KIJIN AN

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(a) Education

2015.8-2021.5 (expected): Ph.D. Candidate, **Virginia Tech**, Computer Science, Blacksburg, VA
Advisor: Prof. Eli Tilevich, https://people.cs.vt.edu/~tilevich

2007.3–2009.2: M.S., **POSTECH**, Computer and Communication, Pohang, South Korea
Advisor: Prof. Hwangjun Song, https://mcnl.postech.ac.kr

2003.3–2007.2: B.E., **University of Seoul**, Electrical and Computer Engineering, Seoul, South Korea

(b) Research Interests

My research is to facilitate the evolutionary modifications of distributed apps via automatic and architectural refactorings. My work enables localizing bugs in distributed apps, optimizing distribution granularity, and correctly replicating cloud services for edge-based services. My approach improves software engineering's latest ideas such as declarative program analysis, fuzzing/checkpointing execution, and program transformation.

Keywords: *Refactoring/Optimizing Distributed Apps, Software Engineering, Web-based System, Automated Program Transformation, Mobile/Full-Stack JS Applications, Software Security, Networking*

(c) Employment and Projects

2015.8–now: **GTA/GRA**, Department of Computer Science, Virginia Tech, Blacksburg, VA
Understanding Heap-Spraying Attacks: I developed a core course project for VT CS2506. This is a distributed system for operating a victim server based on *V8*.
http://courses.cs.vt.edu/cs2506/Spring2018/C/HS/handout.pdf

RT-Trust: I participated in the project for developing tools to automate distributing embedded applications (e.g. drone firmware *PX4*) to support *optee-os*/*SGX* Environments.

2012.9–2015.8: **Researcher**, Robotics Research, KIST, Seoul, South Korea
SimonPiC: This project aims for a robot's simultaneous interaction with many students in a classroom environment. To overcome a limited ability of the robot, we developed an ambient distributed system that networks many heterogeneous sensors and fuses their individually detected information. I mainly developed the core system that includes sensor fusion algorithms and is scalable to sensors. The government awarded this project as *18th Industry Technology of this Month*. I was project manager from 1^{st} to 4^{th} years, implementing the core distributed system, 3D Simlator, Web-based UIs, and Leg detection.
http://www.robot-intelligence.kr/index.php/3W_for_HRI

2009.5–2012.9: **Network System Engineer**, SK telesys, Pankyo, South Korea (Military Duty)
I was a system Engineer for developing 3·4G equipments, specialized in MAC/Routing protocols.
WiBro Base-station (19.5-19.12, SK telecom), Ethernet Inbuilding System–eIBS (10.4-11.1, SK telecom), WiFi-IPPBX–WIP-300 (11.3-11.10, SK telink), 4G RF/Optic repeaters–MiBoS&TRIO-LM (11.12-12.09, SK telecom)

2007.3–2009.2: **GRA**, Multimedia Computing and Networking lab, POSTECH, South Korea
I implemented MAC and routing stacks for Sensor Network such as *802.15.4*, *AODV* over the *Ptolemy* framework (07.3-07.12, DGIST, UC Berkeley). Based on successful completion of this work, I implemented Location Recognition system over multiple base stations by using *Ptolemy* framework again (08.5-08.12, DGIST).

(d) Skills

Programming: JavaScript, Java, Python, C/C++, Datalog, SQL, wasm, Swift, golang
Package: V8, z3, CRDT, angular/cordova, tensorflow.js, optee-os, LLVM, ROS, Blender, PCL, Ptolemy, ns-2
Hardware: L2 Switch, 802.11, 802.15.4, rpi, Android/iOS, turtlebot, Kinect/Hokuyo, PSA/RF signal generator

