Yiming Huang

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EDUCATION

University of Electronic Science and Technology of China (985 project colleges) Chengdu, China
Master of Computer Science and Technology *Sep. 2021 – Jun. 2024*
- GPA: **3.8** / 4.0
- Research with **Prof. Linyuan Lü**
- A+ subjects: Graph Theory and its Application (98), Algorithmic Game Theory (93), Matrix Theory et al.

Nanjing University of Information Science & Technology (Double-First Class) Nanjing, China
Bachelor of Computer Science and Technology *Sep. 2017 – Jun. 2021*
- GPA: **4.1** / 5.0
- Research with **Prof. Zhiguo Qu**
- A+ subjects: Data Structure (100), Object-oriented Programming (98), Linear Algebra (97), Discrete Mathematics (97), Analytic Geometry (96), University Physics (95), Probability and Statistics (93) et al.

RESEARCH PRESENTATIONS

[1] Higher-order Graph Convolutional Network with Flower-Petals Laplacians on Simplicial Complexes
Yiming Huang, Yujie Zeng, Qiang Wu and Linyuan Lü *Submitted to NeurIPS2023*

[2] Identifying key players in complex networks via network entanglement
Yiming Huang, Hao Wang, Xiao-Long Ren, and Linyuan Lü *Under Review*

[3] A Novel Coherence-based Quantum Steganalysis Protocol
Zhiguo Qu, Yiming Huang, Min Zheng (Student first author) *Quantum Inf. Process.*

[4] Cooperative Network Learning for a Large-Scale and Decentralized Graph
Qiang Wu, Yiming Huang, Yujie Zeng, Yijie Teng, Fang Zhou, and Linyuan Lü (Student first author) *Under Review*

[5] Influential Simplices Mining via Simplicial Convolutional Network
Yujie Zeng, Yiming Huang, Qiang Wu and Linyuan Lü (Joint first author) *preprint arXiv:2307.05841*

[6] Identifying vital nodes through augmented random walks on higher-order networks
Yujie Zeng, Yiming Huang, Xiao-Long Ren and Linyuan Lü *preprint arXiv:2305.06898*

[7] Graph Machine Learning (Chinese Book)
Linyuan Lü, Qiang Wu, Yiming Huang, Yujie Zeng (Subeditor) *Collaborate with Prof. Jure Leskovec*

RESEARCH EXPERIENCE

Higher-order GCN with Flower-Petals Laplacian on Simplicial Complexes Jul. 2022 – Present
Aim: integrate higher-order structures into geometric and topological deep learning *USTC, Hefei*
- It has been presented at the **NetSci2023** conference in oral and is under review in *NeurIPS2023*.
- Proposed a higher-order graph convolutional network (HiGCN), which achieves SOTA in various graph learning tasks.
- Quantified the influence of higher-order structures in the network by the filter weight of HiGCN.
- Extended HiGCN to cell complexes, a more general scenario, and distinguish the impact of different higher-order structures, such as simplex and cell, on graph learning.

Cooperative Network Learning for a Large-Scale and Decentralized Graph Aug. 2022 – Jun. 2023
Aim: establish a multi-party trusted, decentralized, and privacy-preserving graph learning framework. *UESTC, Chengdu*
- Published a monograph - Graph Machine Learning (Chinese), and the latest research is under review in *Nat. Commun.*
- Introduced a Cooperative Network Learning (CNL) framework, which unifies the formulation of graph models with distributed data for various agencies.

- Utilized homomorphic encryption and relevant technologies to ensure data security of inter-organizational computing.
- Demonstrated the effectiveness, reliability, and security of CNL on multi-party graph learning tasks through various graph learning tasks, including contagion dynamics prediction, node classification, and link prediction.

Influential Simplices Mining via Simplicial Convolutional Network   Dec. 2022 – Jun. 2023
Aim: establish a multi-party trusted, decentralized, and privacy-preserving graph learning framework.   *UESTC, Chengdu*
- It has been presented at the **NetSci2023** conference in oral.
- Detected the inconsistency between mining influential nodes and simplices, and formulated influential simplices mining task as graph learning problem for the first time.
- Introduced an influential simplices mining neural network (ISMnet) model, and demonstrated its commendable performance in influential simplices mining issues through extensive experiments.

Identifying Key Players in Complex Networks via Network Entanglement   Sep. 2021 – Jul. 2022
Aim: incorporate quantum information theory and design a metric to capture global topological properties.   *UESTC-YDRI, Huzhou*
- It has been presented at the **NetSci2022** conference in oral and is under review in *Commum. Phys.*
- Proposed a novel method - vertex entanglement (VE) - to identify key players in networks, which quantifies the effect of local perturbations on entropy and is found to be strongly related to network robustness and functional diversity.
- Demonstrated the effectiveness of VE in network dismantling tasks with numerical experiments.
- Detected topological discrepancies in functional brain networks between ASD patients and typical controls with VE.

HoRW: Augmented Random Walks on Higher-order Networks   Sep. 2021 – Jul. 2022
Aim: propose a higher-order structure-based model to address the shortcomings of the traditional models.   *UESTC-YDRI, Huzhou*
- It has been presented at the **NetSci2022** conference in oral.
- Proposed a novel high-order representation and higher-order random walk (HoRW) model.
- Presented a novel HoRW-based influencer identification strategy that allows multiscale analysis according to the strength of higher-order effects. Demonstrated HoRW's effectiveness in epidemic spreading and network dismantling tasks.

A Novel Coherence-based Quantum Steganalysis Protocol   Sep. 2019 – Sep. 2020
Aim: introduce an effective quantum steganalysis protocol.   *NUIST, Nanjing*
- This work has been published in **Quantum Inf. Process.**
- Proposed a novel coherence-based quantum steganalysis protocol, which adheres to the fundamental fact that classical steganography tends to change the probability distribution of the carrier, and the physical properties that the unknown quantum state discrimination process is sensitive to the distribution in quantum state discrimination.
- Conducted the quantum steganalysis and performance evaluation targeting a famous quantum steganography protocol - BB84 - in detail.

AWARDS & HONORS

Awards: 1 international awards, more than **10** provincial and above awards; **6** patents; **1** national research projects.

"Internet+" College Students Innovation and Entrepreneurship Competition - Gold Prize (Top 1%)	*2023*
Honor Graduate (Top 10%)	*2021*
Mathematical Contest In Modeling (MCM) - Finalist (Top 1%)	*2020*
National Training Program of Innovation and Entrepreneurship for Undergraduates - PI	*2020*
China Software and Information Technology "Blue Bridge Cup" Design Competition - Second Prize	*2020*
China Undergraduate Mathematical Contest in Modeling - Second Prize	*2019*
Academic Scholarship of Master Degree student, Bachelor Degree students - First-Class (Top 10%)	*2017-2022*

SKILLS & INTERESTS

Programming Languages: proficient with Python, MatLab, C, C++, Java; using Illustrator, Gephi, SPASS.
Languages: Mandarin (native), English (fluent).
Interests: Running, badminton, drawing, and board games.