System Group
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Field of study: UltraFast Communication, IoT Security.
Key words: B5G/6G Networking, Machine Learning
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1. The Subjects and Aims of Research
   a) UltraFast Communication: Design and implement schemes to deliver low latency and bandwidth intensive applications over next generation wireless networks.
   a) IoT Security: Design and implement schemes to attack and defense IoT service.

2. Recent Research Topics
   (a) UltraFast Communication:

   Currently, we aim to build a framework for low latency and bandwidth intensive content delivery for B5G/6G. We adopt machine learning algorithms to design MAC layer schemes for AR/VR content delivery over mmWave frequency band. Further, the schemes will be implemented in a SDR platform for V2X testbed.
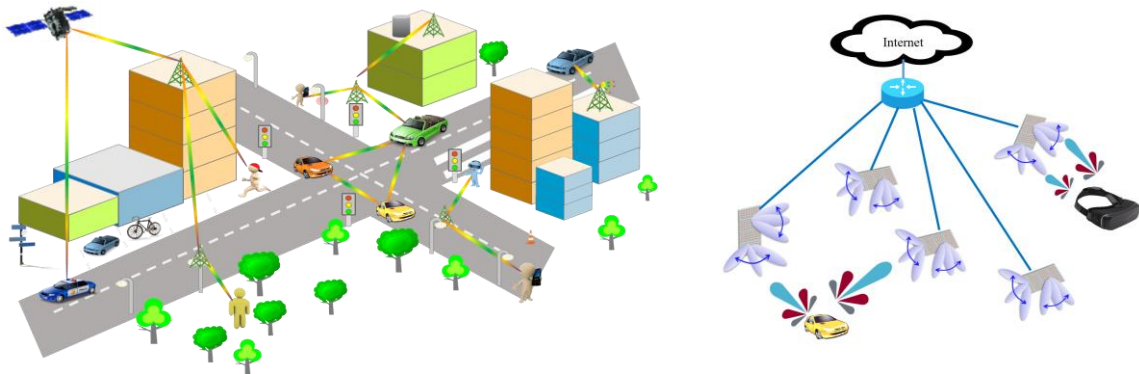
   (b) IoT Security:

   Currently, we aim to construct a reliable and secure LEO communication network for IoTs. We first design and implement schemes to attack LEO communication. Specifically, threats in 5G core network and ground stations, are studied based on existing protocol stack. Then, the defense schemes will be developed with the assistance of machine learning to real-time protect the LEO communication.
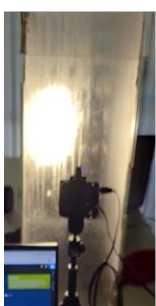
3. Selected Publications and Projects

A. Journal Papers

[J1] T. -Q. Bai, **C. -Y. Huang** and Y. -K. Lee, "Reliably Route IoT Packets in Software Defined mmWave Mesh Networks", in IEEE Networking Letters, vol. 5, no. 1, pp. 50-54, Mar. 2023.

[J2] T. -C. Huang, **C. -Y. Huang** and Y. -C. Chen, "Real-Time DDoS Detection and Alleviation in Software-Defined In-Vehicle Networks", in IEEE Sensors Letters, vol. 6, no. 9, pp. 1-4, Sep. 2022

[J3] Z. Wu, **C.-Y. Huang** and P. Ramanathan, "Measuring Millimeter Wave based Link Bandwidth Fluctuations during Indoor Immersive Experience", in IEEE Networking Letters, vol. 4, no. 3, pp. 113-117, Sep. 2022.

[J4] D. Ageng, **C.-Y. Huang** and R.-G. Cheng, "A Short-Term Household Load Forecasting Framework using LSTM and Data Preparation," IEEE Access, vol. 9, pp. 167911-167919, Dec. 2021.

[J5] J. Gunawan and **C.-Y. Huang**, "An Extensible Framework for Short-Term Holiday Load Forecasting Combining Dynamic Time Warping and LSTM Network," IEEE Access, vol. 9, pp. 106885 - 106894, Jul. 2021.

B. Conference Papers

[C1] Z. Wu, **C.-Y. Huang** and P. Ramanathan, "MIA: A Transport-Layer Plugin for Immersive Applications in Millimeter Wave Access Networks", INFOCOM, May 2023.

[C2] Z. Wu, **C.-Y. Huang** and P. Ramanathan, "COded Taking And Giving (COTAG): Enhancing Transport Layer Performance over Indoor Millimeter Wave Access Networks", ICC, May 2022.

[C3] S.-M. Chan, M.-H. Xie, H.-S. Chang and **C.-Y. Huang**, "Design and Implementation of a Network Coding Platform based on NetFPGA and ns-3", 2021 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN), 2021, pp. 108-109.

[C4] H.-J. Huang, **C.-Y. Huang** and Y.-K. Lee, "PINC: Design and Implementation of Inter-Flow Network Coding in P4-enabled Networks", 2021 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN), 2021, pp. 106-107.

C. Projects

[P1] Toward 6G: Design and Implementation of Low Latency Data Transmission in Software Defined mmWave IAB Networks (NSTC 112-2221-E-011 -059 -MY3), Aug. 2023 - Jul. 2026.

[P2] Cyber resilient and reliable LEO satellite communication systems: security communication and connectivity, software security, IoT sustainability, privacy-preserving, and disinformation detection (112-2634-F-027 -001 -MBK), Jun. 2023 - May 2024 (Co-PI).

[P3] Attacks on 5G SA Core Network (Industrial Project), Jan. 2023 - Dec. 2023.

[P4] Reliably Deliver Low Latency Content in Intelligent Transportation System (NSTC 111-2221-E-011-092-), Aug. 2022 - Jul. 2023.

[P5] HTTP/2 Attack in 5G SA Core Network (Industrial Project), Jun. 2022 - Dec. 2022.