Taegyeong Lee

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SUMMARY

I am a graduate student at KAIST, under the supervision of Prof. Junehwa Song. My research interests lie in the areas of mobile/IoT systems and social computing. My current projects focus on mobile systems to support remote caring and collaboration for multiple people. I am also interested in IoT systems for the public and Mobile/Edge AI systems. I enjoy implementing working prototypes and discussing new problems.

RESEARCH INTERESTS

Mobile/IoT Systems

- Systems for public IoTs
- Mobile/Edge deep learning platforms
- Continuous monitoring & pervasive sensing
- Privacy-aware intelligent system

Social & Interactional Computing Systems

- Deep understanding of interpersonal interactions
- Supporting remote services for caring & collaborations

EDUCATION

2019 – *present* Ph.D. in Computer Science, KAIST, Daejeon, Korea
Advisor: Prof. Junehwa Song

2017 – 2019 M.S. in Computer Science, KAIST, Daejeon, Korea
Advisor: Prof. Junehwa Song

2013 – 2017 B.S. in Computer Science, KAIST, Daejeon, Korea

WORK EXPERIENCE

JUL. 2018 – SEP. 2018 **Microsoft Research, Beijing, China**
Research Intern, Intelligent Cloud & Edge Group (Mentor: Dr. Yunxin Liu)

MAR. 2016 – FEB. 2017 **KAIST Networking & Mobile Systems Lab, Daejeon, Korea**
Undergraduate Research Intern (Advisor: Prof. Sung-Ju Lee)

DEC. 2015 – FEB. 2016 **SK Hynix, Icheon, Korea**
Undergraduate Intern, Memory System Lab

PUBLICATIONS

Conferences

2026 [C.04] **Taegyeong Lee**, Seonghoon Kim, Insun Baek, Sookyung Han, Junehwa Song. **A Qualitative Exploration of Contextual Motivation Dynamics for Everyday Volunteering in Sustained Remote Collective Care**. In *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (**IMWUT '26**).
[ACM DL]

2021 [C.03] Wonjung Kim, Seungchul Lee, Youngjae Chang, **Taegyeong Lee**, Inseok Hwang, Junehwa Song. **Hivemind: social control-and-use of IoT towards democratization of public spaces**. In *Proceedings of the 19th Annual International Conference on Mobile Systems, Applications, and Services* (**MobiSys '21**).
[ACM DL] [Demo Video]

2019 [C.02] **Taegyeong Lee**, Zhiqi Lin, Saumay Pushp, Caihua Li, Yunxin Liu, Youngki Lee, Fengyuan Xu, Chenren Xu, Lintao Zhang, Junehwa Song. **Occlumency: Privacy-preserving Remote Deep-learning Inference Using SGX**. In *Proceeding of the 25th Annual International Conference on Mobile Computing and Networking* (**MobiCom '19**).
[ACM DL]

2018 [C.01] Bumsoo Kang, Inseok Hwang, Jinho Lee, Seungchul Lee, **Taegyeong Lee**, Youngjae Chang, Min Kyung Lee. **My Being to Your Place, Your Being to My Place: Co-present Robotic Avatars Create Illusion of Living Together**. In *Proceedings of the 16th Annual International Conference on Mobile Systems, Applications, and Services* (**MobiSys '18**).
[ACM DL] [Demo Video] [Concept Video]

Adjuncts (Demos and Posters)

2022 [A.05] Wonjung Kim, Seungchul Lee, Youngjae Chang, **Taegyeong Lee**, Seongwoong Kang, Inseok Hwang, Junehwa Song. **Hivemind: IoT-based democratization of shared devices in a public space (demo)**. In *Proceedings of the 23rd International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing* (**MobiHoc '22**). [ACM DL]

2021 [A.04] Wonjung Kim, Seungchul Lee, Youngjae Chang, **Taegyeong Lee**, Inseok Hwang, Junehwa Song. **Facilitating in-situ shared use of IoT actuators in public spaces (demo)**. In *Proceedings of the 19th Annual International Conference on Mobile Systems, Applications, and Services* (**MobiSys '21**). [ACM DL]

