

# Curriculum Vitae—Yifan Jiang

## Research Professor

Korea University

School of Electrical Engineering

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## Research Interests

- COVID-19 Diagnosis related Medical Imaging Analysis
- Deep Learning based Image Synthesis
- Human Action Recognition
- Visual Object Tracking
- Generative Adversarial Networks (GANs)
- Transfer Learning
- Deep Reinforcement Learning

## Skills

- AI & ML related programming
- PyTorch and Keras frameworks
- Large-scale image data analysis
- Verilog & FPGA Development
- Python
- C & C++
- R

## Work Experience

**Korea University**, Mar 2022-present.

School of Electrical Engineering.

Research Professor.

- Research interests: Image synthesis using diffusion models and deep learning based human action recognition via deep learning.
- Radiology reports-driven image synthesis for a potential pandemic in the post-COVID-19 era:
  - Yifan is conducting research related to Contrastive Language-Image Pretraining (CLIP) and Denoising Diffusion Probabilistic Models (DDPM) based medical image synthesis.
  - This novel image synthesis approach has the potential to generate various high-quality medical imaging data, including but not limited to CT, X-ray and MRI, by bridging natural language processing (NLP) and computer vision models and being guided by the extra information from radiology reports.
- Real-time COVID-19 symptoms detection:
  - The proposed model detects potential COVID-19 patients in public areas jointly using fine-grained 3D pose estimation and real-time human action recognition technologies.
  - Given its high accuracy and real-time processing capability, this model has the great potential to be deployed in many public facilities, such as shopping malls and stations.
  - [Demo link](#).

## Education

**Korea University**, South Korea, Feb 2022.  
School of Electrical Engineering (Prof. Hanseok Ko).  
Ph.D. in Artificial Intelligence.  
Grade: 4.29/4.5.

- Research interests: GANs based image synthesis and deep learning based COVID-19 diagnosis.
- COVID-19 CT image synthesis:
  - A conditional GANs based image synthesizer generates realistic COVID-19 CT images that can use in downstream diagnostic tasks.
  - This research was published in IEEE JBHI (a top journal of Health Information Management) as a featured article, with more than 40 citations.
  - **Project site**; **Paper link**.
- Few-shot COVID-19 CT diagnosis:
  - A domain adaptation based approach can utilize synthetic CT data to achieve better few-shot COVID-19 diagnostic performance.
  - This research was published in ICASSP 2021 (a top conference in image and acoustic signal processing).
  - **Project site**; **Paper link**.
- Human action synthesis for COVID-19 symptoms detection:
  - A controllable GANs inversion method can generate diverse sequential actions corresponding to the most common COVID-19 symptoms.
  - A real-time action recognition approach is introduced to handle COVID-19 symptoms detection using synthetic action sequences.
  - **Project site**; **Paper link**.
- Side scan sonar image synthesis:
  - A conditional GANs based image synthesizer that generates high-quality side scan sonar images from manually crafted segmentation layouts.
  - This research was published in IEEE Geoscience and Remote Sensing Letters (a high-impacted journal of geoscience).
  - **Project site**; **Paper link**.

**Korea University**, South Korea, Feb 2019.  
School of Electrical Engineering (Prof. Hanseok Ko).  
M.S. in Artificial Intelligence.  
Grade: 4.38/4.5.

- Research interests: deep reinforcement learning (DRL) based object tracking.
- DRL based visual object tracker:
  - A DRL based single object tracking approach inspired by the human perception mechanism.
  - This research was published in IET computer vision (a high-impacted journal of computer vision).
  - **Project site**; **Paper link**.
- DRL based multi-person tracking bounding box regression:
  - A DRL based bounding box regression method can improve multi-person tracking performance significantly.
  - This research was published in ICASSP 2018 (a top conference in image and acoustic signal processing).
  - **Project site**; **Paper link**.

**Harbin Engineering University**, China, June 2015.  
College of Information and Communication Engineering.  
B.S. in Electronic Information Engineering.

- Research interests: Computer vision algorithms' acceleration using SoC FPGA.
- Yifan received basic training in machine learning and computer vision, which laid a strong foundation for my later research and career.

## Awards

- **BK21 (Brain Korea 21) plus Scholarship**, issued by *Brain Korea 21* , Mar 2019.
- **Natural Sciences and Engineering Scholarship**, issued by *Korea University* , Mar 2019.
- **BK21 (Brain Korea 21) plus Scholarship**, issued by *Brain Korea 21* , Mar 2017.
- **Natural Sciences and Engineering Scholarship**, issued by *Korea University*, Mar 2017.

## Publications: International Journals

- Yifan Jiang, Han Chen, Murray Loew, and Hanseok Ko. "COVID-19 CT image synthesis with a conditional generative adversarial network." *IEEE Journal of Biomedical and Health Informatics* 25.2 (2020): 441-452.
- Yifan Jiang, Bonhwa Ku, Wanjin Kim, and Hanseok Ko. "Side-Scan Sonar Image Synthesis Based on Generative Adversarial Network for Images in Multiple Frequencies." *IEEE Geoscience and Remote Sensing Letters* 18.9 (2020): 1505-1509.
- Yifan Jiang, David K. Han, and Hanseok Ko. "Relay dueling network for visual tracking with broad field-of-view." *IET Computer Vision* 13.7 (2019): 615-622.
- Han Chen, Yifan Jiang, Murray Loew, and Hanseok Ko. "Unsupervised domain adaptation based COVID-19 CT infection segmentation network." *Applied Intelligence* (2021): 1-14.
- Han Chen, Yifan Jiang, Murray Loew and Hanseok Ko. "A Teacher-Student Framework with Fourier Augmentation for COVID-19 Infection Segmentation in CT Images." *arXiv preprint arXiv: 2110.06411* (2021). (Preprint)

## Publications: International Conferences

- Yifan Jiang, Han Chen, David K. Han, and Hanseok Ko. "Few-shot learning for CT scan based COVID-19 diagnosis." *ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, 2021.
- Yifan Jiang, Hyunhak Shin, and Hanseok Ko. "Precise regression for bounding box correction for improved tracking based on deep reinforcement learning." *2018 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, 2018.
- Yifan Jiang, Hyunhak Shin, Jaeyong Ju and Hanseok Ko. "Online pedestrian tracking with multi-stage re-identification." *2017 14th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS)*. IEEE, 2017.
- Han Chen, Yifan Jiang, and Hanseok Ko. "Action Recognition with Domain Invariant Features of Skeleton Image." *2021 17th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS)*. IEEE, 2021.
- Luis Patino, Yifan Jiang et al. "PETS2021: Through-foliage detection and tracking challenge and evaluation." *2021 18th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS)*. IEEE, 2021.