Yen-Yu Chang

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Research Interests

Machine Learning

Deep learning, graph mining, time series forecasting, and reinforcement learning

Computer Vision

Visual reasoning, scene understanding, and 3D object detection

Education

Stanford University — *Sep.2019 - Present*

Master of Science — *Stanford, California*

- Major: Electrical Engineering

National Taiwan University (NTU) — *Sep. 2014 - Jun. 2018*

Bachelor of Science in Engineering — *Taipei, Taiwan*

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

Publications

Inductive Representation Learning in Temporal Networks via Causal Anonymous Walks | Link — *May. 2021*

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

Submitted to The 9'th 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 — *Mar. 2021*

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

Published in The 14'th ACM International Conference on Web Search and Data Mining (WSDM-2021) — *Jerusalem, Israel*

- 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 — *May. 2019*

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

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 — *Feb. 2018*

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

Published in 2018 AAAI/ACM Conference on Artificial Intelligence, Ethics, and Society (AIES-18) — *New Orleans, USA*

- Proposed a diminishing reward shaping to avoid greedy behaviors of agents.

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 time-series network (MTNet) to address the multivariate time series forecasting.
- Visualized and analyzed the attention mechanism of the long-term time series data.
- 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 $O(\frac{n}{\beta})$ for all Heterogeneous Star Celebrity Games.

Research Experiences

Research Assistant, instructed by Prof. Jure Leskovec & Dr. Pan Li — *Jul. 2019 - Present*
Stanford Network Analysis Project (SNAP) — *Stanford, California*
- Researched on data mining, with focus on segregation areas analysis.
- Researched on graph neural network, with focus on dynamic graphs nodes classification, links prediction and anomalous behavior detection.

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 speech signal processing, with focus on speech enhancement.
- 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 Engineering, NTU — *Taipei, Taiwan*
- 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 submitted the paper **"A Memory-Network Based Solution for Multivariate Time-Series Forecasint"** to **ECML PKDD 2019**.
- 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.
- Helped review conference papers for **WWW 2019**.

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 PoA is upper bounded by $O(\frac{n}{\beta})$ for all Heterogeneous Star Celebrity Games.

Honors & Awards

International

2018 **19th Place (out of 662 teams)**, KDD Cup 2018 — *London, U.K.*
2018 **4th Place (out of 662 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

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.

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

Skills

Languages Python, C/C++, Shell scripting, Matlab
Libraries/Tools Keras, Tensorflow, Pytorch
OS GNU/Linux (Ubuntu & Arch Linux), Mac OSX
Other Git, LaTeX