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EDUCATION

PhD in Computer Science 2011.08 – 2018.05

Purdue University (West Lafayette, IN, USA)

GPA: 3.93

- Research Interests: Internet of Things (**IoT**) and Wireless Sensor Networks (**WSNs**)

BS in Electronic Engineering 2007.09 – 2011.07

University of Science and Technology of China (Hefei, China)

GPA: 3.45

EXPERIENCE

2011.08 – 2018.05 *Graduate Researcher* (CS@Purdue University, Indianapolis, IN, USA)

Wireless Sensor Network Deployment/Testbed for Hydrology Research (nesC/C, Java)

- About 100 nodes consists of ATmega128 based devices (MicaZ and IRIS) and TI MSP430 based device (TelosB).
- Perform various tasks including sampling, upward routing, downward routing, over-the-air programming, compressed sensing, flash accessing, etc. Everything fits in 4KB RAM (MicaZ) or 48 KB ROM (TelosB).
- Multi-hop networking based on IEEE 802.15.4 (the underlying standard of ZigBee).

Downward Routing for IoT/WSNs Node Actuation (nesC/C, Python)

- Designed an adaptive Bloom filter to encode source-route; build routing table based on upward traffic.
- Achieved a reliability > 98%, excellent energy efficiency, and extreme scalability for large-scale networks.

Over-The-Air Programming for Outdoor WSN testbed (nesC/C, Java)

- Designed a mobile tool for outdoor WSN testbed reprogramming, maintenance, query, and diagnosis.
- Works for heterogeneous and duty-cycled WSN deployments. Significantly reduces the laborious work on the field.

Sensor Board and Driver for TelosB (TI MSP430) Platform (nesC/C, Eagle)

- Designed a 2-layered sensor board using Eagle to drive analog and digital Decagon sensors (e.g., EC-5, MPS-2).
- Solved the clock drift problem in UART communication of TelosB using a fridge and oscilloscope.

Routing Topology Reconstruction for Dynamic WSNs (nesC/C, Python)

- Designed a compressed sensing based algorithm to reconstruct routing topology using a 4-byte field in each data collection packet. Improved accuracy for > 50% compared to other approaches.

Quality of Service Control for IoT/WSNs (nesC/C)

- Designed a QoS control based on Gur Game to autonomously control the number of reports in WSNs.
- Improved energy efficiency of the whole network. Converges in just a few rounds.

Network Dynamics and Benchmarking (Python)

- Analyzed the network dynamics including link level, network level, and temporal characteristics.
- Devised a benchmark data suite which has link information and full topological information.

IoT Smart Systems (C, Python)

- Smart Home using Raspberry Pi to control home devices (e.g., light, coffee maker) using the CoAP protocol.
- Green House using TelosB to monitor temperature, humidity, light, and soil moisture for home plants.
- Setup a server to display the data and send notification through email (SMTP) and SMS (Twilio).

SKILLS

- **Programming Languages:** C, nesC, Java, Python,
- **IoT/WSNs/Embedded Platforms:** TinyOS, Contiki OS, Raspberry Pi, Arduino, TelosB, IRIS, MicaZ
- **Operating Systems:** Linux, Virtual Machines

HONORS & AWARDS

- 2018 Gersting Award for an Outstanding Graduate Student (CS@IUPUI)
- 2014 IEEE Travel Grant to attend IEEE MASS 2014

PUBLICATIONS

- X. Zhong and Y. Liang, “Scalable Downward Routing for Wireless Sensor Networks and Internet of Things Actuation”, LCN 2018 (submitted for review).
- G. Villalba, F. Plaza, X. Zhong, T. W. Davis, M. Navarro, Y. Li, T. A. Slater, Y. Liang, and X. Liang, “A *Networked Sensor System for the Analysis of Plot-Scale Hydrology*”, *Sensors*, 2017, 17(3), 636.
- X. Zhong and Y. Liang. “*Raspberry Pi: An Effective Vehicle in Teaching the Internet of Things in Computer Science and Engineering*”, *Electronics* (Basel), 2016.
- R. Liu, X. Zhong, Y. Liang, and J. He. “*Understanding Compressed Sensing Inspired Approaches for Path Reconstruction in Wireless Sensor Networks*”, *SustainCom* 2015.
- R. Liu, Y. Liang, and X. Zhong. “*Monitoring Routing Topology in Dynamic Wireless Sensor Network Systems*,” in *ICNP*, 2015.
- R. Liu, Y. Liang, and X. Zhong, “*Poster: Compressed Sensing Inspired Approaches for Path Reconstruction in Wireless Sensor Networks*”, in *MobiHoc*, 2015.
- X. Zhong, M. Navarro, G. Villalba, X. Liang, and Y. Liang. “*MobileDeluge: Mobile Code Dissemination for Wireless Sensor Networks*.” In *MASS*, 2014.
- X. Zhong, M. Navarro, G. Villalba, X. Liang, and Y. Liang. “*Demo: MobileDeluge: A Novel Mobile Code Dissemination Tool for WSNs*.” In *MASS*, 2014.
- M. Navarro, T. W. Davis, G. Villalba, Y. Li, X. Zhong, N. Erratt, X. Liang, and Y. Liang, “*Towards Long-Term Multi-Hop WSN Deployments for Environmental Monitoring: An Experimental Network Evaluation*.” *Journal of Sensor and Actuator Networks* 3.4 (2014): 297-330.