Curriculum Vitae—Yifan Jiang

Research Professor
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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 can bridge natural language processing (NLP) and computer vision models and improve the quality of synthetic medical images by taking 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.