Patrick Kwon

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RESEARCH INTERESTS

My main research goal is to solve 2D/3D generation problems with semantic control, based on deep learning techniques. My prior research areas include DeepFake content generation and detection, diffusion-model based image generation, 3D human digitalization, and Augmented Reality programming.

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
- Researched and designed deep learning solutions focused on image / 3D generation and editing

Deep Learning Researcher   Jan 2020 - Sep 2021
Deepbrain AI   Seoul, ROK
- Researched and designed deep learing solutions for face generation and speech synthesis

Research Assistant   Sep 2019 – Dec 2019
Columbia University CGUI Lab   New York, NY
- Developed Unity (C♯) based Augmented Reality projects with Professor Steven K. Feiner.

Data Scientist   June 2019 – Dec 2019
Emadri   New York, NY
- Designed recommendation systems for recommending packing list items for travelers.

Data Analyst   June 2017 – Jul 2018
Krafton   Pangyo, ROK
- Provided 20+ data analysis papers on TERA, Krafton's leading MMORPG Title.

PROJECTS AND RESEARCH

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

Chupa : Diffusion-based 3D Human Digitalization | *Python, C♯*   Dec 2022
Naver Webtoon AI & Seoul National University
- Collaborated with the Visual Computing Lab in creating 3D humanoid models based on 2D diffusion models.
- Research paper was accepted to ICCV 2023.

LPMM : Facial landmark based Talking-head model | *Python*   Aug 2022
Naver Webtoon AI
- Proposed a novel method of creating photorealistic talking head videos with enhanced pose controllability.
- Research paper was accepted to CVPR 2023 Workshop (AI4CC)

StyleGAN3-Inversion for cartoon images | *Python*   Feb 2022

Naver Webtoon AI
- Introduced deep-learning based image reconstruction and editing methods towards translating photos into cartoon style illustrations, to aid artists and creators.
- Research paper was accepted to CVPR 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.

Augmented Reality for Dental Implant Applications | *C♯*   Nov 2019

Columbia University
- Augmented Reality program based on EPSON's Moverio smart glasses, aimed to aid dental students during implant practices.

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.

RescYou: Emergency contact application with deep learning | *Python, Java*   Aug 2018

Columbia University
- Project on using Facial Recognition along with IBM Cloud to contact people with needs during emergency situations

PUBLICATIONS

1. Byungjun Kim*, Patrick Kwon*, Kwangho Lee, Myunggi Lee, Sookwan Han, Daesik Kim, and Hanbyul Joo. Chupa: Carving 3d clothed humans from skinned shape priors using 2d diffusion probabilistic models. *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, May 2023

2. Kwangho Lee*, Patrick Kwon*, Myunggi Lee, Namhyuk Ahn, and Junsoo Lee. LPMM: Intuitive pose control for neural talking-head model via landmark-parameter morphable model. *arXiv preprint arXiv:2305.10456*, May 2023

3. Namhyuk Ahn, Patrick Kwon, Jihye Back, Kibeom Hong, and Seungkwon Kim. Interactive cartoonization with controllable perceptual factors. *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, December 2022

4. Patrick Kwon, Jaeseong You, Gyuhyeon Nam, Sungwoo Park, and Gyeongsu Chae. Kodf: A large-scale korean deepfake detection dataset. *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, pages 10744–10753, October 2021

HONORS AND AWARDS

Verizon 5G Edtech Challenge Winning Project   May 2019

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