Yuzhe Yang

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EDUCATION

School of Electronic Engineering and Computer Science, Peking University   *Aug. 2014 - Present*

➢ **Overall   Ranking: 4/53,   Cumulative GPA: 3.71/4,   Major GPA: 3.83/4**

➢ **Junior Year   Ranking: 1/53,   Cumulative GPA: 3.92/4,   Major GPA: 3.93/4**

➢ **Core Courses:** Information and Coding Theory (96/100), Methods of Mathematical Physics (97/100), Data Structure and Algorithm (96/100), Electrodynamics (99/100), Signals and Systems (93/100), Principle of Microcomputer (99/100), Computer Networks (Honor Track) (95/100), Principle of Circuit Analysis (92/100), Academic Writing and Report (92/100), Emerging Techniques for Modern Wireless Communications (94/100)

Honors and Awards:

➢ 2017 IEEE ComSoc Student Competition **First Prize** (1st out of 23 finalists), serving as *Team Leader*

➢ 2017 National Scholarship (highest honor), The Chinese Government, Top 0.1% nationwide

➢ 2017 Distinguished All-Round Leader-Student, Peking University, Top 1/53

➢ 2016 Samsung Scholarship, Samsung Electronics Co., Ltd, Top 3/53

➢ 2016 Distinguished All-Round Student, Peking University, Top 3/53

➢ 2015 Wu Si Scholarship, Peking University, Top 10%

➢ 2015 Outstanding Research Award, Peking University

RESEARCH EXPERIENCE

Research Assistant, Institute of Wireless Communications and Signal Processing

Advisor: **Prof. Lingyang Song**, *School of EECS*

I. Sensor Location Recommendation for 3D Fine-Grained Air Quality Monitoring via Semi-Supervised Learning   *Sept. 2017 – Present*

➢ Designed a multi-layer 3D spatial-temporal correlation graph model; proposed an entropy-based semi-supervised learning method for air quality index (AQI) estimation, based on very sparse raw data

➢ Designed an Entropy Minimization Ranking algorithm to select and recommend most suitable sensor locations for 3D fine-grained AQI monitoring

➢ Constructed method greatly outperforms other methods w.r.t. estimation accuracy, and the proposed algorithm provides near-optimal choices for sensor deployment

II. Optimal Drone Trajectory Planning for 3D Mobile Sensing   *Jun. 2017 - Aug. 2017*

➢ Defined the "dominating path" using the concept of dominating set; established a multi-layer 3D network model; formulated the problem as the minimum dominating path problem

➢ Mathematically derived the function of optimal dominating path for the 3D grids; determined the lower bound of the optimal path for different sizes of grids

➢ Proposed algorithm saved 32% time, while covering 19% more sensing scope than existing solutions

III. Realtime Profiling of Fine-Grained 3D AQI Distribution using UAV Sensing   *Dec. 2016 - Jun. 2017*

➢ Designed a mobile sensing system by unmanned-aerial-vehicle (UAV) to profile realtime fine-grained 3D AQI map

➢ Proposed a novel distribution model that consists of a linear part using Gaussian Plume model (GPM), and a non-linear part using Artificial Neural Networks (ANNs)

➢ Designed the adaptive monitoring algorithms for UAV measurement, and formulated a sub-optimal trajectory planning algorithm

➢ Demo video can be found on YouTube: https://www.youtube.com/watch?v=POX-kazz_Ec

IV. Outdoor 3D Spectrum Map Reconstruction via UAV Sensing   *Jul. 2016 – Dec. 2016*

➢ Assembled two UAVs with separate modules, adjusted their PID parameters by debugging motors' outputs (using SITL on Linux to do UAV simulation), and realized stable flying and loitering

➢ Divided outdoor complex space into cubes with regular shape, using an Android smartphone boarded on the UAV to sense the Wi-Fi intensity, i.e. received signal strength (RSS)

➢ Used random walking model via Markov chain for UAV to detect possible dramatic changes

PUBLICATIONS

- **Yuzhe Yang**, Zijie Zheng, Kaigui Bian, Lingyang Song and Zhu Han. "Realtime Profiling of Fine-Grained Air Quality Index Distribution using UAV Sensing," accepted by *IEEE Internet of Things Journal*, Nov. 2017.

