Patrick (Yong Jae) Kwon

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Research Interests

My main research goal is in embedding human-level spatial intelligence towards generative models, in order to provide better user controllability in solving various problems. My research areas include generative models, 3D reconstruction, talking head video generation / detection, human object interactions, and augmented reality.

Education

Master of Science | ***Data Science*** — Aug 2018 – Dec 2019
Columbia University (GPA : 3.9/4.0) — New York, NY

Bachelor of Arts | ***Computer Science, Statistics*** — Aug 2015 – May 2017
University of Virginia (GPA : 3.8/4.0) (2 year early graduation) — Charlottesville, VA

Work Experience

Deep Learning Researcher — Sep 2021 - Current
Naver Webtoon AI — Pangyo, ROK

Deep Learning Researcher — Jan 2020 - Sep 2021
Deepbrain AI — Seoul, ROK

Research Assistant — Sep 2019 – Dec 2019
Columbia University CGUI Lab — New York, NY

Data Scientist — June 2019 – Dec 2019
Emadri — New York, NY

Data Analyst — June 2017 – Jul 2018
Krafton — Pangyo, ROK

Publications

* indicates equal contribution

1. P. Kwon and H. Joo. Graspdiffusion: Synthesizing realistic whole-body hand-object interaction. *arXiv preprint arXiv:2410.13911*, October 2024. doi: 10.48550/arXiv.2410.13911

2. H. Kim, S. Han, P. Kwon, and H. Joo. Beyond the contact: Discovering comprehensive affordance for 3d objects from pre-trained 2d diffusion models. *European Conference on Computer Vision*, September 2024. doi: 10.1007/978-3-031-72983-6_23

3. S. J. Song, M. Tang, B. Gwartzman, D. Lee, P. Romandini, M. Salem, P. Kwon, S. K. Feiner, and I. Sailer. Augmented-reality-assisted intraoral scanning: A proof-of-concept study. *Journal of Prosthodontics*, 33(6):550–557, July 2024. doi: 10.1111/jopr.13836

4. B. Kim*, P. Kwon*, K. Lee, M. Lee, S. Han, D. Kim, and H. Joo. Chupa: Carving 3d clothed humans from skinned shape priors using 2d diffusion probabilistic models. In *2023 IEEE/CVF International Conference on Computer Vision (ICCV)*, pages 15919–15930, October 2023. doi: 10.1109/ICCV51070.2023.01463

5. K. Lee*, P. Kwon*, M. Lee, N. Ahn, and J. Lee. LPMM: Intuitive pose control for neural talking-head model via landmark-parameter morphable model. *arXiv preprint arXiv:2305.10456*, May 2023. doi: 10.48550/arXiv.2305.10456

6. N. Ahn, P. Kwon, J. Back, K. Hong, and S. Kim. Interactive cartoonization with controllable perceptual factors. In *2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 16827–16835, June 2023. doi: 10.1109/CVPR52729.2023.01614

7. P. Kwon, J. You, G. Nam, S. Park, and G. Chae. Kodf: A large-scale korean deepfake detection dataset. In *2021 IEEE/CVF International Conference on Computer Vision (ICCV)*, pages 10724–10733, 2021. doi: 10.1109/ICCV48922.2021.01057

Projects and Research

AI Photocard | ***Python*** Dec 2023
Naver Webtoon AI
- Built a python-based library to service the state-of-the-art diffusion models in generating image, video and 3D content, for internal usage

AI Studio : An easy-to-use generative AI framework | ***Python, C♯*** June 2023
Naver Webtoon AI
- Built an user-friendly system of creating / inpainting images based on generative AI models.

Augmented-Reality-Assisted Intraoral Scanning (ARIOS) | ***C♯*** June 2023
Columbia University
- Participated in a proof-of-concept study of implementing Augmented Reality towards intraoral scanning to further improve efficiency of scanning procedures.

Chupa : Diffusion-based 3D Human Digitalization | ***Python, C♯*** Feb 2023
Naver Webtoon AI & Seoul National University
- Collaborated with SNU Visual Computing Lab in creating 3D clothed human models via diffusion probabilistic models.
- Research paper was accepted as an oral paper to ICCV 2023.

KoDF: A Large-scale Korean DeepFake Detection Dataset | ***Python*** Oct 2020
Deepbrain AI
- Large scale original/synthesized (deepfake) facial video dataset focused on asian subjects, along with a deepfake detection model trained on the dataset.
- Research paper was accepted to ICCV 2021.

Pally : Augmented Reality for Social Transition | ***C♯*** June 2019
Verizon 5G Edtech Challenge
- Project on improving social skills for autistic children using Microsoft Hololens and 5G Network.

Honors and Awards

ICCV Oral Oct 2023
for ”Chupa: Carving 3d clothed humans...” (top 1.8% of submissions)

Verizon 5G Edtech Challenge Winning Project May 2019
for ”Pally: Augmented Reality for Social Transition” (Top 10 amongst submitted projects)

IBM Call for Code Hackathon 1st place Aug 2018

UVA Order of the Orange Stole May 2017
Recognition for early graduation at University of Virginia

Dean’s List August 2015 – May 2017
Recognition for academic excellence at University of Virginia

Skills

Languages: Korean, English
Programming: Python (PyTorch, Tensorflow), MATLAB, C++, C♯, Java, SQL, R Studio, AWS, Azure