Chih-Ho Hsu

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Education

National Taiwan University (NTU) *Sep. 2016 – Jan. 2021(expected)*

- Bachelor of Science in Electrical Engineering, GPA: 3.3/4.0 (Overall)
- Specialization in Wireless Communications, Computer Network and related topics, including Edge computing, Adaptive video streaming, Caching, Computation offloading, Social network, Reinforcement learning

Publications

Journal Papers

- **[1]** Y. Chiang, **C. Hsu**, and H. Wei, "Collaborative Social-Aware and QoE-Driven Video Caching and Adaptation in Edge Network," to appear in *IEEE Transactions on Multimedia*, 2020. [Demo]
- **[2]** Y. Chiang, Y. Chao, **C. Hsu**, C. Chou and H. Wei, "Virtual Network Embedding With Dynamic Speed Switching Orchestration in Edge Network," in *IEEE Access*, vol. 8, pp. 84753-84768, 2020. [PDF]
- **[3]** Y. Zhang, Y. Chiang, **C. Hsu**, Y. Chao, and H. Wei, "Management and Orchestration of Edge Computing: A survey", *under preparation,* 2020.

Conference Papers

- **[4]** Y. Chao, Y. Chiang, **C. Hsu**, C. Chou and H. Wei, "Satellite-UAV-MEC Collaborative Architecture for Task Offloading in Vehicular Networks," to appear in *IEEE GLOBECOM Workshops*, 2020.
- **[5] C. Hsu**, Y. Chiang, and H. Wei, "Mobility-Aware Joint QoS Promotion and Load Balancing in MEC-based Vehicular Networks: A Deep Learning Approach," submitted to *IEEE Vehicular Technology Conference (VTC),* 2020.
- **[6] C. Hsu**, "MEC-Assisted FoV-Aware and QoE-Driven Adaptive 360◦ Video Streaming for Virtual Reality," to appear in *IEEE International Conference on Mobility, Sensing and Networking (MSN)*, 2020.
- **[7] C. Hsu**, Y. Chiang, and H. Wei, "QoE-Driven Interest-Based Video Caching and Adaptation in 5G Mobile Edge Network," *poster in Taiwan Telecommunication Annual Symposium*, 2020.
- **[8] C. Hsu**, Y. Chiang, and H. Wei, "Entropy-based Load-balanced QoS Flow Routing for Software Defined Heterogeneous Edge Network," *under preparation*, 2020.

Research Experiences

Wireless Mobile Network Laboratory, NTU Advisor: Prof. Hung-Yu Wei

Research Assistant *Feb. 2020 – Present*

- **Researched on emerging techniques in 5G&B mobile network** [2], [3], [8]
  - Surveyed architecture, challenges and state-of-the-art researches on Multi-access Edge Computing (MEC) system
  - Collaborated on architecture design and simulation design of Virtual Network Embedding (VNE) problem
  - Designed a low-complexity and load-balanced routing algorithm to guarantee heterogeneous QoS in SDN
  - Implemented the dynamic network slicing system based on traffic prediction in the 5G testbed
- **Researched on computation offloading in edge computing system** [4], [5]
  - Constructed a DL model to jointly optimize computation offloading, allocation of spectrum resources and computing resource in RAN under the constraint of energy consumption, experienced latency and vehicles' mobility
  - Developed a 2-stage method to jointly optimize UAV deployment and resource allocation for vehicular network

Undergraduate Researcher *Sep. 2018 – Jan. 2020*

- **Researched on adaptive video streaming in edge computing system** [1], [7]
  - Formulated a hybrid Quality of Experience (QoE) model for adaptive video streaming, consisting of video resolution, resolution switching rate, initial buffering time and video stalling time
  - Implemented a statistical time series model to predict interactions among users in Online Social Networks (OSN)
  - Established a mathematical model to quantify the information dissemination among users in OSN
  - Designed a social-aware QoE-driven framework to determine video caching and video transcoding decision of edge nodes in 2-tier MEC system based on viewing history, information dissemination state and users' channel condition
  - Conducted experiments with real-world traces to validate the proposed framework

Work Experiences

Global Communications Conference (GLOBECOM), IEEE *Aug. 2020*

Reviewer

- Reviewed a paper on vehicular edge computing network that was submitted to workshop on RAFNET

Cinnamon AI Taiwan Inc., Taipei *Jul – Aug. 2019*

Summer Internship

- Maintained online model serving pipeline with Docker and Tensorflow
- Designed specialized loss function and data preprocessing mechanism for MobileNetv3 to perform text recognition

BroadMission Technology, Remote *Jan. – Jul 2019*

Software Engineer (part-time)

- Developed a home supervision system, realizing RTSP-based streaming platform, real-time object recognition with Yolov3 and LSTM-based anomaly detection mechanism
- Developed a customized DevOps tool for automated CICD tracking by Hygiea, Jenkins, Maven, SonarQube, Jmeter
- Developed a functional Chatbot, realizing user classification, customized response and hierarchical control interface

Foxconn Advanced Communication Academy, Taipei *Sep. 2018 – Jun 2019*

Internship

- **Collaborated on developing commercial platform for network infrastructure management**
  - Orchestrated edge hosts in MEC system with OpenStack and Kubernetes
  - Implemented network microservices instantiation and policy-driven lifecycle management with ONAP
  - Constructed GUI and role-based access control for the MEC system

Cyber-Physical Systems Research Group, NTU *May – Jun 2018*

Undergraduate Assistant

- Collaborated on analyzing images of endoscopic surgery for labeling and building the website for crowdsensing

Advanced Material Research Group, NTU *Feb. – Aug. 2017*

Undergraduate Assistant

- Implemented plant factory, realizing automatic measurement and control of temperature, moisture, light, and gases

Skills

Programming:	Python, C++, PHP, JavaScript, Java, C#, MATLAB
Framework:	Vue.js, Django, Flask, OpenCV, Tensorflow, Pytorch, MySQL, Mininet, Git
Platform:	OpenStack, Kubernetes, ONAP, AWS, GCP, Azure, Docker, Jenkins
Software:	LaTeX, Unity, Android Studio, SolidWorks, Arduino, Quartus II, PSpice, LabVIEW

Course Projects

Analysis of Operation Scheduling Algorithms for FPGA HLS *May – Jun 2020*

Introduction to Electronic Design Automation

- Implemented state-of-the-art resource-constrained scheduling algorithms for FPGA HLS, including list scheduling, force-directed scheduling, DRL, GA, SA and ACO
- Compared the performances of algorithms in terms of complexities and the completion time of dependant tasks

SMS-Controlled Smart and Reliable Pet Keeper *Jan. – Feb. 2020*

Personal Communications Services

- Constructed an automatic pet feeding system controlled by Arduino through Bluetooth communication
- Developed an Android APP to remotely feed and monitor the pets through Short Message Service (SMS)

Analysis of D2D caching schemes in Heterogeneous Network *May – Jun 2019*

Introduction to Wireless and Mobile Networking

- Implemented simulations for heterogeneous network by modeling user mobility, interference incurring by base station and D2D communication, and the corresponding wireless channels
- Assessed performance of D2D caching by implemented algorithms from few papers

P2P-based Multi-user Concurrent Video Conference System *May – Jun 2018*

Introduction to Computer Network

- Constructed transport layer client and server sockets based on TCP protocol to realize multi-user video conference
- Implemented an orchestration node to synchronize video source from multiple users during the conference