Yueh-Hua Wu

Phone: +886 934 353 604
Personal Website: https://kristery.github.io/ <kriswu8021@gmail.com>

EDUCATION

National Taiwan University (NTU), Taipei, Taiwan *Sept. 2017 - PRESENT*
Master of Science in Computer Science and Information Engineering

National Taiwan University (NTU), Taipei, Taiwan *Sept. 2013 - Jun. 2017*
Bachelor of Science in Electrical Engineering

- Related courses:
  - Mathematics: Linear Algebra, Differential Equation, Discrete Mathematics, Stochastic Process, Probability and Statistics
  - Computer Science: Convex Optimization and Machine Learning, Artificial Intelligence, Artificial Neural Network, Genetic Algorithm, Algorithm Design and Analysis, Data Structure and Programming, Operating Systems

RESEARCH INTERESTS

My research interest is to enable **reinforcement learning** and **imitation learning** to be practical and robust enough for real-world decision-making problems by considering the imperfectness in data and costly sampling conditions.

PUBLICATIONS

- **Yueh-Hua Wu***, Ting-Han Fan*, Peter J. Ramadge, and Hao Su, "Model Imitation for Model-Based Reinforcement Learning", *Preprint arXiv:1909.11821, 2019*

- **Yueh-Hua Wu**, Nontawat Charoenphakdee, Han Bao, Voot Tangkaratt, and Masashi Sugiyama, "Imitation Learning from Imperfect Demonstration", *In Proceedings of the 36th International Conference on Machine Learning (**ICML**), 2019* (**Oral**)

- Fan-Yun Sun, Yen-Yu Chang, **Yueh-Hua Wu**, and Shou-De Lin, "A Regulation Enforcement Solution for Multi-agent Reinforcement Learning", *In Proceedings of the 18th International Conference on Autonomous Agents and Multiagent Systems (**AAMAS**), 2019*

- **Yueh-Hua Wu**, Fan-Yun Sun, Yen-Yu Chang, and Shou-De Lin, "ANS: Adaptive Network Scaling for Deep Rectifier Reinforcement Learning Models", *Preprint arXiv:1809.02112, 2018*

- Yen-Yu Chang, Fan-Yun Sun, **Yueh-Hua Wu**, and Shou-De Lin, "A Memory-Network Based Solution for Multivariate Time-Series Forecasting", *Preprint arXiv:1809.02105, 2018*

- **Yueh-Hua Wu** and Shou-De Lin, "A Low-Cost Ethics Shaping Approach for Designing Reinforcement Learning Agents", *In Proceedings of the 32nd AAAI Conference on Artificial Intelligence (**AAAI**), Feb. 2018* (**Oral**)

- Fan-Yun Sun, Yen-Yu Chang, **Yueh-Hua Wu**, and Shou-De Lin, "Designing Non-greedy Reinforcement Learning Agents with Diminishing Reward Shaping", *In Proceedings of the 1st AAAI/ACM conference on Artificial Intelligence, Ethics, and Society (**AIES**), Feb. 2018* (**Oral**)

- Shu-Kai Chang, Sui-Tsung Go, **Yueh-Hua Wu**, Yen-Ting Lee, Chien-Lin Lai, Sz-Han Yu, Chun-Wei Chen, Huan-Yuan Chen, Ming-Feng Tsai, Mi-Yen Yeh, and Shou-De Lin, "An Ensemble of Ranking Strategies for Static Rank Prediction in a Large Heterogeneous Graph", *2016 WSDM Cup (Winner Report)*

- Chin-Chi Hsu, Kuan-Hou Chan, Ming-Han Feng, **Yueh-Hua Wu**, Huan-Yuan Chen, Sz-Han Yu, Chun-Wei Chen, Ming-Feng Tsai, Mi-Yen Yeh, and Shou-De Lin, "Time-Aware Weighted PageRank for Paper Ranking in Academic Graphs", *2016 WSDM Cup (Winner Report)*

AWARDS & HONORS

- Winner, Microsoft WSDM Cup *2016*
- Student Scholarship, Ministry of Education, Taiwan *Sep. 2017 - Jan. 2019*
- Outstanding Students Scholarship, Tainan City United Workers Association *Sep. 2013*

RESEARCH EXPERIENCES

Academia Sinica *Jul. 2019 - PRESENT*
Research Assistant
Advisor: Mark Liao, Distinguished Research Fellow at Academia Sinica

Research Project: **Batch Reinforcement Learning for Adaptive Traffic Signal Control**

- Proposed an RL method that optimized traffic signal control policies coherently with data collected from multiple intersections.

