Ace Cheng

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Education

Vanderbilt University   Nashville, TN
Ph.D. in Computer Science   *Aug. 2021 – present*

University of Michigan   Ann Arbor, MI
M.S.E. in Civil Engineering (Structures)   *Aug. 2018 – Dec. 2019*

Professional & Research Experiences

Tsingroc.ai   Remote
Machine Learning Engineer Intern   *Jul. 2024 – Present*

- Process weather data (wind speed, temperature, humidity, etc.) from PostgreSQL, apply filtering and PCA for feature selection, and generate time-aligned input data for power forecasting.
- Develop multi-modal fusion models (SimVP, FusionSF) for wind/solar power forecasting, improving RMSE by 5% through temporal pattern learning.
- Organize workshops on time series forecasting papers, sharing trends on LLM/diffusion-based time series generation.

Network and Data Science (NDS) Lab   Vanderbilt University
Research/Teaching Assistant advised by Dr. Tyler Derr   *May. 2023 – present*

- **Edge Classification on Graphs: New Directions in Topological Imbalance (WSDM'25)**
  * Identified and quantified topological imbalance in edges' local subgraphs using Topological Entropy (TE), finding over 40% training accuracy discrepancy between edges with high and low TE.
  * Developed TopoEdge framework with neighbor reweighting and synthetic edge generation, improving balanced accuracy by 10% and Macro-F1 by 12% on GNN backbones (GCN, GAT, ChebNet) compared with SOTA baselines (TER+AER).
  * Implemented distributed training on GPU clusters for scaling to large graphs ($\geq$ 100k nodes, $\geq$ 1M edges).

- **A Comprehensive Analysis of Social Tie Strength: Definitions, Prediction Methods, and Future Directions**
  * Summarized the mainstream practices for assigning tie strength labels and built an automatic standardized social tie strength pseudo-labeling pipeline based on topology and demographic features.
  * Proposed a tie strength pseudo-labeling evaluation framework from a perspective of tie resilience
  * Trained and benchmarked 6 prediction models (from heuristic to deep learning) on real-world datasets with 100k+ social ties highlighting limitations in current methods and proposing possible future directions.

- **Evaluating the Evolutionary Impact of Social Ties in Polarization (Ongoing)**
  * Built an evaluation framework to use the foundational random graph models to analyze the impact of social ties in forming cohesive subgroups in social networks, proved effectiveness on Twitter interaction network with 10M+ edges.
  * Found the matrix factorization recommendation mechanism could shape the polarization in online social networks by recommending connections between users with similar opinions and forming echo chambers in online social networks.

Technical Skills

Programming Languages: Python, MATLAB, C++
ML Framework: PyTorch, TensorFlow, Keras, Scikit-learn, NetworkX
Tools: NumPy, Pandas, PyG, Godot, Docker, MLflow
Cloud Platforms: AWS, Azure
Skills: Graph machine learning, time-series forecasting, network analysis, recommendation systems, LLM, RAG, MLOps

Selected Publications and Preprints

1. Xueqi Cheng, Yu Wang, Yunchao Liu, Yuying Zhao, Charu C. Aggarwal, and Tyler Derr. " Edge Classification on Graphs: New Directions in Topological Imbalance." (**WSDM**) (2025)

2. Xueqi Cheng. " Edge-centric Network Analytics" (**WSDM**) (2025).

3. Xueqi Cheng, Catherine Yang, Yuying Zhao, Yu Wang, Hamid Karimi, and Tyler Derr. " A Comprehensive Analysis of Social Tie Strength: Definitions, Prediction Methods, and Future Directions." arXiv preprint (2024).

4. Yu Wang, Tong Zhao, Yuying Zhao, Yunchao Liu, Xueqi Cheng, Neil Shah, and Tyler Derr. " A Topological Perspective on Demystifying GNN-Based Link Prediction Performance." (**ICLR**) (2024).

5. Yi Zhang, Yuying Zhao, Zhaoqing Li, Xueqi Cheng, Yu Wang, Olivera Kotevska, Philip S. Yu, and Tyler Derr. " A Survey on Privacy in Graph Neural Networks: Attacks, Preservation, and Applications." (**TKDE**) (2024).

6. Yuying Zhao, Yu Wang, Yunchao Liu, Xueqi Cheng, Charu C. Aggarwal, and Tyler Derr. " Fairness and diversity in recommender systems: a survey." (**TIST**) (2023).

7. Bo Ni, Zheyuan Liu, Leyao Wang, Yongjia Lei, Yuying Zhao, Xueqi Cheng, Qingkai Zeng et al. "Towards Trustworthy Retrieval Augmented Generation for Large Language Models: A Survey." arXiv preprint arXiv:2502.06872 (2025).

Scholarships and Awards

Engineering Graduate Fellowship (2023-2025), Vanderbilt University IBM Ph.D. Fellowship (2021-2025)