(e) Publication

1. (submitted) **Kijin An** and Eli Tilevich, "EdgeFy: Automatic Replication of Cloud Services at the Edge," *ICDCS 2021*.
2. (submitted) **Kijin An** and Eli Tilevich, "Communicating Web Vessels: Improving the Responsiveness of Mobile Web Apps with Adaptive Redistribution," *ICWE 2021*.
3. **Kijin An** and Eli Tilevich, "Client Insourcing: Bringing Ops In-House for Seamless Re-engineering of Full-Stack JavaScript Applications," *Proceedings of the Web Conference (WWW)*, April 2020. (**19%, 217/1129**).
4. **Kijin An**, "Enhancing Web App Execution with Automated Reengineering," *Proceedings of the Web Conference (Dotoral Symposium WWW)*, April 2020.
5. **Kijin An** and Eli Tilevich, "D-Goldilocks: Automatic Redistribution of Remote Functionalities for Performance and Efficiency," *Proceedings of the 27th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2020)*, February 2020. (**21%, 42/199**)
6. Yin Liu, **Kijin An**, and Eli Tilevich, "RT-Trust: Automated Refactoring for Different Trusted Execution Environments under Real-Time Constraints," *Journal of Computer Languages (COLA)*, Volume 56, 100939, 2020 *Journal Article*, **Nominated for a best paper award**.
7. **Kijin An** and Eli Tilevich. "Catch & Release: An Approach to Debugging Distributed Full-Stack JavaScript Applications", *19th International Conference on Web Engineering (ICWE 2019)*, June 2019. (**25%, 26/106**)
8. **Kijin An**, "Facilitating the Evolutionary Modifications in Distributed Apps via Automated Refactoring," *19th International Conference on Web Engineering (Doctoral Symposium ICWE 2019)*, June 2019.
9. Yin Liu, **Kijin An**, and Eli Tilevich, "RT-Trust: Automated Refactoring for Trusted Execution Under Real-Time Constraints," *Proceedings of the 17th International Conference on Generative Programming: Concepts & Experience (GPCE 2018)*, Nov 2018.
10. **Kijin An**, Na Meng, and Eli Tilevich, "Automatic Inference of Java-to-Swift Translation Rules for Porting Mobile Applications," *MobileSoft*, 2018, **Nominated for a best paper award**.(6%, 3/52)

    (*Robotics Research at KIST*)
11. **Kijin An**, Geunjae Lee, Sang-Seok Yun, and JongSuk Choi, "Multiple Humans Recognition of Robot Aided by Perception Sensor Network," *URAI 2015*.
12. Geunjae Lee, **Kijin An**, Sang-Seok Yun, and JongSuk Choi, "A Simultaneous Robot Service Scheme for Multi-Users," *In. Proc. Int. Conf. Ubiquitous Robots and Ambient Intelligence (URAI)*, pp. 373-374, Oct. 2015.
13. Anh Vu Le, **Kijin An** and JongSuk Choi, "Multiple Human Tracking on Robot Operation System," In. Proc. Int. Conf. Ubiquitous Robots and Ambient Intelligence (URAI), Oct. 2015.
14. **Kijin An**, Hyeon-woo Park and JongSuk Choi, "Reliable Fusion method of multiple Human information over a Heterogeneous Sensor Network," *IEEE RO-MAN*, 2015. (extended abstract)
15. Anh Vu Le, **Kijin An** and JongSuk Choi, "Group-based multiple people tracking in perception sensor network," *IEEE RO-MAN*, 2015. (extended abstract)
16. JiGwan Park, **Kijin An**, and JongSuk Choi, "Low-Body-Part Detection using RGB-D camera." *Proceedings of the Tenth Annual ACM/IEEE International Conference on Human-Robot Interaction(HRI)*, Extended Abstracts. ACM, 2015. (video presentation)
17. **Kijin An**, JiGwan Park, Minh Do Hoang and JongSuk Choi, "Dispensing Materials of mobile Robot cooperating with Perception Sensor Network," URAI 2014.
18. JiGwan Park, **Kijin An**, and JongSuk Choi, "Realistic 3D simulation of multiple human recognition over Perception Sensor Network," *ROMAN*, 2014.
19. JiGwan Park, **Kijin An**, Daijin Kim and JongSuk Choi, "Multiple Human Tracking using Multiple Kinects for an Attendance Check System of a Smart Class," *URAI*, 2013. (video presentation)
20. **Kijin An**, JongSuk Choi, "A 3D Simulation Approach for Multi-human Detection using a Multi-sensor frame," *ROMAN*, 2013.

(*Multimedia Networking Lab at POSTECH*)

21. Wan Kim, Hyunchul Joo, **Kijin An**, Inkyu Lee, and Hwangjun Song, "Urgency-based scheduling and routing algorithms for delay-sensitive data transmission over mobile ad hoc networks," *ACM/Springer Wireless Networks*, Vol. 19, No. 7, pp. 1595-1609, 2013. (**Master thesis**, **Journal Article**)

22. Wan Kim, Hyunchul Joo, **Kijin An**, and Hwangjun Song, "A novel packet urgency metric-based cross-layer design for video streaming over multi-rate MANETs," *IIWCMC* 2013.

23. Hyunchul Joo, **Kijin An**, and Hwangjun Song, "Urgency-based Packet Scheduling and Routing Algorithms for Video Transmission over MANETs," *CCWMC* 2011.

24. **Kijin An** and Hwangjun Song, "An effective cross-layer packet scheduling and routing algorithm for delay-sensitive media transmission over MANET," *International Conference on Communications (ICC)*, 2009.

(f) Teaching and Services:

- GTA for CS2505 and CS2506 in CS@VT (Two lecture sessions for *Understanding Heap Spraying*)
- External Reviewer for TSE 2018, ECOOP 2020, RO-MAN 2020, MPLR 2020
- President for Korean Computer Scientists (KCS) in CS@VT (2019.6 - now)