

# CHIA-CHENG (JERRY) YEN

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## RESEARCH INTERESTS

- Deep Reinforcement Learning (DRL), Traffic Signal Control (TSC), Cyber-security, WSNs

## EDUCATION

### PhD Candidate in Computer Science

Expected 06/2022

University of California, Davis

Current GPA: 3.9/4.0

### Master of Science in Computer Science

07/2014

National Tsing Hua University, Hsinchu, Taiwan

Overall GPA: 4.27/4.3 (50% Academic Average and 50% Thesis)

### Bachelor of Science in Computer Science and Information Engineering

06/2012

Fu Jen Catholic University, Taipei, Taiwan

Overall GPA: 3.96/4.0 (Major GPA: 4.0/4.0)

Best Ranked 1<sup>st</sup>, Average Ranked 2<sup>nd</sup> in class

## RESEARCH EXPERIENCES

### Network and Architecture Lab (Advisor: Professor Dipak Ghosal)

09/2017-present

#### University of California, Davis

- AI enabled fuel-aware optimization for multi-model autonomous vehicles  
Train a platooning model by DRL for reducing fuel consumption
- Cyber-attacks to delay packets in 5G Networks  
Analyze the impact of ghost bearers on normal UEs
- Security vulnerability on backpressure-based TSC schemes [1][5]  
Analyze the impact of misinformation on modern TSC systems  
Avoid misinformation attacks using the proposed algorithms
- DRL-based TSC for multi-intersection control [4]  
Increase learning ability of DRL-agents with learnable image features  
Enhance performance of DRL-agents using a novel reward function  
Achieve 3x speed-up during training using the proposed 2DSARSA
- Two-level TSC architecture for multi-intersection control  
Propose a traffic light control system with a higher layer and lower layer  
DRL model at the higher layer controls TSC controllers by weights based on flow dynamics

### Visual Communication Lab (Advisor: Professor Jia-Shung Wang)

09/2012-07/2014

#### National Tsing Hua University, Hsinchu, Taiwan

- Delivery of videos distributed over ultra-dense networks (UDN) [2][6][8]  
Deployed distributed storage using LT codes for popular videos  
Evaluated distributed delivery for popular videos over UDN
- Interpolation-based clustering algorithm for gene expression data [3]  
Proposed an unsupervised framework for classifying time-series data  
Achieved higher classification accuracy than other methods
- Data compression in WSNs [7]  
Compressed data based on available transmission rate without high distortion  
Achieved better performance in compression for heterogeneous sensor data

## PUBLICATIONS

### Journal Papers

- [1] Chia-Cheng Yen, Dipak Ghosal, Michael Zhang, and Chen-Nee Chuah, "Security Vulnerabilities and Protection Algorithms for Backpressure-Based Traffic Signal Control at An Isolated Intersection," *IEEE Transactions on Intelligent Transportation Systems*, 2021.
- [2] Yu-Tai Lin, Chia-Cheng Yen, and Jia-Shung Wang, "Video Popularity Prediction: An Autoencoder Approach with Clustering," *IEEE Access*, vol. 8, pp. 129285-129299, 2020.
- [3] Tai-Yu Chiu, Ting-Chieh Hsu, Chia-Cheng Yen, and Jia-Shung Wang, "Interpolation based consensus clustering for gene expression time series," *BMC Bioinformatics*, 2015;16:117.

