

SiYoung Jang

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☎ +44 7890 439051 **in** Profile

Research Interest

- Edge AI (video analytic & machine learning), networked AI systems, tinyML
- Wireless network, mobile sensing

Education

Korea Advanced Institute of Science & Technology (KAIST)

PhD, School of Computing

- Advisor: Dongman Lee

- Dissertation: *An Efficient Resource Orchestration and Camera Virtualization Architecture for Edge Video Analytics*

Daejeon, Republic of Korea

Feb 2022

Pohang University of Science and Technology, (POSTECH)

MS, Division of IT Convergence Engineering (ITCE)

- Advisor: Young Joo Suh

- Thesis: *An Adaptive Tail Time Scheme for Saving Power of Smart Devices*

Pohang, Republic of Korea

Feb 2015

Soongsil University

BS, Department of Computer Science and Engineering

Seoul, Republic of Korea

Feb 2013

Work Experience

Nokia Bell Labs

Role: Research Scientist

Cambridge, United Kingdom

July 2022 - present

Korea Advanced Institute of Science & Technology (KAIST)

Role: Post-doctoral researcher

Daejeon, Republic of Korea

Mar 2022 - June 2022 (3 months)

Research topic: *Software-defined mobility framework (mOS)*

Nokia Bell Labs

Role: Research Intern

Cambridge, United Kingdom

May 2021 - Aug 2021 (3 months)

Research topic: *Collaborative edge AI for multi camera vision analytic at network edge*

Korea Advanced Institute of Science & Technology (KAIST)

Role: Researcher

Daejeon, Republic of Korea

Aug 2015 - Feb 2016 (6 month)

Research topic: *Smart space IoT sensor data collection and service provisioning*

Refereed Publications (International)

- Nguyen Thanh Tung, **Si Young Jang**, Boyan Kostadinov and Dongman Lee. *PreActo: Efficient Cross-Camera Object Tracking in Video Analytic Edge Computing*. IEEE Percom 2023. (acceptance ratio: 17%)
- Bhawana Chhaglani, Utku Günay Acer, **Si Young Jang**, Fahim Kawsar and Chulhong Min. *Cocoon: On-boy Microphone Collaboration for Spatial Awareness*. ACM HotMobile 2023.
- **Si Young Jang**, Sungkyu Park, Jinhee Cho and Dongman Lee. *CARES: Context-Aware Trust Estimation for Realtime Crowdsensing Services in Vehicular Edge Networks*. ACM Transactions on Internet Technology (ToIT) 2022.
- **Si Young Jang**, Boyan Kostadinov, and Dongman Lee. *Efficient Microservice-based Edge Device Architecture for Video Analytics*. ACM/IEEE Symposium on Edge Computing (SEC) 2021. (acceptance ratio: 27%)
- **Si Young Jang**, Utku Günay Acer, Chulhong Min and Fahim Kawsar. *Deploying Collaborative Machine Learning Systems in Edge with Multiple Cameras*. International Conference on Mobile Computing and Ubiquitous Networking (ICMU) 2021. (Best student paper award)

- Seungho Lee, **Si Young Jang**, Soon J. Hyun, Dongman Lee. *DQN based Coverage Maximization for Mobile Video Camera Networks*. 2021 IEEE 18th Annual Consumer Communications & Networking Conference (CCNC). IEEE, 2021.
- Dongman Lee, **Si Young Jang**, Byoungheon Shin, and Yoonhyung Lee. *Towards Dynamically Reconfigurable IoT Camera Virtualization for Video Analytics Edge Cloud Services*. IEEE Internet Computing. IEEE, 2019.
- **Si Young Jang**, Yoonhyung Lee, Byoungheon Shin, and Dongman Lee. *Application-Aware IoT Camera Virtualization for Video Analytics Edge Computing*. ACM/IEEE Symposium on Edge Computing (SEC). IEEE, 2018.
- **Si Young Jang**, Yoonhyung Lee, Byoungheon Shin, and Dongman Lee. *Towards Application-Aware Virtualization for Edge IoT Clouds*. Proceedings of the 13th International Conference on Future Internet Technologies. ACM, 2018.
- **Si Young Jang**, Hayoung Choi, Yoonhyung Lee, Byoungheon Shin, and Dongman Lee. *Semantic Virtualization for Edge-IoT cloud: Issues and Challenges*. Proceedings of the 2nd Workshop on Cloud-Assisted Networking. ACM, 2017.
- **Si Young Jang**, Byoungheon Shin, and Dongman Lee. *Implementing a Dynamically Reconfigurable Wireless Mesh Network Testbed for Multi-Faceted QoS Support*. Proceedings of the 11th International Conference on Future Internet Technologies. ACM, 2016.
- **Si Young Jang**, Byoungheon Shin, and Dongman Lee. *An Adaptive Tail Time Adjustment Scheme based on Inter-Packet Arrival Time for IEEE 802.11 WLAN*. IEEE International Conference on Communications (ICC). IEEE, 2016.
- Qi, Yuepeng, Chansu Yu, Young-Joo Suh, **Si Young Jang**. *GPS Tethering for Energy Conservation 1*. 2015 IEEE Wireless Communications and Networking Conference (WCNC). IEEE, 2015.

