

Yen-Yu Chang

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Research Interests

Machine Learning, Deep Learning, and Graph Mining

My research interests lie in the general area of machine learning, particularly in deep learning, time series analysis graph mining, and dynamic graph representation learning, as well as their applications in social network analysis, anomaly detection, knowledge graphs, textual semantic analysis, and multi-agent systems.

Education

Stanford University

MASTER OF SCIENCE

- Major: Electrical Engineering

Sep. 2019 - Present

Stanford, California

National Taiwan University (NTU)

BACHELOR OF SCIENCE IN ENGINEERING

- Major: Electrical Engineering
- Cumulative GPA: 3.86/4.00, Major GPA: 3.87/4.00, CS-Related GPA: 3.95/4.00

Sep. 2014 - Jun. 2018

Taipei, Taiwan

Publications

Inductive Representation Learning in Temporal Networks via Causal Anonymous Walks | [Link](#)

Yanbang Wang, Yen-Yu Chang, Yunyu Liu, Pan Li, and Jure Leskovec

May. 2021

PUBLISHED IN THE 9TH INTERNATIONAL CONFERENCE ON LEARNING REPRESENTATIONS (ICLR 2021)

Virtual

- Proposed Causal Anonymous Walks (CAWs) to inductively represent a temporal network.
- CAW-N is evaluated to predict links over 6 real temporal networks and uniformly outperforms previous SOTA methods by averaged 15% AUC gain in the inductive setting.
- CAW-N also outperforms previous methods in 5 out of the 6 networks in the transductive setting.

F-FADE: Frequency Factorization for Anomaly Detection in Edge Streams | [Link](#)

Yen-Yu Chang, Pan Li, Rok Susic, Mohamed Ibrahim, Marco Schweighauser, and Jure Leskovec

Mar. 2021

PUBLISHED IN THE 14TH ACM INTERNATIONAL CONFERENCE ON WEB SEARCH AND DATA MINING (WSDM-2021)

Virtual

- Proposed F-FADE that is an purely unsupervised and online approach to detect anomalies in edge streams.
- F-FADE provides false-positive-rate guarantees in the detection of single or the group of anomalous edges.
- Our experiments on one synthetic and six real-world dynamic networks show that F-FADE achieves state of the art performance and may detect anomalies that previous methods are unable to find.

A Regulation Enforcement Solution for Multi-agent Reinforcement Learning | [Link](#)

Fan-Yun Sun, Yen-Yu Chang, Yueh-Hua Wu, and Shou-De Lin

May. 2019

PUBLISHED IN 2019 INTERNATIONAL CONFERENCE ON AUTONOMOUS AGENTS AND MULTIAGENT SYSTEMS (AAMAS-19)

Montreal, Canada

- Proposed the task of Regulation Enforcement and provided its connection to a well known problem (social dilemma).
- Designed a mechanism that discourages the agents from not obeying the global regulation given a decentralized environment.

Designing Non-greedy Reinforcement Learning Agents with Diminishing Reward Shaping | [Link](#)

Fan-Yun Sun, Yen-Yu Chang, Yueh-Hua Wu, and Shou-De Lin

Feb. 2018

PUBLISHED IN 2018 AAAI/ACM CONFERENCE ON ARTIFICIAL INTELLIGENCE, ETHICS, AND SOCIETY (AIES-18)

New Orleans, USA

- Proposed a cost-effective method to train non-greedy reinforcement learning (RL) agents.
- Conducted multi-agent RL simulations to prove that our method achieved non-homogeneous equality.

ANS: Adaptive Network Scaling for Deep Rectifier Reinforcement Learning Models | [Link](#)

Yueh-Hua Wu, Fan-Yun Sun, Yen-Yu Chang, and Shou-De Lin

PREPRINT

- Provided a thorough study on how reward scaling can affect performance of deep reinforcement learning agents.
- Proposed an Adaptive Network Scaling framework to find a suitable scale of the rewards during learning for better performance.

A Memory-Network Based for Multivariate Time-Series Forecasting | [Link](#)

Yen-Yu Chang, Fan-Yun Sun, Yueh-Hua Wu, and Shou-De Lin

PREPRINT

- Proposed a memory network-based model for time series prediction with interpretable attention mechanism.
- Outperform state-of-the-art models in both univariate and multivariate time series forecasting.

