Cheng-Yeh Chen

☎ (+886)970-600-534 | ✉ garychenmesser@gmail.com | 🔗 GaryChenMesser | ⬛ GaryChenMesser

Research Interests

Video prefetching, wireless virtual reality, 5G New Radio, ultra-reliability and low-latency communication

Education

National Taiwan University (NTU)

M.S. in Communication Engineering (GPA 4.00/4.00)   2019/09-2021/06
B.S. in Electrical Engineering (GPA 3.70/4.00)   2015/09-2019/06

Publications

[1] **Cheng-Yeh Chen** and Hung-Yun Hsieh, "Cross-Frame Resource Allocation with Context-Aware QoE Estimation for 360° Video Streaming in Wireless Virtual Reality," submitted to *IEEE Transactions of Wireless Communications*. [**Paper**]

[2] Hung-Hsien Chen, **Cheng-Yeh Chen**, Ching-Wei Yang and Hung-Yun Hsieh, "Resource Optimization for Machine-Type Communications with Lossy Links Based on Compressive Sensing," preprint. [**Paper**]

[3] **Cheng-Yeh Chen** and Hung-Yun Hsieh, "Does Queue Correlation Matter in 5G Multi-Connectivity with Packet Duplication?," *IEEE Wireless Communications Letters, 2022*. [**Paper**]

[4] **Cheng-Yeh Chen**, Guo-Liang Hung and Hung-Yun Hsieh, "A Study on a New Type of DDoS Attack against 5G Ultra-Reliable and Low-Latency Communications," *2020 European Conference on Networks and Communications (EuCNC)*. [**Paper**][**Slides**]

Research Experiences

NTU Mobile Networks and Wireless Communications Lab, supervised by Prof. Hung-Yun, Hsieh

Scheduling optimization in wireless virtual reality   *Submitted to IEEE TWC, 2022*

- Formulated a novel cross-frame optimization problem, the first work able to incorporate complete series of viewport prediction into tile-based 360° video streaming to enhance QoE by 10.2% and reduce wasted payload by 18.7%.
- Developed an online-learning algorithm for per-tile QoE estimation to accommodate general types of viewport predictors and dynamically adjust the prediction window.

Analysis and optimization in 5G multi-connectivity   *Published in IEEE WCL, 2022*

- Proposed a cross-layer model to incorporate both channel and queue condition over two correlated paths and analytically derived the joint blocking probability and joint waiting time distribution for the two-queue system.
- Revealed queue correlation existing in 5G multi-connectivity for the first time in literature, which could impact outage probability by orders of magnitude.

DDoS Attack against 5G ultra-reliability and low latency communication   *Published in EuCNC, 2020*

- Developed a standard compliant 5G simulator by implementing 3GPP Release 16 specifications on the preemption mechanism for URLLC/eMBB coexistence.
- Studied 3GPP RAN1 specifications related to URLLC/eMBB coexistence and proposed a low-volume highly-synchronized DDoS attack model capable to increase 8.25 times of URLLC outage and waste 1.66 times of eMBB resource.

Teaching Experiences

Teaching Assistant, Probability and Statistics, NTU (2020 Spring)

- Wrote solid solutions for assignments/exams and graded the written work from 80-90 students.
- Provided individual instruction for students with various levels.

Teaching Assistant, Computer Programming, NTU (2019 Fall & 2020 Fall)

- Prepared the assignments/exams for the corresponding lectures through an online judge system.

- Instructed 80-90 students about a C++ module in several lectures to help them build a gaming application.

Working Experiences

Research Associate, *NTU Computer and Information Networking Center*   *Taipei, Taiwan*

Organization and establishment of a real-time packet analysis platform   2021/12-2022/07

- Organized and executed a project with funding of $200,000 for Department of Cyber Security at Executive Yuan to build a real-time packet storage system and collect network traffic dataset for a local area network with peak traffic of 25 Gbps.
- Managed a research group with 4 graduate students to design packet analysis techniques including packet fingerprinting and forensics to enrich the network traffic dataset with diversified cyberattack events.

Software Engineering Intern, *Trendmicro*   *Taipei, Taiwan & Tokyo, Japan*

Behavior analysis on spear-phishing email attack   2019/07- 2019/09

- Proposed a model to extract social interaction topology efficiently from the interaction graph containing 10,000,000+ emails and designed a detection method to identify spear-phishing email attack.
- Improved the accuracy of spear-phishing detection to 98.6%, which was an increase of 30% compared to the original system performance.

Selected Projects

5G simulator for 3GPP Release 16   2019/09-2020/02

- Developed a simulation platform compliant to 3GPP specifications on top of 5G LENA, an extension of ns-3.
- Implemented mechanisms for the coexistence of uplink URLLC and eMBB, including mini-slot allocation, cancellation mechanism, and deployed DDoS attack against the whole system.

Skills

TOEFL iBT	107 (R30, L29, S22, W26)
GRE General	324 (V155, Q169, AW4.0)
Programming Language	C/C++, Python, Matlab, LaTeX