Zhuobin Huang (黄卓彬)

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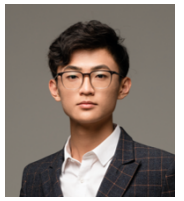
Education

University of Electronic Science and Technology of China (电子科技大学)	Chengdu, P.R.C
M.S. in Communication System	School of Information and Communication Engineering	Sept. 2021 ~ July 2024 (Expected)

- **Thesis:** **System Design for Large-scale Graph Neural Network** (In progress)
- **Advisor:** *Prof.* Shizhong Xu, *Prof.* Sheng Wang

University of Electronic Science and Technology of China (电子科技大学)	Chengdu, P.R.C
B.S. in Network Engineering	School of Information and Communication Engineering	Sept. 2017 ~ July 2021

- **Thesis:** Accelerating Large-Scale Distributed Applications Using In-Network Computing and In-Storage Computing
- **Overall GPA:** 3.8 / 4.0

University of Illinois Urbana-Champaign (UIUC)	Illinois, U.S.A
Research Intern	Systems Platform Research Group (PlatformX)	Feb. 2020 ~ Aug. 2020

Hong Kong Polytechnic University (香港理工大學)	Hong Kong, P.R.C
Visiting Project	Technology Innovation Visiting Practice Project	July 2018 ~ Sept. 2018

Working Skills

- **Language:** Chinese (Native), English (TOEFL: 92), Japanese (N2: 86);
- **Architecture:** IA64 CPU, SIMT GPU;
- **Software Programming:** C/C++, x86 Assembly, Golang, Python, Shell, JavaScript, CMake, Makefile, etc.;
- **Software Framework:** **DGL (Deep Graph Library)**, CUDA, Pytorch, DPDK;
- **Hardware Design Language:** Verilog HDL;
- **Linux Kernel Development:**
  - Familiar with Linux kernel internal mechanism, especially the network subsystem;
  - Familiar with the using of common tracing/profiling tools such as eBPF, Ftrace, Systemtap, etc.

Research Experience

Accelerating Large-Scale Distributed Applications Using In-Network Computing and In-Storage Computing

Role: Project Leader | Advisor: Prof. Jian Huang | @ UIUC, Illinois, U.S.A   Mar.2020 ~ Aug.2020

- In order to overcome the inefficiency of data-intensive applications under traditional server architecture, our project innovatively combines In-Network Computing and In-Storage Computing together to offload parts of computation to the underlying peripheral devices with computing ability (i.e., **SmartNIC** and **SmartSSD**).
- We designed the overall architecture and software framework of the system in detail, including the underlying hardware architecture, user-space APIs, and kernel-space drivers, etc. Evaluation results on real cluster machines show that it significantly improves the performance of most large-scale distributed applications.
- This project won the **Excellent Graduation Project** in University of Electronic Science and Technology of China.

NeuralMon: Graph Neural Network for Flow Measurement Allocation

Role: Co-author | Advisor: Dr. Yang Wang, Prof. Xiong Wang | @ UESTC, Chengdu, P.R.C   May. 2021 ~ Aug.2021

- The development of programmable networks in recent years has made it possible to measure traffic on switches. However, the hardware resources on programmable switches are very limited, which promotes the transformation of measurement from a single switch (Single-node) to a network-wide coordination.
- This paper proposes a **Graph Neural Network (GNN)** model, NeuralMon, which aims to optimize the distribution strategy of traffic measurement between switches with the goal of measurement coverage and accuracy in a network-wide measurement scenario. The evaluation results show that NeuralMon provides excellent performance even in untrained real network topologies.
- This work was presented at the **IEEE GLOBECOM 2021**.

Research on Autonomous Collaboration Technology of Multi-mode Intelligent Sensing Terminal

Role: Research Assistant	*Advisor:* Prof. Shizhong Xu	*@ UESTC, Chengdu, P.R.C*	May. 2019 ~ July 2021

- Designed PSO (Particle Swarm Optimization)-based tree structure clustering routing protocol of WSN (Wireless Sensor Network), which built a dormant mechanism by exploiting randomness and non-uniformity of sensor distribution to optimize energy consumption, stability, robustness of WSN.
- Designed a new multi-layer architecture of WSN which established reliable connections at the Control Layer that managed heterogeneous sensors, and eventually realized M2M communication at the Sensor Layer.
- Simulated our scheme by Python-based WSN simulator which was developed by ourselves and it shows great improvement on network lifetime and robustness. Project group prepared to propose a mature self-organizing solution for WSN and gradually applied it to specific IoT scenarios (e.g., forest fire warning).

