Yule Wang

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Education

Georgia Institute of Technology, Atlanta, GA, USA. Aug. 2022 – Jun. 2026 (Expected)
Doctor of Philosophy - Machine Learning

- **Ph.D. Advisor**: Prof. Anqi Wu.
- **Department**: School of Computational Science and Engineering (CSE).
- **Research Topics**: Statistical Machine Learning; (Deep) Generative Models; NeuroAI.

Shanghai Jiao Tong University, Shanghai, China. Sep. 2019 – Jun. 2022
Master of Science - Computer Science and Engineering

- **Research Topics**: Data Mining; Recommender Systems.

Shanghai Jiao Tong University, Shanghai, China. Sep. 2015 – Jun. 2019
Bachelor of Engineering - Computer Software Engineering

- **Research Topics**: Deep Learning; Recommender Systems.

Industry Experience

Recommender Systems Research Intern at Alibaba Group May. 2021 – Sep. 2021. Beijing, China.

Team: Alimama-Ranking, Manager: Dr. Hongbo Deng

Topic: User Multi-Interest Modeling, Exploration & Exploitation in Online Learning

- In the fine-grained ranking stage, enhanced the Multi-Interest Network with Dynamic Routing (MIND) model by integrating heterogeneous graph neural networks (HGNNs) into the user embedding learning.
- In the recall stage, implemented an adversarial gradient-driven exploration strategy.
- The above approaches have been successfully deployed in Alibaba Tmall's billion-scale online advertising system, resulting in a 1.4% AUC improvement in Click-Through Rate (CTR) prediction.

Natural Language Processing Research Intern at ByteDance Sep. 2020 – Feb. 2021. Shanghai, China.

Topic: Semantic Role Labeling

- Enhanced Xingtu App's Q&A service by incorporating the knowledge of semantic role labeling (SRL) into deep-models like ELECTRA, turning to a 2.71% increase in user satisfaction rate.
- Improved Xingtu App's smart dialog system by optimizing question recognition and classification accuracy in the recall stage using ALBERT, turning to a 0.56% increase in user satisfaction rate.

Selected Research Publications

Exploring Behavior-Relevant and Disentangled Neural Dynamics with Generative Diffusion Models [**NeurIPS'24 Poster**] [Link]

- In this work, we leverage video diffusion models (VDMs) to advance scientific discovery in NeuroAI. Our proposed method, BeNeDiff, first identifies a disentangled latent subspace of time-series neural data through a total-correlation-aware variational autoencoder (VAE). Next, we leverage conditional VDMs to synthesize behavioral videos that activating the temporal trajectory of a specific latent factor. Notablly, we design a biologically-informed InfoNCE objective to guide the score update at each diffusion generation step. These synthesized video results provide scientific insights by illustrating that the neural dynamics of the latent factors exhibit specificity to the corresponding animal's behaviors of interest.

Extraction and Recovery of Spatio-Temporal Structure in Latent Dynamics Alignment with Diffusion Models [**NeurIPS'23 Spotlight**] [Link]

- In this work, we leverage the density estimation power of diffusion models to solve the domain adaptation task of time-series neural data. In brain-computer interfaces, raw neural recordings typically exhibit high variability and large distribution shift across sessions. In light of this, we propose ERDiff, a domain adaptation method that leverages the expressive power of diffusion models to capture the density and spatio-temporal structure of neural trajectories in the source domain (training session). Next, during the alignment phase, guided by the well-trained diffusion model, ERDiff employs a maximum likelihood alignment (MLA) approach to precisely recover these structures in the target domain.

Publication List

(The full publication list can be found in this link):

Core Machine Learning and NeuroAI:

- **Yule Wang**, Chengrui Li, Weihan Li, Anqi Wu. Exploring Behavior-Relevant and Disentangled Neural Dynamics with Generative Diffusion Models. *Neural Information Processing Systems (NeurIPS), 2024.*
- Chengrui Li, **Yule Wang**, Weihan Li, Anqi Wu. Forward χ^2 Divergence Based Variational Importance Sampling. *International Conference on Learning Representations (ICLR), 2024. Spotlight.*
- **Yule Wang**, Zijing Wu, Chengrui Li, Anqi Wu. Extraction and Recovery of Spatio-Temporal Structure in Latent Dynamics Alignment with Diffusion Models. *Neural Information Processing Systems (NeurIPS), 2023. Spotlight.*
- Chengrui Li, Weihan Li, **Yule Wang**, Anqi Wu. A Differentiable POGLM with Forward-Backward Message Passing. *International Conference on Machine Learning (ICML), 2024.*
- Weihan Li, **Yule Wang**, Chengrui Li, Anqi Wu. Markovian Gaussian Process: A Universal State-Space Representation for Stationary Temporal Gaussian Process. *Arxiv Preprint, 2024.*
- Weihan Li, Chengrui Li, **Yule Wang**, Anqi Wu. Multi-Region Markovian Gaussian Process: An Efficient Method to Discover Directional Communications Across Multiple Brain Regions. *International Conference on Machine Learning (ICML), 2024.*

Information Retrieval:

- **Yule Wang**, Xin Xin, Yue Ding, Dong Wang. ICPE: An Item Cluster-Wise Pareto-Efficient Framework for Recommendation Debiasing. *Transactions on Knowledge and Data Engineering (TKDE) Submission*.
- **Yule Wang**, Qiang Luo, Yue Ding, Dong Wang, Hongbo Deng. DemiNet: Dependency-Aware Multi-Interest Network with Self-Supervised Graph Learning for Click-Through Rate Prediction. *Arxiv Preprint, 2022.*
- Yuxiang Shi, Yue Ding, Bo Chen, **Yule Wang**, Ruiming Tang, Dong Wang. Task aligned meta-learning based augmented graph for cold-start recommendation. *Arxiv Preprint, 2022.*
- Yunzhe Li, Bo Chen, Xin Xin, **Yule Wang**, Yuxiang Shi, Ruiming Tang, Dong Wang. Extracting Attentive Social Temporal Excitation for Sequential Recommendation. *30th ACM International Conference on Information and Knowledge Management (CIKM), 2021*.
- Bo Chen, Yue Ding, Xin Xin, **Yule Wang**, Dong Wang. AIRec: Attentive intersection model for tag-aware recommendation. *Neurocomputing, 2021*.
- **Yule Wang**, Xubo Yang. Omni-directional ORB-SLAM2 for mobile robots. *IEEE CSAA Guidance, Navigation and Control Conference CGNCC, 2018.*

Professional Software Development

SOPTOP: WiFi-Streaming Intelligent Learning System Feb. 2019 – Sep. 2019. Shanghai, China.

- Develop a commercial multi-media streaming system for smart teaching using FFmpeg and Kubernetes. Enable mutual transmission of 1080P, 25FPS live streams between the server and student clients with a delay of less than 200ms. Successfully launch the system on Android and iOS app markets.

Professional Skills

Programming Languages: C++, Python, Matlab, Latex
Deep Learning Frameworks: Pytorch (Lightning), Tensorflow

Teaching and Academic Services

Teaching Experience: TA for GaTech ECE 6254: Statistical Machine Learning. Spring 2024
Conference Program Committee: AAAI 2024
Conference Reviewer: NeurIPS 2023/2024; ICML 2023/2024/2025; ICLR 2024/2025; AISTATS 2024.