

Inkyu An

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Research Interests

My research interest is the **robot audition**. Especially, I have been studying **sound source localization (SSL)** in robotics by considering as follow:

- Considering indirect sound, i.e., reflection and diffraction
- Handling a non-line-of-sight source occluded by an obstacle
- Exploiting a large size of training dataset for a deep-learning model.

I am focusing on overcoming **difficult cases**, i.e., NLOS sources, many indirect sounds, and a lack of training datasets, for robots that can occur in real environments. I am also interested in other kinds of robot auditions like sound event detection (SED), source separation, and so on. Recently, I have been conducting research using deep-learning technology, and the results were submitted to the conference (under review).

Education

- **Ph.D., School of Computing** 03/2018-Now
Thesis title: Sound Source Localization with Novel Acoustic Cues for Robots
Advisor: Sung-Eui Yoon
KAIST, South Korea
- **M.S., Robotics Program** 03/2016-02/2018
Advisor: Sung-Eui Yoon
KAIST, South Korea
- **B.S., Electronic Engineering** 03/2009-02/2016
Dongguk Univ., South Korea

Publications

1. Diffraction- and Reflection-Aware Multiple Sound Source Localization

[Inkyu An](#), Youngsun Kwon, and Sung-Eui Yoon

IEEE Transactions On Robotics (T-RO) 2022

2. **Robust Sound Source Localization considering Similarity of Back-Propagation Signals**
[Inkyu An](#), Byeongho-Jo, Youngsun Kwon, Jung-woo Choi, and Sung-Eui Yoon
IEEE International Conference on Robotics and Automation (ICRA) 2020
3. **Super Rays and Culling Region for Real-Time Updates on Grid-based Occupancy Maps**
 Youngsun Kwon, Donghyuk Kim, [Inkyu An](#), and Sung-Eui Yoon
IEEE Transactions On Robotics (T-RO) 2019
4. **Diffraction-Aware Sound Localization for a Non-Line-of-Sight Source**
[Inkyu An](#), Doheon Lee, Jung-woo Choi, Dinesh Manocha, and Sung-Eui Yoon
IEEE International Conference on Robotics and Automation (ICRA) 2019
5. **Reflection-aware Sound Source Localization**
[Inkyu An](#), Myungbae Son, Dinesh Manocha, and Sung-Eui Yoon
IEEE International Conference on Robotics and Automation (ICRA) 2018
6. **A Content-Aware Non-Uniform Grid for Fast Map Deformation**
 Pio Claudio, [Inkyu An](#), Sung-Eui Yoon
CASA 2017

Patents

1. **System and Method for Localization for Non-line-of-sight Sound Source**
[Inkyu An](#), Doheon Lee, Sung-Woo Choi, and Sung-Eui Yoon
 US, Registration Number/Date (US11353581B2 / 2022-06-07)
2. **System and Method for Localization for Non-line of-sight Sound Source Using Diffraction aware**
[Inkyu An](#), Doheon Lee, Sung-Woo Choi, and Sung-Eui Yoon
 South Korea, Registration Number/Date (10-2174598-0000 / 2020-10-30)
3. **System and Method for Sound Source Localization Using Reflection aware**
[Inkyu An](#), Myungbae Son, and Sung-Eui Yoon
 South Korea, Registration Number/Date (10-2105752-0000 / 2022-04-22)

Media Coverages

1. **Interview of Young researcher (신진연구자 인터뷰) in MERIC, 2020:**
https://www.materic.or.kr/v2/mp/content.asp?f_id=78&page=6&listType=20&s_kinds=&s_word=&listCnt=
2. **2020 Annual R&D Report, KAIST:** Our back-propagation signal-based sound source localization techniques were chosen as research highlights of 2020 and covered in the Annual R&D Report

3. **2019 Annual R&D Report, KAIST:** Our diffraction- and reflection- aware sound source localization techniques were chosen as research highlights of 2019 and covered in the Annual R&D Report

Research Activities

1. **A workshop at IEEE International Conference on Robotics and Automation (ICRA) 2019: Sound Source Localization and Its Application**

Main organizer: Sung-Eui Yoon, Co-organizer: Dinesh Manocha, Publicity chair: [Inkyu An](#)

2. **A tutorial at KCC 2021: Sound Source Localization techniques for AI speakers and Robots (AI 스피커 및 로봇을 위한 소리 위치 추적 기술에 관한 튜토리얼)**

Speakers: Sung-Eui Yoon, [Inkyu An](#), Taeyoung Kim

3. **Teaching Assistant for Senior Data Scientist at Samsung SDS**

Machine learning: Tree model and Recommendation, 2019-2020

Lecturer: Sung-Eui Yoon

Teaching Assistants: Woobin Im, Jaeyoon Kim, Heechan Shin, [Inkyu An](#)

Experiments

1. **Research Internship at Korea Electronics Technology Institute (KETI)** 08/2023-07/2015
Hardware design and Firmware
2. **Samsung Software Membership (Talent development program)** 06/2013-12/2015
Supported by Samsung Electronics