


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

- 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

- Proposed a time-frequency semantic generative adversarial network framework (i.e., TFSemantic) to generate high-quality datasets, aiming to address the imbalance classification problem, as well as enhancing the robustness and environmental adaptability of HAR models. Augmented dataset effectively overcomes the poor classification performance caused by class imbalance. Critically, it significantly improves minority class accuracy while ensuring majority class accuracy.

Quantum Machine Learning Apply in Wireless Sensing

Oct. 2022 – May. 2023

Master Student (Remote Intern, supervised by Asst. Prof. Xuyu Wang)

Xidian University

- Proposed a universal mmWave radar-based quantum system (i.e., RadH-Q) for HAR that can be executed on real quantum hardware. In RadH-Q, we have considered and implemented the following three points: feasible encoding of high-dimensional classical data, reasonable updating of hybrid model parameters, and flexible evaluation of multi-class tasks. We have verified the reliability of RadH-Q on both quantum simulators and real quantum computers.

Cross-domain Adversarial Perturbation Attacks.

Apr. 2023 – Jul. 2023

Master Student (Remote Intern, supervised by Asst. Prof. Xuyu Wang)

Xidian University

- Proposed the first targeted adversarial transferability attack (i.e., Milli-ATK) against radar sensing by designing universal attacks that are effective and stealthy. The adversarial dual-path attack generation architecture proposed in Milli-ATK enables attackers to obtain a reliable universal perturbation without the need for training data from the target domain. This addresses the issue of traditional attack methods performing poorly in cross-domain scenarios, as they are constrained by insufficient information.

PUBLICATIONS

- **(TOSN'23)** Peng Liao, Xuyu Wang, Lingling An, Shiwen Mao, Tianya Zhao, and Chao Yang. 2023. TFSemantic: A Time-Frequency Semantic GAN Framework for Imbalanced Classification Using Radio Signals. ACM Trans. Sen. Netw. <https://doi.org/10.1145/3614096>
- **(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*)
- **(Globecom'23)** 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. (*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*)
- 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)