University of California San Diego *Jul. 2019 - Oct. 2019*
Visiting Scholar
Advisor: Hao Su, Assistant Professor at University of California San Diego

Research Project: **Model Imitation for Model-Based Reinforcement Learning**

- Proposed to incorporate matching between the distributions of rollouts from the synthesized environment and the real one
- Provided theoretical results that the difference in cumulative reward between the synthesized environment and the real one can be bounded and optimized by enforcing distribution matching.

RIKEN Center for Advanced Intelligence Project *Jul. 2018 - Jan. 2019*
Research Intern
Advisor: Masashi Sugiyama, Director of RIKEN Center for Advanced Intelligence Project

Research Project: **Imitation Learning from Imperfect Demonstration**

- Proposed two methods that learn from imperfect demonstration partially equipped with confidence scores
- Provided theoretical guarantees to the estimation error bound of the discriminator and the proposed risk and the optimality of the learned policy.

NTU - Machine Discovery and Social Network Mining Lab *Feb. 2015 - PRESENT*
Undergrad. (before Jul. 2017) / Master (after Jul. 2017)
Advisor: Shou-De Lin, Professor at National Taiwan University

Research Project: **Robust Reinforcement Learning**

- Developed general reinforcement learning frameworks to make the learning process faster and to make the performance more robust with respect to hyper-parameters.
- Incorporated reinforcement learning with hyper-parameter optimization (e.g., bayesian optimization) and adaptive tuning approaches so that reinforcement learning models perform consistently well without much human efforts.

Research Project: **Ethical Decision Making**

- Proposed a high-level framework to train an ethical RL agent based on a regular reward function together with certain human data optimizing diverse objectives.
- Designed the ethics shaping model to adjust the reward function through the interaction between the RL and human policy.
- Coined three scenarios *Grab a Milk*, *Driving and Avoiding*, and *Driving and Rescuing* to show how ethics shaping balances ethical behavior and performance pursuit.

NTU - Department of Electrical Engineering *Sep. 2013 - Oct. 2017*
Research Assistant
Advisor: Prof. Jian-Jiun Ding, Department of Electrical Engineering

Research Project: **Singular Value Decomposition for Fast Compressive Sensing**

- Proposed a signal-dependent framework to select suitable atoms with upper error bound for $l1$-norm minimization.
- Deployed singular value decomposition to approximate the atom dictionary used for compressive sensing.

WORK EXPERIENCES

DeepHow *Feb. 2019 - Jun. 2019*
Research Intern
Advisor: Samuel Zheng

Research Project: **Hierarchical Imitation Learning with Various Granularities**

- Considered multilayer hierarchy in real-world policies and proposed an unsupervised learning approach to retrieve such information from the given demonstration.

Groundhog Technologies Inc. *Apr. 2016 - Dec. 2017*
Data Scientist Intern

Research Project: **Real-Time Bidding Machine**

- Transformed images and keywords of advertisements to informative features with Word2vec and semi-supervised dimensionality reduction.
- Designed an ensemble model that took input from Neural Net models and factorization machines.

SELECTED COURSEWORKS AND PROJECTS

Genetic Algorithm for Cluster Ensemble *Fall 2016*
Final Project of Genetic Algorithm

- Utilized Genetic Algorithm to solve non-convex optimization in cluster ensemble.
- Achieved better accuracy than convex approaches with efficient optimization in non-convex domains.

Mental Disease Classification with Neural Nets *Fall 2015*
Final Project of Psychoinformatics and Neuroinformatics

- Crawled mental disease labels and features from PTT forum.
- Predicted delusional disorder symptom with TF-IDF and Neural Net and achieved 0.83 accuracy.

Wireless Oscilloscope with Arduino and Bluetooth module *Fall 2015*
Final Project of Electronic Circuits Experiments (III)

- Designed a wireless device to replace cumbersome wires between circuits and oscilloscopes.