2020 [A.03] Seungpyo Choi, Seonghoon Kim, **Taegyeong Lee**, Junehwa Song. **Scenario-based energy estimation for continuous mobile sensing applications (poster)**. In *Proceedings of the 18th Conference on Embedded Networked Sensor Systems* (**SenSys '20**). [ACM DL]

2019 [A.02] Bumsoo Kang, Inseok Hwang, Jinho Lee, Seungchul Lee, **Taegyeong Lee**, Youngjae Chang, Min Kyung Lee. **Towards Peripheral Awareness of Remote Family Member's Context Using Self-mobile Robotic Avatars (demo)**. In *Proceedings of the 17th Annual International Conference on Mobile Systems, Applications, and Services* (**MobiSys '19**). [ACM DL]
[*Best Demo Award*]

2018 [A.01] Bumsoo Kang, Inseok Hwang, Jinho Lee, Seungchul Lee, **Taegyeong Lee**, Youngjae Chang, Min Kyung Lee. **HomeMeld: Co-present Robotic Avatar System for Illusion of Living Together (demo)**. In *Proceeding of the 16th Annual International Conference on Mobile Systems, Applications, and Services* (**MobiSys '18**). [ACM DL]

PROJECTS

Occlumency: Privacy-preserving remote deep learning system [C.02]

- We propose Occlumency, a cloud-driven solution to protect user privacy without compromising the benefit of using powerful cloud resources. Our key idea is to leverage trusted execution environments to perform DNN inference in the hardware-protected enclave. We devised a new DNN parameter management and DNN inference engine to effectively reduce the memory footprint of DNN inference and maximize the inference performance running in enclaves.
- **Talks:**
  - Paper presentation: ACM MobiCom 2019
  - Seminar: University of Southern California, Networked Systems Lab., Oct. 2019
  - Seminar: Seoul National University, HCS Lab., Oct. 2019
  - Seminar: UNIST, MSN Lab., Sep. 2019
  - Invited talk: KAIST, CS442 (Mobile Computing and Applications) Course, Oct. 2019
- This work was done in part of an internship at Microsoft Research, Beijing.

HomeMeld: Providing living togetherness with co-present robotic avatars for work-separated families [C.01] [A.01] [A.02]

- We propose HomeMeld, a self-mobile robotic system providing living togetherness for families living apart. It continuously monitors a user's spatial context (location/orientation) using computer vision to detect and superposes the context into the other family member's home with a telepresence robot.
- I designed and implemented a navigation system for a telepresence robot that mimics spatial contexts of a person. I devised path planner and destination predictor to reduce start/stop latency of telepresence robot for seamless living togetherness.

Card-stunt as a Service: Empowering a Massively Packed Crowd for Instant Collective Expressiveness

- We propose Card-stunt as a Service (CaaS), an infrastructure-free service that enables the densely packed crowd to instantly visualize collective symbols using their smartphones. It utilizes visible-light angle-of-arrival sensing and scalable constrained optimization to achieve decimeter-level localization of the crowd. After localization, CaaS server sends pixel information to each smartphone to make a collective visual image.
- I fortified CaaS system in terms of network robustness. CaaS, with its early design, suffered from connection failure due to a massive amount of wireless connections. I implemented Bluetooth ad-hoc connection into CaaS system so that devices with a broken connection could adaptively communicate with nearby devices via Bluetooth.

AWARDS

NAVER Ph.D. Fellowship Award, 2020.

Best Demo Award, ACM MobiSys 2019.

SERVICES

External Reviewer, ACM IMWUT 2025, 2024, 2022.

External Reviewer, IEEE INFOCOM 2021.

Student Volunteer, ACM MobiSys 2019, IEEE MDM 2017

TEACHING EXPERIENCE

Data Structure. 2021

Operating Systems and Lab. 2020, 2018, 2017.

Introduction to Programming. 2019, 2018

Compiler Design. 2019

Introduction to Computer Networks. 2017