Heterogeneous Star Celebrity Games | [Link](#)

Yen-Yu Chang, Chin-Chia Hsu, and Ho-Lin Chen

PREPRINT

- Proved the Price of Anarchy (i.e., PoA) is upper bounded by $O(\frac{\alpha}{\beta})$ for all Heterogeneous Star Celebrity Games.

Research Experiences

Research Assistant, instructed by Prof. Jure Leskovec & Prof. Pan Li

Jul. 2019 - Present

STANFORD NETWORK ANALYSIS PROJECT (SNAP)

Stanford, California

- Researched on dynamic graph representation learning, with focus on node classification and link prediction and submitted the paper “**Inductive Representation Learning in Temporal Networks via Causal Anonymous Walks**” to **ICLR-21**
- Researched on data mining and social network analysis, with focus on anomaly detection and published the paper “**F-FADE: Frequency Factorization for Anomaly Detection in Edge Streams**” to **WSDM-21**.

Undergraduate Researcher, instructed by Prof. Hung-Yi Lee & Prof. Lin-Shan Lee

Feb. 2017 - Jun. 2018

SPEECH PROCESSING AND MACHINE LEARNING LABORATORY, DEPARTMENT OF ELECTRICAL ENGINEERING, NTU

Taipei, Taiwan

- Researched on natural language processing, with focus on visual question answering.

Undergraduate Researcher, instructed by Prof. Shou-de Lin

Jul. 2016 - Jun. 2018

MACHINE DISCOVERY AND SOCIAL NETWORK MINING LABORATORY, DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION

Taipei, Taiwan

ENGINEERING, NTU

- Researched on reinforcement learning and multi-agent system, with focus on collaborative and ethics behaviors and published the paper “**Designing Non-greedy Reinforcement Learning Agents with Diminishing Reward Shaping**” to **AIES-19**.
- Researched on time series forecasting, with focus on long-term multivariate prediction and preprint the paper “**A Memory-Network Based Solution for Multivariate Time-Series Forecasting**”.
- Researched on reinforcement learning and multi-agent system, with focus on learning agent-to-agent interaction and published the paper “**A Regulation Enforcement Solution for Multi-agent Reinforcement Learning**” as the extended abstract to **AAMAS 2019**.
- Participated in **KDD Cup 2018** and achieved **19th place** in main prize and **4th place** in special prize.

Undergraduate Researcher, instructed by Prof. Ho-Lin Chen

Jul. 2015 - Jul. 2017

GAME THEORY AND MOLECULAR COMPUTING LABORATORY, DEPARTMENT OF ELECTRICAL ENGINEERING, NTU

Taipei, Taiwan

- Researched on game theory, with focus on network creation games and price of anarchy (PoA).
- Proved the upper bound of PoA for all Heterogeneous Star Celebrity Games.

Honors & Awards

INTERNATIONAL

2018 **19th Place (out of 4180 teams)**, KDD Cup 2018

London, U.K.

2018 **4th Place (out of 4180 teams)**, KDD Cup 2018 Special Prize

London, U.K.

DOMESTIC

2016 **Dean's List**, GPA in top 5% in Department of Electrical Engineering, NTU

Taipei, Taiwan

Selected Projects

Dynamic Graph networks for anomalous behavior detection in social network system

Sep. 2019 - Present

FOR STANFORD NETWORK ANALYSIS PROJECT

- Design new dynamic graph network to model higher-order dependencies between nodes
- Analyze anomalous behaviors in social network systems

Long-term Air Quality Forecasting

Mar. 2018 - Jun. 2018

FOR CSIE7433 (MACHINE LEARNING: THEORY AND PRACTICE)

- Built a recurrent neural network model to forecast air quality in future 48 hours and applied forecast weather data in our RNN.
- **19th place** in KDD Cup 2018 and **4th place** in KDD Cup 2018 special prize

Cyber Security Attack Defender

Sep. 2016 - Jan. 2017

FOR EE5177 (MACHINE LEARNING)

- Predict cyber attack based on real world dataset about connection information
- Won **4th prize** in EE5177 final project competition.

Relevant Courses

ML/AI

Machine Learning, Deep Learning, Convolutional Neural Networks for Visual Recognition, Mining Massive Data Sets, Signal Processing for Machine Learning

Mathematics

Linear Algebra and Matrix Theory, Convex Optimization

Skills

Languages

Python, C/C++, Shell scripting, Matlab

Libraries/Tools

Keras, Tensorflow, Pytorch

OS

GNU/Linux (Ubuntu & Arch Linux), Mac OSX

Other

Git, \LaTeX