Research Projects

Self-learning based Autonomic IoT Edge Computing

KAIST

Project Manager, Researcher

April 2019 - Dec 2026

- Grant: USD 1,953K (*funded by Ministry of Science, ICT and Future Planning (MSIP), Republic of Korea*)
- Designed the overall project architecture and sub-goals for an autonomous IoT edge computing software which optimizes edge services according to a user's intention and surrounding context.
- Year 2019: Developed energy efficient on-camera target tracking & next camera prediction mechanism for cross-camera object tracking system. (*tools & techniques: Python, Deep learning for machine vision, ResNet, CARLA simulator*)
- Year 2020: Developed edge AI service provision framework with micro service architecture. (*tools & techniques: Python, Docker, Kubernetes, Gstreamer, Flask, Nvidia Jetson, Deep learning for machine vision*)
- Year 2021: Developed efficient retraining mechanism for collaborative device-edge split DNN environment. (*tools & techniques: Python, Nvidia Jetson, Deep learning for machine vision, continual learning*)

Research on Establishing Trust in Ultra Dense Network

KAIST

Project Manager

April 2018 - Dec 2018

- Grant: USD 61K (*funded by Korea Internet & Security Agent (KISA), Republic of Korea*)
- Lead the student team to 1) organize key characteristics of ultra dense networking environment, 2) survey state-of-the-art trust establishment schemes and 3) propose essential trust-establishment research directions.

Research on Networking Technologies in Hyper Intelligent Society

KAIST

Project Manager

April 2017 - Dec 2017

- Grant: USD 61K (*funded by Korea Internet & Security Agent (KISA), Republic of Korea*)
- Lead the student team to 1) organize key characteristics of hyper intelligent society, 2) survey state-of-the-art AI-enabled wired & wireless networking schemes and 3) propose collaborative networking schemes for space intelligence and research directions.

Versatile Network System Architecture for Multi-dimensional Diversity

KAIST

Researcher

April 2016 - Dec 2020

- Grant: USD 1,956K (*funded by Ministry of Science, ICT and Future Planning (MSIP), Republic of Korea*)

- Year 2016-2017: Modeled a QoS description language and development of a QoS interpretation module to support edge/fog computing services. For a given type of service (e.g. streaming video), the interpreter interprets the application requirement to required networking and computing parameter such as bandwidth, latency. (*skills involved: Python, Java, ontology*)
- Year 2018-2019: Implemented camera IoT - edge server testbed and evaluated 1) dynamic reconfiguration scheme for camera IoT upon context changes, 2) reinforcement-learning based object tracking system across multiple cameras to support efficient application-aware computing resource slicing. (*tools & techniques: Python, ZMQ, Linux, Docker, reinforcement-learning, computer vision for object detecting & tracking, raspberry pi, Cuda*)

Development of IoT-based Trustworthy and Smart Home Community Framework

KAIST

Researcher

April 2014 - February 2017

- Grant: USD 1,688K (*funded by Ministry of Science, ICT and Future Planning (MSIP), Republic of Korea*)
- Year 2016-2017: Developed an extension to smart home IoT (e.g., smart vacuum cleaner) device with various sensors/actuators on raspberry pi to enable IoT data collection & actuation for provisioning smart home services. (*tools & techniques: Java, MQTT, MongoDB, Phidget/Monnit sensors, Raspberry Pi*)

Research on Network Technologies for Increasing Energy Efficiency of Smart Devices

POSTECH

Researcher

Nov 2013 - February 2015

- Grant: USD N/A (*funded by National Research Foundation (NRF), Republic of Korea*)
- Year 2015: Customized IEEE 802.11n MAC/PHY device driver (Atheros ath9k) for application-aware energy efficient packet transmission protocol by predicting inter packet arrival time and configuring power saving mechanism on a mobile device (and WiFi router) (*tools & techniques: C++, Android, ath9k, OPNET*)

Scholarly Services (Peer Review)

- NetAISys 2023.
- ACM IMWUT 2022.
- Elsevier JRIE 2022.
- IEEE/ACM IWQoS 2021.
- ACM ISWC 2021.
- Elsevier COMCOM 2021, 2020.
- IEEE TMC 2017.
- IARIA UBICOMM 2017.

Patents

Issued.....

- [KR] "Context-Aware Trust Estimation for Realtime Crowdsensing Services in Vehicular Edge Networks" (10-2261607-0000)
- [KR] "A Service and Context Aware Networked Camera Virtualization Method" (10-2257325-0000)
- [KR] "Method and Apparatus for Energy Saving in Wireless Communication Network" (10-1836227-0000)

Pending.....

- [KR] "Trust Estimation for Realtime Crowdsensing Services in Vehicular Edge Networks" (-)
- [KR] "Microservice-based Edge Device Architecture for Video Analytics." (10-2022-0034248)
- [PCT] "A Method for Collaborative vision Analytics with Multiple Cameras in the Edge Settings." (-)
- [PCT] "A Collaborative Method for Vision Analytics with Software-Defined Cameras Deployed in the Edge." (PCT/EP2022/067160)
- [KR] "DQN-based Coverage Maximization for Mobile Video Camera Networks" (10-2020-0174650)
- [KR] "Lightweight Camera Virtualization and Cross-camera Handover for Efficient Object Tracking in Video Analytics Edge Computing" (10-2019-0154361)

Teaching Experience

- Undergraduate Research Program (KAIST): 2020, 2018, 2017
- Head TA: Computer Networks (KAIST CS341): 2019, 2018, 2017
- Head TA: Distributed Systems (KAIST CS543): 2019, 2018, 2017

References

Available upon request.