

Hongsuk Choi

PERSONAL DETAILS

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VISA Green Card Holder (EB1)

INTRODUCTION

I am a machine learning engineer, who has in-depth experience in computer vision and deep learning. I have worked in cross-functional teams, working closely with researchers, engineers, and business departments.

Summary of my experience:

- Over 5 years of software engineering experience in both small and large companies, performing frontend, backend, and AI research
- In-depth experience in large language model, diffusion-based generative AI, and 3D reconstruction models. Maintain opensource projects.
- First authored 7 papers out of 11 total papers (ex. CVPR, ICLR, ICRA) and filed 3 patents, most completed during my 2 years in a Master's program
- Strong expertise in Python and Pytorch. Familiar with CUDA.

EDUCATION & SERVICE

M.S., Electrical and Computer Engineering Seoul National University, Seoul, Korea Advisor: Prof. Kyoung Mu Lee	Mar 2020 - Feb 2022
Military Service, Sergeant Squad Leader Air Force, Korea	Mar 2015 - Mar 2017
B.S., Computer Science and Engineering Seoul National University, Seoul, Korea	Mar 2015 - Feb 2020
B.S., Business Seoul National University, Seoul, Korea	Mar 2013 - Feb 2020

WORK EXPERIENCE

Samsung AI & Robotics Center, New York, USA

Machine Learning Engineer, June 2022 - Feb 2024

Projects I led

- FineControlNet: Fine-level Text Control for Image Generation with Spatially Aligned Text Control Injection
- HandNeRF: Hand-Object Interaction Scene Reconstruction from a Single RGB image
- Metric-scale Human Reconstruction from a Single RGB image

- Hand Force Estimation from Vision

Other team projects

- User-friendly Floor Plan Generation from Lidar Image
- Manipulation Robot System Development; integrated a perception module that estimates 6D object poses from RGBD pointclouds
- Reactive Human Tracking/Following with Mobile Robots

[Tech stack]

Tekscan tactile force sensing, Vicon motion capture, Pointcloud processing using pointnet++, 6D object pose estimation from RGBD sensor, ROS2, Multi-view camera calibration and synchronization, Python 3D simulation, Feature-based NeRF, 3D hand/body reconstruction, Diffusion-based LLM, Mask R-CNN, etc

NAVER AI LAB, Seoul, Korea

Visiting Researcher, Mar 2022 - May 2022

- Project: Data Augmentation for 3D Human Pose and Shape Estimation using Image Generation and Pseudo-labeling
- NAVER AI LAB is the largest AI lab in Korea

[Tech stack]

Style Gan, Inpainting, Image Stitching, 3D Rendering, 3D Model Fitting, Transformer, GraphCNN, CNN, Learning-based fitting, etc

NAVER LABS Europe, Grenoble, France

Research Intern, Apr 2021 - Oct 2021

- Project: Neural Image Generation for an Arbitrary Person with Implicit Function (NeRF) from a Single RGB Image
Advisor: [Gregory Rogez](#), Vincent Leroy
- NAVER LABS Europe is a former Xerox Research Centre Europe

[Tech stack]

Generalizable NeRF, Sparse 3D CNN, GAN, 3D human pose and mesh estimation, 3D mesh rendering/rasterization, etc

Seoul National University, Seoul, Korea

Teaching Assistant, Mar 2019 - Dec 2020

- Lecture: Introduction to Computer Programming

[Tech stack]

Python, Docker

NAVER Webtoon, Seoul, Korea

Software Engineer Intern, Jun 2018 - Aug 2018

- Project: Android App Development for Movie Trailer Play in AR
- NAVER Webtoon has 85.6 million users

[Tech stack]

Java+Android Studio, OpenGL rendering, Vuforia AR API

Start-Up

Team Leader & Software Engineer, Jul 2017 - Feb 2019

- WebApp Development for Workout Social Media
- Publicly launched at App Store & Google Play Store

[Tech stack]

Tech stack: Firebase+Node.js, TypeScript+Angular JS+Ionic Framework

PUBLICATIONS (SELECTED)

[1] **Hongsuk Choi** (*), Isaac Kasahara(*), Selim Engin, Moritz Alexander Graule, Nikhil Chavan-Daffe, Volkan Isler (* equal contribution), “FineControlNet: Fine-level Text Control for Image Generation with Spatially Aligned Text Control Injection”, submitted to CVPR 2024, [[HOMEPAGE](#)][[ARXIV](#)][[CODE](#)]

[2] **Hongsuk Choi**, Nikhil Chavan-Daffe, Jiacheng Yuan, Volkan Isler, Hyunsoo Park, “HandNeRF: Learning to Reconstruct Hand-Object Interaction Scene from a Single RGB Image”, ICRA 2024, [[HOMEPAGE](#)] [[ARXIV](#)][[CODE](#)][[VIDEO](#)]

[3] **Hongsuk Choi** (*), Hyeongjin Nam (*), Taeryung Lee, Gyeongsik Moon, Kyoung Mu Lee (* equal contribution), “Rethinking Self-Supervised Visual Representation Learning in Pre-training for 3D Human Pose and Shape Estimation”, **ICLR 2023**, [[ARXIV](#)][[VIDEO](#)]

