Hongjie Chen

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Research Interests

I am a **Senior Big Data Systems Research Scientist** at Dolby Laboratories. My research primarily focuses on the fields of deep **graph** learning and deep **time-series** learning, extending into the broader areas of recommendation systems and data analytics. Both graphs and time-series are ubiquitous data structures, and my research strives to unify them for various tasks, including relational modeling and time-series forecasting, among others.

Education

Ph.D., Computer Science, Virginia Tech, USA. Advisor: Dr. Hoda Eldardiry	2019-2024
B.S., Computer Science, Xiamen University, China. Advisors: Dr. Xiangrong Liu and Dr. Xiangxiang Zeng	2015-2019

Research Experience

2023–pres.   **Probabilistic hypergraph time-series forecasting models** Propose and implement hypergraph models to leverage simultaneous broadcasting communications among nodes time-series for forecasting.

2022–2023   **Evolving super graph time-series forecasting models** Propose and implement graph models to capture dynamically evolving relationships among node time-series. The resulting paper has been published in PAKDD 2024.

2021–2022   **Incremental online time-series forecasting models** Propose and implement efficient models for time-series forecasting that are fast, scalable, efficient and accurate, specifically designed for streaming data. The resulting paper has been published in TKDD 2023.

2020–2021   **Cloud resources utilization forecasting models** Propose and implement a graph-based probabilistic time-series forecasting model designed for predicting cloud resource utilization, which outperforms previous state-of-the-art approaches. The resulting paper has been published in KDD 2021.

2019–2020   **Demand and supply forecasting on spatio-temporal data.** Design and implement neural network architectures to address the challenge of multivariate time-series predictions in a heterogeneous graph setting. The proposed model leverages a combination of Graph Neural Network and Recurrent Neural Network structures. The resulting work has been published in Big Data 2021.

2018–2019 **Link predictions in the field of computational biology.** Design machine learning approaches to tackle the challenge of relation inference between bio-entities such as between drugs, or between proteins and drugs. The resulting work has been published in BIBM 2018.

2017–2018 **Continuous weighing for aquatic animals** This individual project aims to automate the process of weighing tiny aquatic creatures, such as shrimps, and recording their weights, reducing the need for human labor. The designed algorithm gives the stabilized yet accurate weights based on the input weighing data stream. The resulting Software has been deployed in the laboratory at the College of Ocean and Earth Sciences, Xiamen University.

Professional Experiences

2024 Community Services

- Serve as a reviewer for KDD
- Serve as a reviewer for The Journal of Supercomputing

2023 Community Services

- Serve as a reviewer for CIKM
- Serve as a panelist for TechGirls camp

2022 Instructor, Virginia Tech, Blacksburg, VA

- Introduction to Machine Learning *Summer 2022 CS4824*
- Design class materials and give lectures.

2020–2022 Teaching Assistant, Virginia Tech, Blacksburg, VA

- Graduate-level Software Engineering *Fall 2023, CS5704*
- Senior-level Machine Learning, *Spring 2020/2022/2024 CS4824*
- Senior-level Artificial Intelligence, *Spring 2020 CS4804*
- Senior-level Database, *Spring 2021 CS4604*
- Senior-level Algorithm, *Fall 2021 CS4104*

2019, 2023 Research Assistant, Virginia Tech, Blacksburg, VA

- Abnormalities Detection on Satellite Images *Spring 2023*
- Functional Genomic and Computational Assessment of Threats *Fall 2019*

Publications

[1] *Evolving Super Graph Neural Networks for Large-scale Time-Series Forecasting*, Hongjie Chen, Ryan A. Rossi, Kanak Mahadik, Sungchul Kim and Hoda Eldardiry, **ACM The Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD)**. 2024

[2] *Graph Time-series Modeling in Deep Learning: A Survey*, Hongjie Chen, Ryan A. Rossi, Kanak Mahadik, Sungchul Kim and Hoda Eldardiry, **ACM Transactions on Knowledge Discovery from Data (TKDD)**. 2023

Hypergraph Neural Networks for Time-series Forecasting, Hongjie Chen, Ryan A. Rossi, Kanak Mahadik, Sungchul Kim and Hoda Eldardiry, **IEEE International Conference on Big Data (IEEE BigData)**. 2023

[3] *Graph Deep Factors for Probabilistic Time-series Forecasting*, Hongjie Chen, Ryan A. Rossi, Kanak Mahadik, Sungchul Kim and Hoda Eldardiry, **ACM Transactions on Knowledge Discovery from Data (TKDD)**. 2022

[4] *A Context Integrated Relational Spatio-Temporal Model for Demand and Supply Forecasting*, Hongjie Chen, Ryan A. Rossi, Kanak Mahadik and Hoda Eldardiry, **IEEE International Conference on Big Data (IEEE BigData)**. 2021

[5] *Graph Deep Factors for Forecasting with Applications to Cloud Resource Allocation*, Hongjie Chen, Ryan A. Rossi, Kanak Mahadik, Sungchul Kim and Hoda Eldardiry, **ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)**. 2021

[6] *LncRNA-disease association prediction based on neighborhood information aggregation in neural network*, Hongjie Chen, Xuan Zhang and et al., **IEEE International Conference on Bioinformatics and Biomedicine (BIBM)**, 2018.

[7] Deep Hybrid Graph-Based Forecasting Systems, US Patent Applications (US20220138557A1), 2020

[8] Continuous weighing on living aquatic creatures, China Software Copyright (2018SR543792), 2018.

Work in Progress

[1] *Probabilistic Hypergraph Recurrent Neural Network for Time-series Forecasting*, Hongjie Chen, Ryan A. Rossi, Nesreen K. Ahmed, Namyong Park, Yu Wang, Tyler Derr, and Hoda Eldardiry, **Under Review**.

[2] *Probabilistic Hypergraph Recurrent Neural Network for Time-series Forecasting*, Hongjie Chen, Ryan A. Rossi, Sungchul Kim, Kanak Mahadik and Hoda Eldardiry, **Under Review**.

Skills

Programming Languages: C, C++, C#, CSS, Go, Hadoop, HTML, Java, JavaScript, Linux Bash, MATLAB, Perl, PHP, PySpark, Python, R, Ruby, Scala, SQL, Swift

Natural Languages: Chinese, English, Japanese (JLPT N1), Spanish.

HONORS AND AWARDS

Student Travel Award IEEE International Conference on Big Data 2021

Provincial first prize in Undergraduate Mathematics Contest In Modeling 2017

Honorable prize Interdisciplinary Contest In Modeling 2017

First class scholarship of the school (10%) 2016

Bronze Medal in National Olympiad in Informatics, China (NOI) 2014