PENG LIAO

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EDUCATION

Xidian University   **Sep. 2021 – Present**
Second-Year M.S. in Cybersecurity and Information Countermeasures   *Guangzhou, China*
- GPA: 3.4/4.0
- Supervisor: Prof. Lingling An (Xidian University), Asst. Prof. Xuyu Wang (Florida International University)
- Award: Graduate Student Innovation Fund Project (Main Participant)

Fujian University of Technology   **Sep. 2017 – June 2021**
B.S. in Data Science and Big Data Technology   *Fuzhou, China*
- GPA: 2.4/4.0
- Competition Experience: "Teddy Cup" national data mining challenge (National Third Prize, Provincial First Prize)

RESEARCH INTERESTS

Wireless sensing, IOT Security, Edge-AI, Radar, Acoustic

RESEARCH EXPERIENCE

Imbalanced Classification Using Radio Signals   **Sept. 2021 – Dec. 2022**
Master Student (Remote Intern, supervised by Asst. Prof. Xuyu Wang)   *Xidian University*
- Recently, wireless sensing techniques have been widely used for internet of things applications. However, most existing methods are highly dependent on high-quality datasets, and the minority class will not achieve a satisfactory performance when suffering from a class imbalance problem. In this paper, we propose a time-frequency semantic GAN framework to address the imbalanced classification problem in HAR using radio frequency signals.

Quantum Machine Learning Apply in Wireless Sensing   **Oct. 2022 - May. 2023**
Master Student (Remote Intern, supervised by Asst. Prof. Xuyu Wang)   *Xidian University*
- As computing power and machine learning algorithms continue to improve, deep learning techniques are increasingly used in wireless sensing applications. Concurrently, research in quantum computing is advancing rapidly, prompting researchers to explore the burgeoning field of quantum machine learning. In this paper, we propose a universal mmWave radar-based quantum system for HAR that can be executed on real quantum hardware.

Cross-domain Adversarial Perturbation Attacks.   **Apr. 2023 – Jul. 2023**
Master Student (Remote Intern, supervised by Asst. Prof. Xuyu Wang)   *Xidian University*
- Millimeter wave radar has become prevalent due to its high resolution and privacy protection. While machine learning has enhanced its capabilities, it also introduces potential security risks. Existing attacks only target a single scenario in radar sensing and do not consider cross-domain scenarios. In this paper, we present the first targeted adversarial transferability attack against radar sensing through designed universal attacks with effectiveness and stealthiness.

PUBLICATIONS

- **(TOSN'23) Peng Liao**, Xuyu Wang, Lingling An, Shiwen Mao, Tianya Zhao, and Chao Yang. TFSemantic: A Time-Frequency Semantic GAN Framework for Imbalanced Classification Using Radio Signals[J]. ACM Transactions on Sensor Networks. *(Accepted)*

- **(MASS'23)** Yingxin Shan, **Peng Liao**, Xuyu Wang, Lingling An, and Shiwen Mao. MAA: Modulation-Adaptive Acoustic Gesture Recognition[C]. IEEE International Conference on Mobile Ad-Hoc and Smart Systems. *(Accepted)*

- **Peng Liao**, Yingxin Shan, Xuyu Wang, Lingling An, and Shiwen Mao. RadH-Q: A Universal mmWave Radar-based Quantum System for Human Activity Recognition. *(Under Revision)*

- **Peng Liao**, Xuyu Wang, Yingxin Shan, Tianya Zhao, Lingling An, and Shiwen Mao. Wireless Sensing in Artificial Intelligence of Things: A General Quantum Machine Learning Framework[J]. IEEE Network. *(Under Review)*

- Yingxin Shan, **Peng Liao**, Xuyu Wang, Lingling An, and Shiwen Mao. Classical to Quantum Transfer Learning Framework for Wireless Sensing Under Domain Shift[C]. IEEE Global Communications Conference. *(Under Review)*

- **Peng Liao**, Yingxin Shan, Xuyu Wang, Tianya Zhao, Lingling An, and Shiwen Mao. Imperceptible, Transferable, and Interpretable Attack Against Cross-Domain mmWave-based Sensing Systems[C]. IEEE INFOCOM 2024-IEEE Conference on Computer Communications. *(Under Review)*

SERVICE

Invited Reviewer
- Journal: ACM Transactions on Sensor Networks (TOSN '23)