[4] Gyeongsik Moon, **Hongsuk Choi**, Sanghyuk Chun, Jiyoung Lee, Sangdoon Yun, “Three Recipes for Better 3D Pseudo-GTs of 3D Human Mesh Estimation in the Wild”, **CVPR 2023 workshop**, [[HOMEPAGE](#)][[ARXIV](#)][[PDF](#)]

[5] **Hongsuk Choi** (*), Gyeongsik Moon (*), Matthieu Armando, Vincent Leroy, Kyoung Mu Lee, Gregory Rogez (* equal contribution), “MonoNHR: Monocular Neural Human Renderer”, **3DV 2022**, [[ARXIV](#)][[VIDEO](#)]

[6] **Hongsuk Choi**, Gyeongsik Moon, Joonkyu Park, and Kyoung Mu Lee, “Learning to Estimate Robust 3D Human Mesh from In-the-Wild Crowded Scenes”, **CVPR 2022**, [[ARXIV](#)][[CODE](#)]

[7] Gyeongsik Moon, **Hongsuk Choi**, Kyoung Mu Lee, “NeuralAnnot: Neural Annotator for 3D Human Mesh Training Sets”, **CVPR 2022 workshop**, [[ARXIV](#)][[CODE](#)]

[8] Gyeongsik Moon, **Hongsuk Choi**, Kyoung Mu Lee, “Accurate 3D Hand Pose Estimation for Whole-Body 3D Human Mesh Estimation”, **CVPR 2022 workshop**, [[ARXIV](#)][[CODE](#)]

[9] JoonKyu Park (*), Yeonguk Oh (*), Gyeongsik Moon (*), **Hongsuk Choi**, Kyoung Mu Lee (* equal contribution), “HandOccNet: Occlusion-Robust 3D Hand Mesh Estimation Network”, **CVPR 2022**, [[ARXIV](#)][[CODE](#)]

[10] **Hongsuk Choi**, Gyeongsik Moon, Ju Yong Chang, and Kyoung Mu Lee, “Beyond Static Features for Temporally Consistent 3D Human Pose and Shape from a Video”, **CVPR 2021**, [[ARXIV](#)][[VIDEO](#)][[CODE](#)]

[11] **Hongsuk Choi** (*), Gyeongsik Moon (*), and Kyoung Mu Lee (* equal contribution), “Pose2Mesh: Graph Convolutional Network for 3D Human Pose and Mesh Recovery from a 2D Human Pose”, **ECCV 2020**, [[ARXIV](#)][[PDF](#)][[VIDEO](#)][[CODE](#)]

PATENTS

In Process

[1] FineControlNet: FINE-LEVEL TEXT CONTROL FOR IMAGE GENERATION (U.S. Provisional Application(s) filed No. 63/600,563, filed November 17, 2023 by Samsung)

[2] HandNeRF: RGB-BASED HAND-OBJECT INTERACTION RECONSTRUCTION SYSTEM (United States Patent Application No. 63/460,995, filed on April 21, 2023 by Samsung)

[3] MonoNHR: THREE DIMENSIONAL RENDERING SYSTEMS AND METHODS FROM MONOCULAR IMAGE (U.S. Provisional Application(s) No(s) 63/394,741, filed August 3, 2022 by Seoul National University & NAVER patent)

PROJECTS

Human mesh model parameter fitting from 3D point cloud co-op with Antigravity	Mar 2021 - Oct 2021
A Large-scale Dataset for 3D Human Pose and Mesh Estimation Dataset link / co-op with SweetK and MotionTechnology	May 2020 - Dec 2020
HumanFit: A New Large-scale Dataset for Human Fitness Evaluation and Feedback	May 2020 - Dec 2020
Dataset link / co-op with SuperbAI, KakaoBrain	
Human tracking and counting from Drone images (Data collection and Model development)	Mar 2019 - May 2019
co-op with Ministry of Science and ICT, Korea	
Human Part Segmentation for AI-based Animation Coloring co-op with NCSOFT	Mar 2019 - Jun 2019

HONORS

Distinguished Master Dissertation Award, Seoul National University, 2022

Selected as a finalist in **Qualcomm Innovation Fellowship Korea**, 2020 & 2021

1st place and **2nd place** at the *without association* track of **3D human pose estimation in the wild (3DPW) challenge**, workshop conjunction with **ECCV 2020** (1st in a joint orientation metric and 2nd in a joint position metric), 2020

1st place at the Qualcomm IT Tour presentation competition held by Qualcomm, proposed AR-based workout coaching system and selected as a winner by Jim Cathey (President of Qualcomm Global Business), 2019

SKILLS

Professional at:

PYTHON, PYTORCH, PYTORCH3D, OPENCV, OPEN3D, PIL, CAMERA CALIBRATION, HUMAN BODY AND HAND MOTION CAPTURE, VICON, 3D VISUALIZATION, PERFORMANCE REPORT, CONVENTIONAL MULTI-VIEW GEOMETRY CV, IMAGE PROCESSING, MACHINE LEARNING, CONVEX OPTIMIZATION, LATEX

Familiar at:

JAVA, JAVASCRIPT, TENSORFLOW, ROS, ANDROID STUDIO, PYTHON SIMULATION, TACTILE FORCE SCANNING, 3D GRAPHICS

SOMETHING DIFFERENT

During my stay in Bristol, UK, I went by Benjamin in an elementary school. I played an electric guitar in a university rock band. Looking to expand my musical repertoire, I picked up a bass guitar this year.