GUOLIN YIN

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Education

Device-Free Wireless Sensing, Ph.D **Sep 2020 – Sep 2024**
Department of Electronics, Electrical Engineering and Computer Science *University of Liverpool*

Communication and Signal Processing, M.Sc *(Merit)* **Oct 2018 – Dec 2019**
Department of Electronics, Electrical Engineering *University of Manchester*

Electronic Engineering, B.Eng. *(First Class)* **Sep 2016 – Sep 2018**
Department of Electronics, Electrical Engineering Coventry University

Communication Engineering, B.Eng. *(GPA: 3.7/4.0)* **Sep 2014 – Sep 2016**
Department of Electronics, Electrical Engineering Guilin University of Electronic Technology

Work Experience

Research Associate University of Liverpool **Jul 2024 – Present**

- Leading an EPSRC-funded project on radio frequency fingerprint identification (RFFI), focusing on enhancing physical layer security with advanced AI techniques. Developing and design AI model for identifying RF signatures to enhance the security of communication and IoT systems.
- Collaborating with academic partners Heriot-Watt University and Queen's University Belfast, and industry partner MathWorks, to implement and test innovative security solutions.

Data Scientist (Part-time) SC Solutions AI **Dec 2023 – Jul 2024**

- Led a multidisciplinary research team of five members in an ***innovate UK*** funded project. Coordinated tasks and facilitated effective communication within the team, ensuring timely completion of project milestones and fostering a collaborative working environment.
- Developed commercial applications using advanced AI and remote sensing technique for agriculture, including crop growth trend prediction, crop classification, and biomass estimation. The developed models achieved higher accuracy than traditional methods at a significantly lower cost.

Teach Assistant University of Liverpool **Dec 2020 – Jun 2024**

- Assisted students in subjects categorized into two main areas: data-focused topics like statistics, machine learning, and databases, using Python and MATLAB; and hardware-oriented subjects such as electronic circuit design and communication systems.
- Enhanced my presentation and communication skills, along with organizational abilities, through the preparation and delivery of educational content, leading discussions, and managing various course activities as a Teaching Assistant.

Research Intern CoastSense UK **May 2023 – Aug 2023**

- Proposed an autoencoder method for noise reduction in marine radar data, improving potential data quality, and conducted an in-depth analysis of radar usage in coastal monitoring to enhance environmental analysis accuracy.

Research Intern Asset Handling UK **Feb 2023 – May 2023**

- Engineered and deployed Bluetooth Wireless vibration sensors for marine applications, overcoming data transmission and integrity challenges during internet outages, to ensure consistent and reliable environmental monitoring.

Research Experience

Adapting Wi-Fi Sensing Model to Dynamic Sampling Rate **April 2023 – Dec 2023**
Ph.D Project *University of Liverpool*

- Developed a novel approach in Wi-Fi sensing, to effectively handle variable input sizes and adapt to different sampling rates, enhancing real-world application flexibility.
- Introduced and implemented dynamic sampling rate augmentation techniques, significantly boosting model robustness and performance across varied real-world sampling conditions.

Adversarial Machine Learning in Wi-Fi Sensing Systems **Feb 2022 – Dec 2022**
Ph.D Project *University of Liverpool*

- Conducted an in-depth analysis on adversarial attacks in Wi-Fi sensing systems to understand and demonstrate the vulnerability of DNN models to signal manipulation. This involved adopting white-box attacks (FGSM, PGD, DeepFool) and black-box attacks to the Wi-Fi sensing system. Developed an eavesdropping attack algorithm based on Wi-Fi characteristics.
- Proposed a certifiable defence method for Wi-Fi-based gesture recognition systems, motivated by the need to enhance their security and resilience against adversarial scenarios.

Wi-Fi-based Cross-domain Gesture Recognition System Github **Feb 2021 – Dec 2021**
Ph.D Project *University of Liverpool*

- Researched on Wi-Fi sensing systems in cross-domain scenarios and developed FewSense, a few-shot learning-based system designed to adapt to new environments without retraining, thereby addressing the scalability and domain dependency issues prevalent in existing Wi-Fi sensing technologies.
- Achieved a remarkable 90% accuracy in cross-environment recognition for novel classes, outperforming existing methods, thereby significantly enhancing the practical applicability and reliability of Wi-Fi-based sensing systems.

Publications

Journal Paper

- **G. Yin**, J. Zhang, G. Shen, and Y. Chen, "FewSense, towards a scalable and cross-domain Wi-Fi sensing system using few-shot learning," *IEEE Trans. Mobile Comput.*, vol. 23, no. 1, pp. 453-468, Jan. 2024.
- **G. Yin**, J. Zhang, X. Yi, X. Wang, and Y. Chen. Adversarial attacks against deep learning-based Wi-Fi sensing systems and countermeasures. *IEEE Trans. Mobile Comput., 2023.* Under Review.
- **G. Yin**, J. Zhang, G. Shen, "Towards a Practical Wi-Fi Sensing Under Variable Traffic Patterns," *IEEE Trans. Mobile Comput., 2024*, Under Review.

Awards

Hong Kong and Tung Postgraduate Scholarships **2021, 2022, 2023**

Skills

Python: Pandas, Dklearn, NumPy, Tensorflow, Pytorch
Data visualisation: plotly, matplotlib, seaborn

I am adept at rapidly assimilating information and transforming it into engaging narratives for presentations and whitepapers. Alongside this, I have a strong enthusiasm for a variety of machine learning algorithms and their practical applications in real-world scenarios, coupled with a keen interest in data analysis and a curiosity for exploring new scientific frontiers.