- **Yuzhe Yang**, Zijie Zheng, Kaigui Bian, Yun Jiang, Lingyang Song and Zhu Han. "Arms: A Fine-grained 3D AQI Realtime Monitoring System by UAV," *IEEE Global Communications Conference (Globecom)*, Singapore, Dec. 2017.

- **Yuzhe Yang**, Zhiwen Hu, Zijie Zheng, Kaigui Bian and Lingyang Song. "3D Air Pollution Monitoring System in Urban Areas using UAV," **First Prize** (1st out of 23 finalists), *IEEE ComSoc Student Competition: Communication Technology Changing the World.* Aug. 2017.

- Pengyu Zhao, **Yuzhe Yang**, Yuanxing Zhang, Kaigui Bian and Lingyang Song. "Optimal Trajectory Planning of Drones for 3D Mobile Sensing," submitted to *IEEE International Conference on Computer Communications (INFOCOM)*, May 2018.

- **Yuzhe Yang**, Zijie Zheng, Kaigui Bian, Lingyang Song and Zhu Han. "Sensor Deployment Recommendation for 3D Fine-Grained Air Quality Monitoring using Semi-Supervised Learning," submitted to *IEEE International Conference on Communications (ICC)*, May 2018.

COURSE PROJECTS

Dynamic Webpages   *Jan. 2017 - Present*
- Implemented dynamic webpages by HTML/CSS (Bootstrap), JavaScript (jQuery), Python, Node.js and MySQL
- Presented real-time 3D fine-grained air quality index (AQI) map in Peking University
- Scraped AQI data from Moji website in real-time, and presented 2D AQI map in China with local photos

OFDM System Design and Simulation   *May 2017 - July 2017*
- Designed effective IIR filter to do signal processing on transceiver for OFDM symbol
- Used BPSK/QPSK modulation, cyclic prefix (CP), up/down-sampling, and realized theoretical BER result

Microcomputer Design   *Mar. 2017 - July 2017*
- Designed elevator control system for microcomputers (single chip) by C51
- Realized robust Finite-State-Machine with controlling of 6 floors, keyboard input, "Beep tone" by voice data stored in SPI Flash, graphic interface on TFT screen
- Used multiple modules as LED, Lcd1602, keyboard, TFT, AD/DA and SPI Flash

Image Processing with MATLAB   *Mar. 2016 - July 2016*
- Used four different methods to process image combined with Gaussian Noise and Obfuscation
- Realized different algorithms and compared their performance
- Used two different ways to realize Constrained Least Squares Algorithm

Adjustable Sawtooth-Wave Generator   *Mar. 2016 - July 2016*
- Theoretically calculated the parameters of each element, designed three plans and compared their performance; optimized some parameters and selected the best parameter
- Constructed new functions in Cadence to measure and simulate the function of the generator
- Project won Top 3 overall

Multi-Band Filter   *Oct. 2015 – Dec. 2015*
- Designed a multi-band filter and realized it on a circuit board
- Innovatively used Active Filter to realize the function, with fewer components
- Realized two fixed bands (300~400Hz, 2500~3000Hz) and two changeable bands (1200~1600Hz, 1700~2100Hz) controlled by a switch

SKILLS

Technical: C/C++, Python, Linux, Assembly, MATLAB, VHDL, Git, Cadence, HTML/CSS, JavaScript, Node.js, SQL, LaTeX

ENGLISH PROFICIENCY

TOEFL	Total: 104	Reading: 30	Listening: 25	Speaking: 22	Writing: 27
GRE	Verbal: 153	Quantitative: 170	Analytical Writing: 3.5	