Hongyi Huang

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PROFILE

- Fifth year PhD candidate at Dr. Wenfei Wu's lab in Tsinghua University
- Research interest in ***networking function virtualization*** (modeling, orchestration, verification), ***network management (IT operations)*** and ***programmable switches (P4)*** for redefining network and acceleration

EDUCATION

Bachelor, Beihang University **2013 - 2017**

Ph.D Student, Tsinghua University **2017 - present**

PROFESSIONAL AND RESEARCH EXPERIENCE

Algorithm Design Intern, 2012 Lab, Huawei **2018 - 2019**

- Design DNN-based algorithm to detect anomalies regarding KPI (time series) data
- Design solutions targeting fast construction and auto-generation of operation trees that are useful in enterprise-level failure diagnosis and remediation, which facilitates auto-healing property in IT operations

Graduate Research Assistant, Tsinghua University **2017 - Present**

- Design an NF development framework for rapid development of portable NFs targeting incompatibility between NF logical development and runtime environment (**NFD**)
- Give a talk about **NFD** along with a poster show at *CoNEXT'17 Student Workshop* and *SIGCOMM'19 Poster Session (Student Research Competition)*
- Explore efficient NF placement scheme that ports Service Function Chains (SFC) into P4 switches (**SFP**)

- Explore solution for verification of Network Function with Petri-Net
- Data measurement using real-world Huawei APP market dataset
- Exploite methods to attaching hot patch to runtime NFs for scaling purposes

Graduate Teaching Assistant, Tsinghua University **2017 - 2018**

- Security Technologies in Cyberspace, graduate course
- Fundamentals of Cryptography, undergraduate course

Undergraduate Project, Beihang University and Tsinghua University **2016 - 2017**

- Investigate on the design and implementation of algorithm library and system for anomalous subgraph detection (Beihang, bachelor thesis; advised by Jianxin Li)
- Improve video quality of broadcaster in user-generated live streaming (Tsinghua, accepted by *IWQoS'18*; supervised by Yong Cui and Wenfei Wu)

Lab Assistant, Beihang University **2015 - 2017**

- Carry out research on detecting abnormal subgraphs in heterogeneous networks by non-parametric statistics (accepted by *WWW'17*; supervised by Jianxin Li)
- Track moving trajectory from private location release with structured sparsity model (research paper; accepted by TDSC; supervised by Jianxin Li)
- Develop virtual fitting room with virtual reality technology (Co-PI; leading image recognization and classification; University-level Undergraduate Innovative Entrepreneurship Training Programs; supervised by Xiaowu Chen and Bin Zhou)
- Analyze traffic flows with GPS datasets captured by taxis in Beijing (Urban Computing Project; leading data cleaning and trajectory recovery; supervised by Jingyuan Wang)

HONORS AND AWARDS

- Outstanding Graduates of Beijing **2017**
- Excellent Scholarship of BUAA **2014, 2016**
- Beihang Friendship Scholarship — CASC Prize **2016**
- Innovation Scholarship of BUAA **2015, 2016**
- Ranking top 5% at CCF Certified Software Professional **2016**
- Excellent Freshman of BUAA **2013**

PROJECTS

- **NFD: Cross-platform NFV Development**
  - This project proposes NF abstractions and extensible compiler for rapid development of portable NFs targeting incompatibility between NF logical development and runtime environment. Refer to the **homepage** for more details.
- **SFP: SFC Provision in Programmable Switch**
  - This project is designed to provision multi-tenant service function chains in programmable (P4) switches in terms of efficient resource utilization and inter-tenant isolation.
- **WRS: Workflow Retrieval System for Cloud Automatic Remediation**
  - This project formalizes the workflow in remediation rules as trees and extracts representative atomic structures among trees.
  - These structures can be further retrieved to accelerate the workflow generation widely used in IT operations.
- **MGraph: Algorithm Library and Visual System for Anomalous Subgraph Detection**
  - The library embraces five popular algorithms that are widely used in anomalous subgraph detection within the concept of data mining. For big data processing, we parallelize most of algorithms and deploy them in Spark.
  - The visual system helps analysis and selection of best-matched algorithms for different datasets.

PATENTS

- Development Method, System, Computer Devices and storage Medium of Network Function. CN Patent, No. ZL 2018 1 0353060.X.
- Development Method, System, Computer Devices and storage Medium of Network Function. CN Patent, No. ZL 2018 1 0353209.4.
- Compiling Method, System, Computer Devices and Storage Medium of Program File. CN Patent, No. ZL 2018 1 0353071.8.

PUBLICATIONS

- Hongyi Huang, Wenfei Wu, Yongchao He, Bangwen Deng, Ying Zhang, Yongqiang Xiong, Guo Chen, Yong Cui, and Peng Cheng. NFD: A Development Framework for

Cross-Platform Network Functions. In the 2021 IEEE International Conference on Computer Communications (INFOCOM ’21). [pdf]

- Minglai Shao, Jianxin Li, Qiben Yan, Feng Chen, Hongyi Huang and Xunxun Chen. 2020. Structured Sparsity Model Based Trajectory Tracking Using Private Location Data Release. In IEEE Transactions on Dependable and Secure Computing (TDSC). [link]
- Hongyi Huang and Wenfei Wu. 2019. NFD: Using Behavior Models to Develop Cross-Platform NFs. In Proceedings of the ACM SIGCOMM 2019 Conference Posters and Demos (SIGCOMM Posters and Demos ‘19). [pdf]
- Qingmei Ren, Yong Cui, Wenfei Wu, Changfeng Chen, Yuchi Chen, Jiangchuan Liu and Hongyi Huang. 2018. Improving Quality of Experience for Mobile Broadcasters in Personalized Live Video Streaming. In Quality of Service (IWQoS ’18), 2018 IEEE/ACM 26rd International Symposium. [pdf]
- Minglai Shao, Jianxin Li, Feng Chen, Hongyi Huang, Shuai Zhang, and Xunxun Chen. 2017. An Efficient Approach to Event Detection and Forecasting in Dynamic Multivariate Social Media Networks. In Proceedings of the 26th International Conference on World Wide Web (WWW ’17). [pdf]