

Can Xu

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EDUCATION

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- **Nanjing University of Information Science and Technology** Nanjing, China
Bachelor of Science - Statistics Sep 2017 - June 2021
 - **Zhejiang Gongshang University** Hangzhou, China
Master of Science - Statistics Sep 2021 - Jan 2024

PUBLICATIONS

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- **A fairness-aware graph contrastive learning recommender framework for social tagging systems** Published at "Information Sciences" (JCR Q1 & CCF-B)
 - **Pursuit and Evasion Strategy of a Differential Game Based on Deep Reinforcement Learning** Published at "Frontiers in Bioengineering and Biotechnology"

EXPERIENCE

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- **Zhejiang Lab - Research Center of Graph Computing** Intern
AI for Science July 2022 - Aug. 2023
 - **OGB-LSC 2022:** Focus on large-scale molecular learning and achieve 11th place globally.
 - **Molecular learning:** Reproduce and deploy large-scale molecular pretraining methods and molecule conformation generation methods;
 - **Survey on diffusion-based graph generation:** Write the survey on diffusion-based graph generation methods, whose applications range from molecule design to motion synthesis;
 - **Diffusion-based molecule generation:** Build up an $E(n)$ denoising kernel and come up with a loss function that promote 3D molecule generation performance.

PROJECTS

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- **Fairness-aware Recommender Systems**
 - Build up Tag-Aware Graph Contrastive Learning (TAGCL) and significantly improve performance and fairness of tag-aware recommendations;
 - Separately build up user-tag and item-tag graphs, and perturb both graphs by normalized noise to embeddings to set up self-supervised learning tasks;
 - Propose the training objective based on InfoNCE loss, negative tag sampling loss and TransT regularization, which jointly promote accuracy, fairness and consistency between two graphs;
 - Experiments indicate TAGCL outperforms state-of-the-art baselines by at least 5 % while being less discriminative.
 - **Open Graph Benchmark Large-Scale Challenge (OGB-LSC) 2022**
 - Build up HFAGNN for large-scale (over 3 million) molecular property prediction;
 - Build a equivariant hybrid module, which extracts atom chemical properties and 3D geometry information using Bessel function. The module combines topology and geometry information together efficiently;
 - Implement the model with multi-gpus training and achieve the 11th place in the leaderboard.
 - **Diffusion-based Molecule Generation (Work in Progress)**
 - Build up an effective denoising kernel of diffusion process, which generates novel and valid 3D molecules from scratch;
 - By combining the intrinsic feature of diffusion model with the nature of interatomic force, construct a effective denoising kernel that fully leverages geometry information.
 - In order to tackle the discrete nature of graphs in an efficient manner, introduce a carefully designed GFLoss, which facilitates the formation of bonds indirectly during training.
 - **User Item Value Evaluations and Personalized Recommendations in E-Commerce**
 - Based on real e-commerce data, the study aims to evaluate the value of products from the aspects of profitability, sales level, and return rate, and to effectively segment user groups based on product value. Then, personalized recommendations are made for users;
 - Based on LightGCN, WideGCN is proposed to effectively utilize side information. The performance lift over SOTA methods is around 2% to 5%.
 - **Pursuit and Evasion Strategy of a Differential Game Based on Deep Reinforcement Learning**
 - Construct kinematic equations of differential pursuit-evasion problem and solve the kinematic pursuit and evasion strategy respectively;
 - Use DQN and DDPG algorithm to train the agent escape automatically;
 - Devise the reward function to further improve the success rate of escaping.
 - **Spatial anti-interference UWB positioning algorithm**
 - Construct the UWB positioning algorithm based on 3 and 4 anchors respectively;
 - Discriminate whether the observed data is interfered using SVM.
 - Using the above algorithm and Kalman filter, the trajectory in 3D space is generated.

SKILLS SUMMARY

- **Languages** Python, C, SQL, \LaTeX , Bash
- **Frameworks** PyTorch, TensorFlow, PyG, DGL, Scikit

HONORS AND AWARDS

- 2018 National English Competition for College Students - First Prize- May, 2012
- The 18th China Post-graduate Mathematical Contest in Modeling - Third Prize - Oct, 2021
- The 5th National Post-graduate Case Competition for Applied Statistics - Third Prize - Aug, 2022
- Zhejiang Gongshang University Graduate Academic Scholarship - First Prize - Nov, 2022