CHENYE YANG

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For more information, please visit my website at *yangchenye.github.io*

EDUCATION

Columbia University, United States   *Sep 2019 - Apr 2021*
M.S. Advanced Research Specialization in Electrical Engineering   **Cumulative GPA: 3.8/4.0**
Nikola Tesla Electrical Engineering Scholarship

Xi'an Jiaotong University, China   *Sep 2015 - Jun 2019*
B.Eng. in Automation   **Cumulative Grade: 89.42/100**
Honors Electronic and Information Engineering Program (QianXuesen Class)

National University of Singapore, Singapore   *Jul 2017 - Aug 2017*
Summer Program on Unmanned Aerial Vehicle   **Grade: A+**

RESEARCH EXPERIENCES

Edge AI System for Smart Home   *Prof. Xiaofan (Fred) Jiang, Columbia University, Jun 2021 - Sep 2021*
Summer Research Assistant in Columbia Intelligent and Connected Systems Lab.
- A system able to auto-discover the sensors connected to it and allocate sensor and actuator resources according to the smart home applications users specified, deployed in multiple lab rooms.
- Survey on current Edge AI systems and Digital Twin (DT) representation, and design our own system architecture from MCU and sensor hardware to user application. Build the testbed from scratch.
- Testbed: Arduino Uno reads custom sensor data (vibration, sound, etc.) and transmit them to ESP8266 via UART. ESP8266 packs data with DT format and MQTT discovery format, and sends them to lab computer server (HTTP with Flask) and Home Assistant Raspberry Pi server (MQTT). Integrate Google Nest camera into HA and get the video stream. Data stored in PostgreSQL and MarialDB.

Fever Screening System   *Prof. Xiaofan (Fred) Jiang, Columbia University, Jan 2020 - May 2021*
Research Intern in Columbia Intelligent and Connected Systems Lab.
- A low-cost system based on RGB-thermal camera for continuous fever screening of multiple people without human interaction, deployed in a restaurant and hospital clinic in New York City.
- Investigate solutions. Match multiple RGB and thermal heads, train and deploy YOLOV3 (head detection) and FSA-Net (head orientation regression), estimate distance using non-identical RGB and thermal camera, etc. Write paper.
- Two publications accepted by SenSys 2020 Poster and CPHS 2021. Columbia news. Project website.

Khameleon Scheduler in Reinforcement Learning   *Prof. Eugene Wu, Columbia University, Jul 2020 - Sep 2020*
Research Intern in WuLab Columbia University.
- The server-side scheduler involves a complex optimization based on available resources, predicted user interactions, and response quality levels to maximize user-perceived interactivity in real-time.
- Create the simulated RL environment, write Q-Learning and SARSA based prefetching scheduler to trade off latency for response quality with the progressive encoded response in cloud-based interactive applications.

Optical Quantum Information   *Prof. Xiaoqi Zhou, Sun Yat-Sen University, Feb 2019 - Jun 2019*
Undergraduate Thesis. Research Intern in Optical Quantum Information Lab.
- Simulation of integrated optics for quantum information applications.
- Design methods to solve optimal parameters of grating coupler based on regression analysis and constrained optimization problem solving. Conduct simulation experiment with one-dimensional grating coupler.

Cyber-Physical Energy Systems   *Prof. Jiang Wu, Xi'an Jiaotong University, Oct 2017 - Feb 2019*
Member of XJTU Information-technology Talent Program.
Research Intern in Ministry of Education Key Lab for Intelligent Networks and Network Security.
- Proposed centralized K-means algorithm, using weighted combination of features from PCA and prior knowledge. Expanded it to distributed cases, using parameter consensus and feature transferring method.
- Write centralized & distributed K-means clustering algorithms for massive data on energy demand side. Analyze the results obtained from the power system in a city. Write paper.
- Two papers written and one accepted by Chinese Control Conference 2018.