## Conference Papers

- [4] **Chia-Cheng Yen**, Dipak Ghosal, Michael Zhang, and Chen-Nee Chuah, "A Deep On-Policy Learning Agent for Traffic Signal Control of Multiple Intersections," *IEEE 23<sup>rd</sup> International Conference on Intelligent Transportation Systems*, Sep. 2020.  
**Nominated for the best student paper award.**
- [5] **Chia-Cheng Yen**, Dipak Ghosal, Michael Zhang, Chen-Nee Chuah, and Hao Chen, "Falsified Data Attack on Backpressure-based Traffic Signal Control Algorithms," *IEEE Vehicular Networking Conference (VNC)*, Dec. 2018.
- [6] Yi-Ting Chen, **Chia-Cheng Yen**, Yu-Tai Lin, and Jia-Shung Wang, "Cooperative Caching Plan of Popular Videos for Mobile Users by Grouping Preferences," *IEEE 16<sup>th</sup> International Conference on Pervasive Intelligence and Computing (PiCom)*, Aug. 2018.
- [7] Chu-Ming Wang, **Chia-Cheng Yen**, Wan-Yane Yang, and Jia-Shung Wang, "Tree-Structure Linear Approximation for Data Compression over WSNs," *IEEE 12<sup>th</sup> International Conference on Distributed Computing in Sensor Systems (DCOSS)*, May 2016.
- [8] **Chia-Cheng Yen** and Jia-Shung Wang, "Distributed Delivery of Popular Videos over Ultra-Dense Networks," *IEEE Symposium on Computers and Communication (ISCC)*, Jul. 2015.
- [9] Hsien-Tzu Chiu, **Chia-Cheng Yen**, and Jia-Shung Wang, "A Framework of Temporal Data Retrieval for Unreliable WSNs Using Distributed Fountain Codes," *IEEE 9<sup>th</sup> International Conference on Mobile Ad-hoc and Sensor Networks (MSN)*, Dec. 2013.

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## WORK EXPERIENCES

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|---|------------------------|
| <b>Data Scientist Intern, Global Artificial Intelligence Accelerator (GAIA)</b> (Manager: Dr. Wenting Sun)<br><b>Ericsson, Santa Clara, CA, USA</b> <ul style="list-style-type: none"><li>• Survey existing work on root cause analysis (RCA)</li><li>• Develop an innovative graph neural network (GNN-based) RCA algorithm for 5G wireless environments</li><li>• Predict potential root cause nodes and a series of failures led by them</li><li>• Achieve higher prediction accuracy if more node features are included</li></ul> | <b>06/2021-09/2021</b> |
| <b>Teaching Assistant, Department of Computer Science</b><br><b>University of California, Davis, CA, USA</b> <ul style="list-style-type: none"><li>• ECS 10, ECS 36B, ECS 50, ECS 122A, ECS 154A, ECS 252</li><li>• Hold office hours, lead discussions, and grade assignments for undergraduate students</li></ul>   | <b>03/2018-present</b> |
| <b>Graduate Student Researcher, Network and Architecture Lab</b><br><b>University of California, Davis, CA, USA</b> <ul style="list-style-type: none"><li>• Research topics including Reinforcement Learning, Traffic Signal Control, and Security</li></ul>  | <b>09/2017-present</b> |
| <b>Research Assistant, Advanced Network Technologies and Services Lab</b><br><b>Institute of Information Science, Academia Sinica, Taiwan</b> <ul style="list-style-type: none"><li>• Research topics including Wireless Networks and Machine Learning</li></ul>  | <b>04/2017-08/2017</b> |
| <b>Research Assistant, Visual Communication Lab</b><br><b>National Tsing Hua University, Hsinchu, Taiwan</b> <ul style="list-style-type: none"><li>• Research topics including Networks, Clustering, Stereo Matching, and Data Compression</li></ul>  | <b>09/2012-07/2014</b> |

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## AWARDS

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|---|------------------------|
| <b>NSF Travel Grant Award, 2018 VNC</b> | <b>12/2018</b>         |
| <b>Academic Excellence Award, FJU</b>   | <b>09/2008-06/2012</b> |
| <b>Second Best Project Award, FJU</b>   | <b>11/2011</b>         |

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## SELECTED TERM PROJECTS

- Online Ticketing System, Department of Computer Science and Information Engineering, FJCU**
  - Utilized Oracle to build up an online ticketing system for railway
  - Supported multiple users for simultaneous booking
- Multimedia Sharing System, Department of Computer Science and Information Engineering, FJCU**
  - Shared movies or music with friends through MSN
  - Utilized peer-to-peer communication and adjusted transmission rate dynamically
  - Applied distributed streaming mechanism and circular buffer technique
- Stereo Matching, Visual Communication Lab**
  - Implemented Horizontal and Vertical Consideration on Cost Initialization as well as Domain Transform on Cost Aggregation
  - Improved disparity estimation method

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## PROGRAMMING LANGUAGES

- **Proficient with:** C/C++, Python, Java, Matlab
- **Familiar with:** HTML, Assembly