

## QUALIFICATIONS

- Several publications at **NeurIPS**, **AAAI**, and the top-tier journal published by **Nature Publishing Group**.
- Strong knowledge of theory, practice, and research experience on **explainable deep neural networks-based recommendation system** with an emphasis on self-attention module, deep learning for MRI diagnostics, click-through rate Prediction and **reinforcement learning** focusing on the stochastic contexture bandit problem and monte carlo tree search.
- Proficient in Python and C++, with advanced expertise in machine learning frameworks including PyTorch, Caffe, Scikit-learn, LightGBM, and XGBoost, complemented by strong capabilities in data manipulation using Numpy, Pandas and Boost C++.

## EDUCATION

- 2018–Present **Ph.D – Machine Learning**, *Department of Computer Science and Engineering*, Univeristy of Connecticut, Storrs, CT, GPA 4.0/4.0.
- 2014–2017 **M.A. – Computer Science and Technology**, Northeastern University – Shenyang, China.  
Thesis: Research and Application of Algorithm on Knowledge Learning from Expert Game Records of Go
- 2010–2014 **B.S. – Computer Science and Technology**, Northeastern University – Shenyang, China.  
Thesis: Design and Implementation of Script-Based Information System

## RESEARCH EXPERIENCE

- 2019–Present **Research Assistant: Interpretable Deep Neural Network for Recommender Systems**, *University of Connecticut, Storrs, Connecticut*.
- Designed and implemented Polyhedron Attention Module, an **interpretable self-attention model** for deep neural networks, to learn interaction effects adaptively. Conducted experiments to examine the learned interaction effects in predicting brain age with brain white volumes, and showed the proposed module's state-of-the-art performance ( $\sim 3X$  improvement compared with the second-best algorithm) on Criteo and Avazu, two massive datasets of the **Click-through Rate Prediction**, a critical task in the recommender system. This work was accepted by **NeurIPS 2023 (Accept Ratio: 26.1%)**.
  - Developed deep neural networks diagnosing alcohol/nicotine use disorder with MRI images, which leveraged interpretable knowledge of brain networks and alcohol/nicotine biotypes to enhance performance. Two papers of this work were published in **Translational Psychiatry 2022 (by Nature Publishing Group, Q1 journal)** and **Biological Psychiatry: Cognitive Neuroscience and Neuroimaging 2023 (Q1 journal)**.
- 2018–2021 **Research Assistant: Optimization and Convergence Analysis in Deep Reinforcement Learning**, *University of Connecticut, Storrs, CT*.
- Proposed a stage-wised optimization algorithm for *deep stochastic contextual bandits problem*. Performed theoretical analysis and extensive experiments to demonstrate the effectiveness and efficiency of the proposed algorithm. This work was accepted by **AAAI 2021 (Accept Ratio: 21.1%)**.
- 2014 – 2017 **Research Assistant: Key Algorithm Research in High Complex Game Problem Based on Deep Learning**, *Northeastern University, Shenyang, China*.
- Proposed Belief-state Monte-Carlo Tree Search, a searching framework used in imperfect information games, which was published in **IEEE Symposium on Computational Intelligence and Games 2015** and **IEEE Transactions on Games 2017**.
  - Participated in the theoretical analysis and conducted the experiment of Only-One-Victor, an algorithm proposed for pattern learning in the Go game. This work was published in **IEEE Transactions on Games 2015**.

## SELECTED PUBLICATIONS (7/18)

- 2023 [1] **Tan Zhu**, et al. "Polyhedron Attention Module: Learning Adaptive-order Interactions." NeurIPS 2023, (**A<sup>+</sup> conference**).
- 2023 [2] **Tan Zhu**, et al. "Machine Learning of Functional Connectivity to Biotype Alcohol and Nicotine Use Disorders." Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 2023, (**Q1 journal, impact factor: 5.9**).
- 2023 [3] Fei Dou, Jin Lu, **Tan Zhu**, et al. "On-Device Indoor Positioning: A Federated Reinforcement Learning Approach With Heterogeneous Devices." IEEE Internet of Things Journal, 2023, (**Q1 journal, impact factor: 9.9**).
- 2022 [4] **Tan Zhu**, et al. "Identifying alcohol misuse biotypes from neural connectivity markers and concurrent genetic associations." Translational Psychiatry 12, no. 1 (2022): 253, (**Q1 journal, by Nature Publication Group, impact factor: 7.9**).
- 2022 [5] Qianqian Tong, Guannan Liang, Jiahao Ding, **Tan Zhu**, et al. "Federated Optimization of 0-norm Regularized Sparse Learning." Algorithms 15, no. 9 (2022): 319, (**Q2 journal**).
- 2021 [6] **Tan Zhu**, et al. "An Efficient Algorithm for Deep Stochastic Contextual Bandits." In Proceedings of the AAAI Conference on Artificial Intelligence, vol. 35, no. 12, pp. 11193-11201. 2021, (**A<sup>+</sup> conference**).
- 2019 [7] Chunjiang Zhu, **Tan Zhu**, et al. "Communication-optimal distributed dynamic graph clustering." In Proceedings of the AAAI Conference on Artificial Intelligence, vol. 33, no. 01, pp. 5957-5964. 2019, (**A<sup>+</sup> conference**).