[redacted] Yu

Ph.D. Student · ECE · Virginia Tech

[redacted], Virginia Tech, Blacksburg, 24060, VA

[redacted]

Education

Virginia Tech — *Blacksburg, VA*

Ph.D. in Communication Engineering — *Aug. 2017 - PRESENT*

- GPA: 3.90/400
- Key courses: Advanced Machine Learning, Software Designed Radio, Robot Motion Planning

NTU(National Taiwan University) — *Taipei, Taiwan*

M.S. in Communication Engineering — *Sept. 2014 - Jul.2017*

- GPA: 3.50/ 4.00
- **Thesis:Advanced Scheduling of IEEE802.15.4e TSCH Wireless Networks**

BIT(Beijing Institute of Technology) — *Beijing, China*

B.S. in Information Engineering — *Sept. 2009 - July. 2013*

- GPA: 3.38/ 4.00
- **Thesis: Design of GPS Signal Processing Simulator on MFC**

Research Interest

- **Reinforcement Learning on Dynamic Channel Access**
- Software Designed Radio
- Micro controller and Interfaces
- Wireless Sensor Network/ Body Area Network/Unmanned Aerial Vehicle
- Millimeter Wave Communication/ Cellular Network

Skills

Programming C/C++, Python, Matlab, Shell, Markdown, Java, Latex, HTML/CSS, Verilog, R, SQL.

Toolkit& Library Tensorflow, PyTorch, GNUR Radio, ROS, NS3, ITPP++, OpenWSN, Android Studio.

Publications

- Mark Kozy, [redacted]Michael Buehrer, etc "Applying Deep-Q Networks to Target Tracking to Improve Cognitive Radar", in **IEEE Radar** 2019.
- Yue Xu [redacted]William C Headley, Michael Buehrer, " Deep Reinforcement Learning for Dynamic Spectrum Access in Wireless Networks", in **IEEE Milcom** 2018.
- Yue Xu, J[redacted]chael Buehrer, "Dealing with Partial Observations in Dynamic Spectrum Access: Deep Recurrent Q-Networks", in **IEEE Milcomm** 2018 (*invited paper*).
- J[redacted]ung-Yun Hsieh, "Application of Multiple Interfaces and Balanced Tree Routing of Low-delayed Convergecast in IEEE802.15.4e TSCH M2M Networks", in **IEEE ICCS** 2016.
- J[redacted]ung-Yun Hsieh, "Building Cost-Balanced Routing Trees for Fast Data Collection in IEEE 802.15.4e TSCH Networks", in ICEECS 2016.

Intern & Work Experience

Virginia Tech, Research Assistant — *Blacksburg, VA*

Fall 2018 - Current

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Virginia Tech, Teaching Assistant of EE2534 Microcontroller and Interfacing *Blacksburg, VA*

Spring 2018, Fall 2017

- Instruct students debugging or solve problems with their hand-on projects, which cover over 1000 lines of code/ 20 hour programming work by average.
- Help to design homework and labs by providing solutions and feedback individually

Research Experience

MPRG Lab, Virginia Tech *Blacksburg*

Under the instruction of Dr. Michael Buehrer *Sept. 2017 - present*

- **SC2 DAPRA - Spectrum Collaboration Challenge**
  - Apply Reinforcement Learning on dynamic channel access,
  - Implement Markov Decision Process(MDP), Deep Q Network(DQN) to share spectrum with hopping or intermittent nodes (**in publication**),
  - Implement POMDP, Deep Recurrent Q Network(DRQN) to deal with partial observation (**in publication**),
  - Explore to learn stochastic nodes and hidden nodes,
  - Explore fast and suboptimal converge cast algorithm.
- **Cognitive Radar**
  - Equip radar with neural network methods like Deep Q Network and Deep Policy Gradient to precise track objects with different trajectory, under various kind of interference.
- **DoA Estimation with Machine Learning**
  - apply machine learning to estimate direction of arrival at vector sensor.

TONIC Lab, NTU *Taipei*

Under the instruction of Dr. Hung-Yun Hsieh *Sept. 2014 - Jul. 2017*

- **Advanced Scheduling of IEEE802.15.4e TSCH Wireless Networks**
  - Explore different metric of matching and coloring to achieve faster convergecast.**[pdf link]**
  - Design cost balanced tree topology and implement multiple interface on the coordinator for achieving faster convergecast, parts of the work is in **Publications**.
  - Allocate resource for retransmission to ensure reliability under degraded channel.
  - Stochastic Optimization method to schedule.**[pdf link]**

Radar Technology Research Lab, BIT *Beijing*

Under the instruction of Dr. Feng Liu *Mar. 2013 - June. 2013*

- **Design of GPS Signals Processing Simulator on MFC.**
  Work of B.S thesis, implement algorithms from the GPS standards on the MFC interface, including the basic part like modulation, error coding, synchronization adjustment and PLL, then show the plot figures with extensive toolkits under different settings.

Selected Past Projects

- **Obstacle Avoid Car with DQN in Unreal Engine & Airsim**
  Car start somewhere surrounded by obstacle, plan to get out without collide eventually by Reinforcement Learning. **[link]**
- **Implementation of a Tiny MIMO Communication System with USRPs**
  Implement 2X2 MIMO system on 4 Ettus N210 devices with GNU Radio Companion and some OOT programmings, able to successfully transmit text, image and audio. **[pdf link]**
- **Smart Light**
  Automatically switch on or off lights according to the user position in a house, implement on the TI Soc CC2530 with luminance sensor.**[Youtube Link]**
- **Simulations of DSRC protocol with NS3**
  Analyze the performance of Dedicated Short Range Communication (DSRC) protocol with different QoS requirements or traffic pattern with NS3 simulator.**[pdf link]**
- **Multiuser MIMO with LTE codebook precoder**
  Propose precoding schemes like choosing eigen vectors, selecting PMI from LTE codebook to reduce the inter-beam interference, and find the effect of the channel correlation of different users. **[pdf link]**
- **Cuisine Prediction from Recipe**
  A classification problem on Kaggle, with a training dataset around 4K MB. Step by step trial with cosine similarity, PCA reduction, xgboost(extreme gradient boosting toolkit), item split, LDA and grid search method in R or python codes, and finally reach top 5% with 82% accuracy. **[pdf link]**