tensorflow, Gym, Hadoop, Flask

Others: L^AT_EX, Origin, Mathematica

VOLUNTEER EXPERIENCE

World Artificial Intelligence Conference 2018 (Shanghai, China)

Sept 2018