Xue Wei

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EDUCATION

University at Albany, State University of New York **NY, USA**
PhD, Signal Processing & Communications (Advised by: Dr.Dola Saha) *01/2021 - present*
PhD, Computer Engineering (Advised by: Dr.Weifu Wang) *09/2019 - 12/2020*
GPA: 3.89/4.0

Xidian University **Shaanxi, China**
Master of Engineering, Signal and Information Processing *09/2016 - 07/2019*
GPA: 3.78/4.0

Xidian University **Shaanxi, China**
Bachelor of Engineering, Electrical and Computer Engineering *09/2012 - 07/2016*
GPA: 3.67/4.0

TECHNICAL SKILLS

Languages: MATLAB, Python, C++
Expertise: Wireless Communications Systems, OFDM, Machine Learning, USRP X310, B210 etc
Platforms: PyTorch, Robot Operating System, Unity, HFSS, LTspice, Xilinx Zynq UltraScale+ RFSoC, Vivado, Simulink, CASPER, HTG-ZRF16

Publications

My research focuses on wireless communications, wireless steganography, key generation, RFI cancellation with RIS. I have strong knowledge of OFDM, MIMO, WIFI, beamforming, RIS, Software Defined Radio, and Machine Learning techniques. I also have experience using Xilinx Zynq UltraScale+ RFSoC.

Journals

1. **Xue Wei**, Dola Saha, Gregory Hellbourg and Aveek Dutta, `IDOL`: Iterative Direction Of Arrival in Low SNR, IEEE Transactions on Cognitive Communications and Networking(Under Review).
2. **Xue Wei** and Dola Saha, `WISE`: Waveform Independent Signal Embedding for Covert Communication, IEEE Transactions on Machine Learning in Communications and Networking.
3. Jin Liu, **Xue Wei**, Langlang Li, MR Image Segmentation Based on Level Set Method, Multimedia Tools and Applications, 79, pages11487–11502(2020).

Conferences

1. **Xue Wei**, Dola Saha and Anna Quach, Exploiting Multi-Domain Features for Detection of Unclassified Electromagnetic Signals, in IEEE Military Communications Conference (MILCOM) 2024.
2. Zhibin Zou, **Xue Wei**, Xin Tian, Genshe Chen, Aveek Dutta, Khanh Pham, Erik Blasch, Joint Interference Cancellation with Imperfect CSI, in IEEE Military Communications Conference (MILCOM) 2024.
3. **Xue Wei**, Anushka Gupta, Aveek Dutta, Dola Saha and Gregory Hellbourg, RIS for Signal Cancellation in 3D, in IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN) 2024.
4. **Xue Wei** and Dola Saha, KNEW: Key Generation using NEural Networks from Wireless Channels, in N2Women Workshop ACM SIGCOMM 2023.
5. **Xue Wei**, Dola Saha, Gregory Hellbourg, Aveek Dutta, Multistage 2D DoA Estimation in Low SNR, in IEEE International Conference on Communications (ICC) 2023.
6. Zhibin Zou, **Xue Wei**, Dola Saha, Aveek Dutta, Gregory Hellbourg, SCISRS: Signal Cancellation using Intelligent Surfaces for Radio Astronomy Services, in 2022 IEEE Global Communications Conference (GLOBECOM).
7. **Xue Wei** and Dola Saha, KNEW: Key Generation using NEural Networks from Wireless Channels, in ACM Wireless Security and Machine Learning (WiseML) 2022.
8. Hesham Mohammed, **Xue Wei** and Dola Saha, Adversarial Learning for Hiding Wireless Signals, in 2021 IEEE Global Communications Conference (GLOBECOM).
9. Jin Liu, **Xue Wei**, Qi Li, Langlang Li, A Level Set Algorithm Based on Probabilistic Statistics for MR Image Segmentation, 2018 International Conference on Intelligence Science and Big Data Engineering, PP. 562.
10. Jin Liu, Langlang Li, Qi Li, **Xue Wei**, Collaborative Error Propagation for Single Sample Face Recognition, 2018 International Conference on Intelligence Science and Big Data Engineering, PP. 332.

Research Experience

AI Tutor - STEM Specialist in xAI 2024 Dec – present

- Refine annotation tools and address complex problems from STEM fields to improve model performance, support and ensure the delivery of high-quality curated data during the training of new tasks

Research intern in Intelligent Fusion Technology, Inc 2024 May – 2024 Aug

- Build a GPS receiver to receive and process multi-system GPS signals using USRP
- Design neural networks for canceling interference for time-varying MIMO channels

Research assistant in University at Albany, SUNY 2019 Sep – present

Mobile Emerging Systems and Applications (MESA) Lab 2021 Jan – present

Open Set waveform Recognition(Cooperate with INL)

- Generate Zigbee, Bluetooth, LTE, and WiFi data sets and provide wireless technical support
- Extract features from autoencoders and design GAN to generate synthetic data and classify waveforms

NSF SWIFT: RFI cancellation using RIS(Cooperate with Caltech)

- Propose 3D RFI cancellation by controlling the phase and amplitude to cancel incident RFI on telescope
- Provide blueprints and circuit analysis for RIS array prototyping across multiple DoAs
- Propose a three-stage algorithm that exploits digital beamforming, creates virtual subarrays, inspects multiple options and introduces clustering to estimate the DoA in low SNRs

Key generation

- Train two NNs simultaneously to reconstruct each other's channel estimates and map each other's channel estimates to a latent space that is inaccessible to the adversary
- Extract the implicit features of channel in a compressed form to derive keys with high KGR and low KDR

Wireless steganography

- Design a complex-valued neural network to enable wireless steganography where the covert signal is encoded to resemble hardware generated noise
- This method has nothing to do with any properties of the covert signal (waveform or modulation order
- Transmit signals over the air and apply the transfer learning to retrain the model to further optimize the system and get a lower bit error rate

Prof.Wang's lab 2019 Sep - 2020 Dec

NSF Collaborative Research: Teaching human motion(Cooperate with Dartmouth)

- Explore how to decompose complex physical motion making it easier for humans to understand and learn
- Build a teaching environment in a virtual environment (VR + unity)
- Use real robot teaching frontend(ABB YuMi) to demonstrate motion clips(breaststroke, butterfly, etc)

Research assistant in Xidian University 2016 Sep - 2019 Jul

Medical Image Segmentation and Face Recognition

- Propose MR image segmentation algorithm based on the level set algorithm to address challenges, like uneven gray level distribution, strong background interference, and blurred target area
- Propose a cooperative model that integrates global and local information to enhance recognition accuracy of facial images under varying conditions in a single-sample face recognition environment.

Teaching Experience

IECE 111-Introduction to ECE, IECE 141-Introduction to Programming — Spring 2022
IECE 553-Cyber-Physical Systems, IECE 110-Introduction to Engineering — Fall 2021
IECE 371-Signals and Systems, IECE 110-Introduction to Engineering — Fall 2020

Selected Courses

Random Process, Digital Signal Processing, Advanced Electronic Circuits, Modern Wireless Networks, Robotics, Cyber-Physical Systems, Linear Control Theory, Adv Digital Communications and Info Theory, Inference, Mach Lrn

Awards and Honors

MILCOM 2024 ComSoc Student Travel Grant — MILCOM2024
ACM SIGCOMM 2023 Student Travel Grant — SIGCOMM2023
ACM WiSec2022 Student Travel Grants — Wisec2022
Presidential Fellowship Award 2021 — University at Albany
Presidential Fellowship Award 2020 — University at Albany
Excellent Graduate Student, First Class Graduate Student Scholarship — Xidian University