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浙江大学计算机系统结构与网络安全研究所 (CCNT Lab)



个人概述

2019 年 9 月被推免至浙江大学计算机学院直接攻读博士学位，研究兴趣为边缘计算、服务计算、移动计算。近期主要关注计算卸载、边缘智能、调度策略优化等问题。当前已在 CCF 推荐的会议及期刊上以第一作者 (包含学生一作) 身份发表了 4 篇论文，获得了领域顶级会议 ICWS 2019 的最佳学生论文奖。

教育经历

武汉理工大学

2015 年 09 月 - 2019 年 06 月

计算机科学与技术专业 - 本科 - 计算机科学与技术学院

- 综合测评排名: 4/275, CET 4: 610, CET 6: 576
- 勤奋好学先进个人 - 2016, 校一等奖学金 - 2016
- 湖北省大学省数学竞赛一等奖 - 2017
- 全国计算机设计大赛一等奖 - 2018
- 卓越奖学金 (全校每年评选 20 人, ¥20000) - 2019
- 校优秀毕业生 - 2019

浙江大学

2019 年 09 月 - 2024 年 06 月

计算机科学与技术专业 - 博士 - 计算机科学与技术学院

- 计算机学院博新奖学金 (¥10000) - 2019
- IEEE ICWS 2019 最佳学生论文奖 - 2019

研究内容

计算卸载 (Computation Offloading)

计算卸载是指将资源密集型计算任务转移到外部平台，例如集群、网格或云。由于设备的硬件限制，诸如有限的计算能力、存储空间和能源供应，卸载是十分必要的。资源密集型的任务可能是视频流处理、病毒扫描、图像识别、计算决策等。在移动边缘计算领域，我研究了各种计算和通信资源在边缘服务器选择和频谱分配方式下的负载均衡问题。相关研究被 IEEE UIC、IEEE ICWS、IEEE Trans. on Services Computing、ACM Trans. on Internet Technology 等会议和期刊接收。

边缘智能 (Edge Intelligence)

边缘智能是边缘计算与人工智能的深度融合。在最近的一项综述论文中，我将边缘智能划分为 AI on Edge 以及 AI for Edge 两个层面。前者研究如何将人工智能模型部署至资源受限的边端设备；后者研究如何将人工智能模型用于边缘计算的组网架构、服务体验等问题的优化。综述论文被领域 Top 期刊 IEEE Internet of Things Journal 接收。

服务编排与调度策略 (Service Orchestration & Job Scheduling)

服务编排是云原生时代的重要问题。从云边端协同的角度出发，我针对资源协同、智能协同、数据协同等问题开展了研究。这其中涉及到诸如资源调度与任务分发等问题。针对具体场景，我提出了 Dependent Function Embedding 等模型，相关内容投稿至 INFOCOM 2021。

论文出版

- Hailiang Zhao, Shuiguang Deng*, Zijie Liu, Jianwei Yin, and Schahram Dustdar, *Distributed Redundant Placement for Microservice-based Applications at the Edge*. In: IEEE Transactions on Services Computing (TSC), doi:

Current Version: 2020.9.2

10.1109/TSC.2020.3013600. (Core A*, CCF B)

- Shuiguang Deng, Guanjie Cheng, **Hailiang Zhao**, Honghao Gao, and Jianwei Yin, *Incentive-driven Computation Offloading in Blockchain-enabled E-commerce*. In: ACM Transactions on Internet Technology (TOIT), doi: <https://doi.org/10.1145/3397160>. (Core B, CCF B)
- Shuiguang Deng, **Hailiang Zhao**, Weijia Fang*, Jianwei Yin, Schahram Dustdar, and Albert Y. Zomaya, *Edge Intelligence: The Confluence of Edge Computing and Artificial Intelligence*. In: IEEE Internet of Things Journal, doi: 10.1109/JIOT.2020.2984887. (SCI I, JCR Q1)
- **Hailiang Zhao**, Shuiguang Deng*, Cheng Zhang, Wei Du, Qiang He, and Jianwei Yin, *A Mobility-aware Cross-edge Computation Offloading Framework for Partitionable Applications*. In: Proceedings of the 17th IEEE International Conference on Web Services (ICWS'19), Milan, Italy, 2019. [Best Student Paper] (Core A, CCF B)
- Yishan Chen, Shuiguang Deng*, **Hailiang Zhao**, Qiang He, Yin Li, and Honghao Gao, *Data-intensive Application Deployment at Edge: A Deep Reinforcement Learning Approach*. In: Proceedings of the 17th IEEE International Conference on Web Services (ICWS'19), Milan, Italy, 2019. (Core A, CCF B, short paper)
- Wei Du, Tao Lei, Qiang He, Wei Liu, Qiwang Lei, **Hailiang Zhao**, and Wei Wang, *Service Capacity Enhanced Task Offloading and Resource Allocation in Multi-Server Edge Computing Environment*. In: Proceedings of the 17th IEEE International Conference on Web Services (ICWS'19), Milan, Italy, 2019. (Core A, CCF B)
- Wei Du, Qiwang Lei, Qiang He, Wei Liu, Feifei Chen, Lei Pan, Tao Lei, and **Hailiang Zhao**, *Multiple Energy Harvesting Devices Enabled Joint Computation Offloading and Dynamic Resource Allocation for Mobile-Edge Computing Systems*. In: Proceedings of the 17th IEEE International Conference on Web Services (ICWS'19), Milan, Italy, 2019. (Core A, CCF B, short paper)
- Cheng Zhang, **Hailiang Zhao**, and Shuiguang Deng, *A Density-based Offloading Strategy for IoT Devices in Edge Computing Systems*. In: IEEE Access, doi: 10.1109/ACCESS.2018.2882452. (SCI II, JCR Q2)
- **Hailiang Zhao**, Wei Du, Wei Liu, Tao Lei, and Qiwang Lei, *QoE Aware and Cell Capacity Enhanced Computation Offloading for Multi-Server Mobile Edge Computing Systems with Energy Harvesting Devices*. In: Proceedings of the 15th IEEE International Conference on Ubiquitous Intelligence and Computing (UIC'18), Guangzhou, China, 2018. (Core B, CCF C)

论文在投

- Zhengzhe Xiang, Shuiguang Deng, **Hailiang Zhao**, Dongjing Wang, Zengwei Zheng, and Albert Y. Zomaya, *Divide, Cooperate and Conquer: The Latency-Aware Service Provisioning in Multi-Access Edge Computing*. Submitted to IEEE Transactions on Mobile Computing (TMC). (Core A*, CCF A)
- **Hailiang Zhao**, Shuiguang Deng*, Zijie Liu, Zhengzhe Xiang, and Jianwei Yin, —[†]. Submitted to IEEE INFOCOM 2021 - IEEE Conference on Computer Communications. (Core A*, CCF A)
- Cheng Zhang, **Hailiang Zhao**, Shuiguang Deng*, Zhengzhe Xiang, and Jianwei Yin, —[†]. Submitted to IEEE INFOCOM 2021 - IEEE Conference on Computer Communications. (Core A*, CCF A)

[†]: Paper title is hidden for double-blind review.