Yansong Huang

yansong.huang.25@ucl.ac.uk · (+86) 180-175-85587 · https://iso497.github.io/

Education

University College London (UCL), London, United Kingdom *Oct. 2025 – Present*

Interests: *Fluid Antenna Systems, Deep Learning.*

Beijing University of Posts and Telecommunications (BUPT), Beijing, China *Sept. 2022 – Jun. 2025*

***M.E.** in Information and Communication Engineering | GPA (present): 91.65/100*

Beijing University of Posts and Telecommunications (BUPT), Beijing, China *Sept. 2018 – Jun. 2022*

***B.E.** in Telecommunications Engineering with Management | GPA: 86.94/100*

Queen Mary University of London (QMUL), Beijing, China *Sept. 2018 – Jun. 2022*

***BSc** in Telecommunications Engineering with Management | GPA: 381/510 (Honors, First Class)*

Publications

PAPERS

Y. Huang, X. Li, M. Zhao, H. Li and M. Peng, "Asynchronous Federated Learning via Over-the-Air Computation in LEO Satellite Networks," *IEEE Trans. Wireless Commun.*, vol. 23, no. 12, pp. 19885–19901, Dec. 2024.

- This paper proposed an asynchronous federated learning (FL) framework in low-earth orbit (LEO) satellite networks by exploiting multiple high-altitude platforms (HAPs) for model aggregation
- Over-the-air computation (AirComp) is utilized in the FL framework for reducing energy consumption.
- To find the optimal aggregation scheme and beamforming vector, this paper proposed a linkage search algorithm combining depth-first search (DFS) and breadth-first search (BFS) algorithm with subtree pruning.

Y. Huang, X. Li, L. Zhang and M. Peng, "AirComp-Assisted Asynchronous Federated Learning for UAV Swarms: A Self-Adaptive Aggregation Scheme to Tackle Model Staleness," *IEEE Trans. Wireless Commun.*, Early Access.

- This paper proposed an asynchronous federated learning (AFL) framework in unmanned aerial vehicle (UAV) swarm networks with AirComp to improve communication efficiency.
- An alternating optimization algorithm is proposed to get the optimal solution of beamforming vectors.
- Cosine-similarity-based model aggregation scheme is proosed to relieve model staleness in AFL.

Y. Huang, K. K. Wong, "Fluid Antenna Assisted Over-the-Air Computation for Federated Learning Systems," *IEEE Trans. Wireless Commun.*, Submitted.

- This paper proposed an AirComp-assisted AFL framework for air-ground integrated networks, enabling UAVs and terrestrial vehicles to collaboratively train deep learning models with reduced aggregation delay.
- Dual-sided FAS is introduced to dynamically reconfigure antenna positions at both UAVs and vehicles, thereby improving wireless channel conditions and AirComp aggregation reliability.
- A joint optimization problem of aggregation scheduling, receive beamforming, and antenna positioning is formulated, with an iterative optimization algorithm developed as the benchmark solution, and a Transformer- and deep-unfolding-based optimization method is proposed to reduce computational complexity.

Y. Huang, H. Wei, J. Yang, M. Wu, "Damaged Road Extraction Based on Simulated Post-Disaster Remote Sensing Images," *2021 IEEE Int. Geosci. Remote Sens. Symp. IGARSS*, Brussels, Belgium, 2021, pp. 4684–4687.

- This paper applied CoCosNet on translating pre-disaster images to simulated post-disaster images of the same area, enlarging the dataset for related deep learning tasks.
- The work was varified effective by the high accuracy of applying D-LinkNet trained with real post-disaster images on detecting damaged roads in simulated post-disaster images.

PATENTS

X. Li, **Y. Huang**, M. Zhao, "A Method, Device, System, and Virtual Node for Constructing a Digital Twin Network," Beijing: CN116318397A, Jun. 23, 2023.

X. Li, **Y. Huang**, M. Zhao, "A User-Centric Federated Learning Method and Device Based on Visible Light Communication," Beijing: CN115942499B, Jun. 2, 2023.

X. Li, M. Zhao, **Y. Huang**, "A Multi-User Scheduling Method and Scheduling Device Based on Visible Light Communication," Beijing: CN117978667B, Aug. 6, 2024.

X. Li, B. Zhang, **Y. Huang**, "A Method for Establishing a High-G Overload Incapacitation Detection Model, Detection Method, and Apparatus," Beijing: CN121093065A, Dec. 9, 2025.

X. Li, Y. Zhang, L. Zhang, **Y. Huang**, "A Containerized and Isolated Multi-Device Management System and Device," Beijing: CN120762810A, Oct. 10, 2025.

Projects

Large-Scale Distributed Mobile Ad-hoc Network Emulation System *Mar. 2022 – Jun. 2025*

This project constructed a communication **emulation** system deployed in a **distributed** framework and managed by Kubernetes. The system utilized Docker to create containers as independent nodes and emulated the effect of physical layer and data link layer through its highly flexible model plugin.

- Modified the system to emulate swarm communication with real data.
- Construct the distributed deployment pattern of the system through shell script and Kubernetes.

Deep Learning Based Human State Assessment System *Oct. 2021 – Jun. 2025*

This project construct a **non-contact human state assessment** system to monitor the realtime state of drivers and alert when abnormal state is predicted through videos captured by only one or two cameras. This system including target detection, keypoint detection, head pose estimation and time series prediction algorithms.

- Designed the framework of the human state assessment system.
- Surveyed and implemented related deep learning algorithms and the hardware of the system.

High-Resolution Road Disaster Monitoring and Assessment System *Aug. 2020 – Jun. 2021*

This project aimed to construct an **artificial intelligent** assisted system to monitor geological disasters and **assess road damage** through remote sensing images taken by satellites.

- Implemented and validated the feasibility of damaged road detection algorithm D-LinkNet.
- Applied CoCosNet on generating simulated post-disaster remote sensing images.

Skills

- **Languages:** English (IELTS: 7, GRE: 149+170), Madarin (Native)
- **Programming Languages:** Python > Java > Matlab > C > C++ > HTML + CSS + JavaScript

Honors and Awards

Outstanding Master Thesis, Awarded by BUPT *Jun. 2025*

First-Class Scholarship, Triple *Oct. 2022 - Oct. 2024*

Outstanding Graduate, Awarded by BUPT and QMUL *Jun. 2022*

Meritorious Winner, Award on 2021 Interdisciplinary Contest In Modeling *Apr. 2021*