Competition Experience

Internet-based Signal Transmission System   @ 2019 National College Student Electronic Design Competition

Role: Team Leader	*Advisor:* Prof. Zhongxiao Yang	*City:* Shanghai, P.R.C	Mar. 2019 ~ Aug. 2019

- Designed a microsecond-level time synchronization network protocol based on PTP (IEEE1588) and realized synchronous sampling and regeneration of periodic signals with an accuracy of less than 10 microseconds.
- Built a network hardware system based on DP83640 (PHY chip with hardware timestamp function) and STM32 microcontroller, and transplanted LwIP stack to designed nodes to access the TCP / IP network.
- Won **National Second Prize** (First prize in west area of China).

Wearable Intelligent Guide Device for Blind People   @ 2019 National "Internet Plus" Innovation Competition

Role: Algorithm Engineer	*Advisor*: Prof. Zhuming Chen, Prof. Yubai Li	*City*: Chengdu, P.R.C	Oct. 2018 ~ Oct. 2019

- Undertook major work in designing device that helps blind people navigate indoors and outdoors.
- Designed Kalman filter-based algorithm of inertial navigation module and programmed related driver code to achieve indoor positioning with an accuracy of 50cm.
- Obtained **National Patent** and the device is now used in the daily life of some blind people.

Pre-graduate Industry Experience

Byte Dance   @ Volcano Engine (Department of Cloud Infrastructure)

Position: Network Virtualization R&D Engineer (Internship)	*Base:* Hangzhou, P.R. China	Mar. 2021 ~ Sept. 2021

- **Optimization of OVS-DPDK:** Participate in the reconstruction and optimization of OvS-DPDK (Open vSwitch), the infrastructure used by the internal IDC to build virtual switching networks, and improve the bottleneck performance of the data plane to meet the needs of internal services.
- **Development of OpenStack-based Control Plane for Cloud Network:** A software framework responsible for developing and maintaining a virtual network control plane to ensure the atomicity of control transactions.
- **Online Business Operation and Maintenance:** responsible for some online businesses, database stability assurance, error location, troubleshooting and resolution.
- Get the opportunity to regularize, yet decided to continue my academic career in college.

Huawei   @ Department of Wireless (Chengdu Research Institute)

Position: Algorithm Engineer (Internship)	*Base:* Chengdu, P.R. China	Mar. 2020 ~ Nov. 2020

- Obtained the internship offer from Huawei's "Brave Star" internship program, but missed this internship due to COVID-19 situation in the spring of 2020.

Prudential Investment, Loan, and Assurance Company

Position: Internship (Courses & Projects)	*Base:* Hong Kong, P.R. China	Mar. 2020 ~ Nov. 2020

- Learned relevant knowledge about financial insurance products and became familiar with the operating mechanism and status of related financial industries.
- Led group to design an insurance product related to pregnant women with financial mathematics lens; was recognized by corporate experts.
- Received a recommendation letter from Senior Regional Director Xu Meng for outstanding performance.

Patents & Awards

Patent:

- A Wearable Intelligent Guide Device (current status: Publication of invention patent application), Patent number: CN201910639192.3

Awards:

- Outstanding Academic Scholarship of UESTC   2018-2019, 2019-2020, 2020-2021
- Excellent Graduation Project (Undergraduate) of 2021 in UESTC   June. 2021
- National Second Prize in National College Student Electronic Design Competition (top 1%).   Aug. 2019
- National Innovation and Entrepreneurship Excellent Project (top 1%)   2018 - 2019
- First Prize in Electronic Design Competition (Sichuan Division) (top 3%)   Aug. 2018
- Second Prize in "Challenge Cup" Science and Technology Competition (Sichuan Division)   July. 2019
- Bronze Award in "Internet Plus" Innovation Competition (Sichuan Division) (top 3%)   Oct. 2019
- Monitor of the Excellent Class in UESTC   2018 - 2019