PUBLICATIONS

- Stephen Xia, Rishikanth Chandrasekaran, Yanchen Liu, **Chenye Yang**, Tajana Simunic Rosing, Xiaofan Jiang, "A Drone-based System for Intelligent and Autonomous Homes" *SenSys 2021 Best Demo Award*.
- Peter Wei, Yanchen Liu, Hengjiu Kang, **Chenye Yang**, Xiaofan Jiang, "A Low-Cost and Scalable Personalized Thermal Comfort Estimation System in Indoor Environments" *CPHS 2021*.
- Peter Wei, **Chenye Yang**, Xiaofan Jiang, "Low-Cost Multi-Person Continuous Skin Temperature Sensing System for Fever Detection: Poster Abstract" *SenSys 2020 Poster*.
- Pengyuan Liu, **Chenye Yang**, Jiang Wu, "Hybrid Features Based K-means Clustering Algorithm for Use in Electricity Customer Load Pattern Analysis" *2018 37th Chinese Control Conference*.

PROJECTS & TEACHING EXPERIENCES

Course projects:	Internet of Things, Large Scale Stream Processing, Sparse Models for High-D Data, Statistical Learning, Random Matrix Theory, Systems on Chip
Teaching:	M.S. Teaching Assistant for E4764 IoT - Intelligent and Connected Systems in Fall 2020

Large Scale Stream Processing   *Prof. Deepak S. Turaga, Columbia University, Jan 2020 - May 2020*
- Create data generator and stream processor with python multi-threads, database and website for storage and control.
- Design the socket and HTTP data communication, and websocket control communication between each part.

Sparse Models for High-Dimensional Data   *Prof. John Wright, Columbia University, Jan 2020 - May 2020*
- A system able to fast detect moving objects in high-resolution video. Tested on a sport video and daily scenario.
- Super-resolution reconstruction of video frame is used to make processing fast while keeping a high-res video.

Internet of Things   *Prof. Xiaofan (Fred) Jiang, Columbia University, Sep 2019 - Dec 2019*
- Program ESP8266 to deal with IO, work with APIs, run as server, connect to MongoDB and recognize gesture.
- Design a distributed scalable system to measure soil conditions over long duration at multiple locations via LoRa wireless communication. Data is stored in MongoDB. A website is built for data visualization and systems control.

Statistical Learning   *Prof. Predrag Jelenkovic, Columbia University, Sep 2019 - Dec 2019*
- Reproduce the results about identification and authentication in *Smartphone and Smartwatch-Based Biometrics Using Activities of Daily Living* with *WISDM Dataset* using Decision Tree, Random Forest and K-NN.
- Conduct Support Vector Machine on the same dataset and compare different methods.

INTERNSHIP EXPERIENCE

WiLO Networks Inc., California US   *Network Engineer*   *Oct 2021 - Apr 2022*
· **Network**
- Build a mesh network based on LoRa PHY with ESP32 board + LoRa SX1276 chip for low-cost smart agriculture.
- Work with MCCI LoRaWAN LMIC Library to realize the register level operating mode transition, interruption and data Tx Rx and CAD sequence of SX1276, and OS.Job level communication timing of ESP32.
- Design the LoRa protocol between gateway and multiple nodes. Propose strategies to ensure the auto-initialization and the long-term robustness of mesh network. Implement field test in Duke Smart Farm and simulation in NS-3.
- Investigate mesh for LoRa PHY network.
· **Cloud & ML**
- Implement the data flow from sensors to microcontroller to cloud. Use Azure InfluxDB to do data fusion and ML.
· **Hardware**
- Design and build the PCB for 2.45GHz and 5.8Ghz back-scatter tag. Choose components and design PCB layout.
· **Other**
- Organize and standardize WiLOLoRa.lib and WiLOSensors.lib to support the operating of LoRa mesh network and interfacing of multiple sensors and code reuse. Create KiCad schematic library and footprint library for PCB design.

TECHNICAL SKILLS

Programming:	Python, C/C++/SystemC, Matlab, HTML, R, VerilogHDL
Software & Tools:	**Design:** KiCad, Autodesk Inventor, Altium Designer, LabVIEW, FDTD Solutions
	IDE: VS Code, PlatformIO, PyCharm, etc
	Others: GitHub, Linux, NS-3, LaTeX, Docker, TensorFlow, OpenCV, Spark, AWS, GCP

AWARD

- Columbia University: Nikola Tesla Scholarship   *Sep 2019*
- Xi'an Jiaotong Univeristy: Outstanding Student, Siyuan Scholarship, Third Scholarship   *Oct 2017 - Dec 2018*