Yihan Xu

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Summary

I am a Ph.D. Candidate in Electrical and Computer Engineering with a strong background in sensing, deep learning, data analysis, network modeling, IoT, and blockchain, with recent experience in sustainable environmental engineering. I excel at identifying limitations and challenges, and I develop innovative, data-driven solutions using advanced analytical techniques. Currently leading serval teams on a deep learning task, ground generating radar, and IoT task. I effectively collaborate with interdisciplinary teams to drive project success. My expertise includes deep learning, electromagnetic, sensing, etc and I am passionate about applying cutting-edge research to solve real-world problems.

Education

Ph.D. **New York Institute of Technology**, Electrical and computer engineering — 2022 – present
- Expected Graduation: Summer 2025
- Dissertation: Soil/Liquid Sensing, Flood study, Deep Learning, Software Defined radio

MS **New York Institute of Technology**, Computer Science — 2019 – 2022
- GPA: 3.840/4.000
- Relevant Coursework: Computer Network, Deep Learning

BS **Shanghai Maritime University**, Electronic Engineering — 2013 – 2017
- Club Minister (2014 - 2015)
- Relevant Coursework: Control System, Signal and System

Experience

Shrieve Chemical, Marketing Assistant (intern) — Shanghai, China, 2016 – 2017
- Create and schedule content for social media platforms and produce event promotional materials.

New York Institute of Technology, Teaching Assistant — New York City, NY, 2021 – present
- Develop and design computer network lab

Halliburton, Wireline and Perforating, Electromagnetic Engineer (intern) — Houston, TX, May, 2024 – August, 2024
- Designed and implemented a Finite Difference Frequency Domain (FDFD) algorithm to measure formation conductivity.
- Assisted in troubleshooting and debugging Machine learning for pipeline corrosion detection.
- Presented project findings and recommendations to senior engineers and managers.

Technologies and Research Field

Languages: C++, Python, Matlab
Research field: Soil sensing, Liquid pollution sensing, Machine learning, Ground generating radar, Raspberry Pi, IoT, Blockchain

Projects

Wireless Soil Sensing:

- Developed advanced communication and sensing systems to measure critical soil parameters, including nitrogen levels, moisture content, and **salinity**, enhancing precision agriculture practices.
- Utilized Software Defined Radio technology to design flexible and cost-effective wireless sensor networks for real-time soil monitoring.
- Applied the finite difference method to simulate electromagnetic wave propagation in soil, optimizing sensor placement and improving signal accuracy.

Liquid Sensing:

- Designed a reconfigurable substrate-integrated waveguide (SIW) sensor for detecting and analyzing liquid pollutants in water sources.
- Employed FEKO electromagnetic simulation software to model sensor behavior and optimize design parameters for enhanced sensitivity and selectivity.
- Implemented machine learning algorithms to classify types of liquid pollutants based on sensor data, achieving high accuracy in pollutant identification.

Flash Flood in New York City

- A comprehensive flash flood study in New York City examines the factors contributing to sudden flooding events, including meteorological conditions, urban infrastructure, and land use patterns.
- Utilizes machine learning techniques, such as XGBoost, to analyze the contribution of various factors to flood risks and predict flood depth.
- Aims to enhance flood forecasting and inform urban planning decisions to better mitigate future flash flood impacts in the city.

IoT Testbed with blockchain

- Developing a Raspberry Pi-based IoT testbed for the smart city.
- Wireless network design and edge computing application in the IoT system
- Applying blockchain to solve the challenges in scalability and security for IoT testbed.

Research Statement

My research integrates machine learning, deep learning, computer networks, big data analytics, electromagnetics, and sensing technologies. During an intensive research internship, I worked as an electromagnetic scientist, focusing on 3D induction logging modeling using the Finite Difference Method and applying machine learning techniques to detect pipeline corrosion. This work contributed to an improved understanding of subsurface sensing and electromagnetic modeling.

In academic settings, I lead and contribute to several interdisciplinary research projects with real-world impact. In the Wireless Soil Sensing project, I developed advanced communication and sensing systems to monitor soil nitrogen concentration, leveraging Software Defined Radio (SDR) technology for flexible and cost-effective deployment. In parallel, I am investigating the application of ground-penetrating radar (GPR) for disaster-related detection tasks, including subsurface anomaly identification and infrastructure assessment.

For liquid sensing, I designed a reconfigurable substrate-integrated waveguide (SIW) sensor to detect and classify waterborne pollutants. Using FEKO for electromagnetic simulation, I optimized sensor design and performance. I further integrated machine learning algorithms to accurately identify pollutant types based on sensor response patterns.

In the Flash Flood in New York City study, I lead a deep learning–based project that combines environmental, meteorological, urban infrastructure, and socioeconomic data to enhance flood forecasting capabilities. As team leader, I coordinate researchers at both the undergraduate and graduate levels, organize research discussions, mentor students, and oversee experimental design and model evaluation. This work employs XGBoost and other machine learning methods to identify critical flood predictors and support early warning systems and data-driven urban planning.

Additionally, I am developing an IoT testbed for smart cities, utilizing Raspberry Pi platforms to design wireless network architectures and implement edge computing strategies. The system incorporates blockchain technologies to address scalability, security, and data integrity challenges in distributed IoT environments.