

Sung-heon Park

Suwon, Korea | +82-10-2584-6673 | sungheon.park@gmail.com

RESEARCH INTERESTS

Neural radiance field, neural rendering, 3D reconstruction, human reconstruction, generative models, multimodal learning

EXPERIENCE

Samsung Advanced Institute of Technology (SAIT)

Suwon, Korea

Staff Researcher, Multimedia Systems Lab

01/2022 – Present

- Co-initiated a neural graphics algorithm project, driving research on neural radiance fields (NeRFs) encompassing dynamic, few-shot, and relightable NeRF. Spearheaded the development of accurate and fast dynamic NeRF training algorithms, recognized with a CVPR'23 highlight paper
- Prototyped lightweight neural rendering algorithms tailored for photorealistic human face avatars, performed network quantization and neural texture implementation
- Implemented neural material rendering frameworks for photorealistic rendering of complex materials, leading to integration of neural network modules to Falcorn and Unreal 5 rendering pipelines
- Pioneered an image-to-3D generation framework utilizing depth estimation and image inpainting diffusion models

Staff Researcher, Computer Vision Lab

07/2019 – 12/2021

- Developed real-time lightweight face liveness detection methods using dual-pixel cameras adopted to Samsung Galaxy S20 and S21 face authentication, engineered disparity extraction method and optimized network architecture
- Designed AI-based auto white balance algorithm based on convolutional neural nets, resulting in a 20% improvement over traditional white balance methods
- Conducted research on 3D human pose estimation under semi-supervised and weakly-supervised settings, resulting in a publication of research paper at ECCV'20

EDUCATION

Seoul National University

Seoul, Korea

Ph.D. in Engineering, Graduate School of Convergence Science and Technology

03/2014 - 02/2019

- Thesis: 3D Reconstruction, Weakly-Supervised Learning, and Supervised Learning Methods for 3D Human Pose Estimation (Advisor: Nojun Kwak, Outstanding thesis award)

Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, Korea

M.S. in Computer Science

03/2012 - 02/2014

- Thesis: 3D Reconstruction of Manhattan Worlds Based on a Single Image Using Graph Cut Optimization and Minimal Spanning Tree (Advisor: Hyun S. Yang)

B.S. in Computer Science

03/2006 - 02/2012

- Exchange Student at RMIT University, Melbourne, Australia (07/2009 - 12/2009)

PUBLICATION

1. **Sungheon Park**, Minjung Son, Seokhwan Jang, Young Chun Ahn, Ji-Yeon Kim, and Nahyup Kang, "Temporal Interpolation Is All You Need for Dynamic Neural Radiance Fields," **CVPR 2023 (Highlight)**
2. **Sungheon Park***, Minsik Lee*, and Nojun Kwak, "Procrustean Regression Networks: Learning 3D Structure of Non-Rigid Objects from 2D Annotations," **ECCV 2020** (*: equal contribution)
3. Jihye Hwang, Jieun Lee, **Sungheon Park** and Nojun Kwak, "Pose Estimator and Tracker Using Temporal Flow Maps for Limbs," **IJCNN 2019**
4. **Sungheon Park** and Nojun Kwak, "3D Human Pose Estimation with Relational Networks, **BMVC 2018**
5. **Sungheon Park**, Minsik Lee, and Nojun Kwak, "Procrustean Regression: A Flexible Alignment-Based Framework for Nonrigid Structure Estimation," **IEEE Transactions on Image Processing**, vol. 27, pp. 249-264, Jan, 2018
6. **Sungheon Park** and Nojun Kwak, "Independent Component Analysis by Lp-norm Optimization," **Pattern Recognition**, vol. 76, pp. 752-760, Apr, 2018.

7. **Sungheon Park**, Taehoon Kim, Kyogu Lee, and Nojun Kwak, "Music Source Separation Using Stacked Hourglass Networks," **ISMIR 2018**
8. Jihye Hwang, **Sungheon Park**, and Nojun Kwak, "Athlete Pose Estimation by a Global-Local Network," 3rd International Workshop on Computer Vision in Sports, **CVPR 2017 Workshops**
9. **Sungheon Park** and Nojun Kwak, "Analysis on the Dropout Effect in Convolutional Neural Networks," **ACCV 2016**
10. **Sungheon Park**, Jihye Hwang, and Nojun Kwak, "3D Human Pose Estimation Using Convolutional Neural Networks with 2D Pose Information," Geometry Meets Deep Learning Workshop, **ECCV 2016 Workshops**
11. **Sungheon Park** and Nojun Kwak, "Illumination Robust Optical Flow Estimation by Illumination-Chromaticity Decoupling," **ICIP 2015**
12. **Sungheon Park** and Nojun Kwak, "Cultural Event Recognition by Subregion Classification with Convolutional Neural Network," ChaLearn Looking at the People Workshop, **CVPR 2015 Workshops**
13. **Sungheon Park**, Hyeopwoo Lee, Suwon Lee, and Hyun S. Yang, "Line-based Single View 3D Reconstruction in Manhattan World for Augmented Reality," **VRCAI 2015**
14. Jinki Jung, Jihye Hong, **Sungheon Park**, and Hyun S. Yang, "Smartphone as an Augmented Reality Authoring Tool via Multi-touch Based 3D Interaction Method," **VRCAI 2012**
15. Young Chun Ahn, Seokhwan Jang, **Sungheon Park**, Ji-Yeon Kim, and Nahyup Kang, "PANeRF: Pseudo-view Augmentation for Improved Neural Radiance Fields Based on Few-shot Inputs", arXiv, 2022
16. **Sungheon Park**, Myunggi Lee, and Nojun Kwak, "Polyp detection in colonoscopy videos using deeply-learned hierarchical features", Technical report, Seoul National University, 2015.

PATENT

- Method and apparatus for testing liveness (US20210326616A1), 2021
- Object recognition method and object recognition apparatus (US20210397819A1), 2021
- Method and apparatus for detecting liveness based on phase difference (US11244181B2), 2022

AWARDS

- **Samsung Annual Awards Gold prize (2nd place)** in Software development track, an annual recognition for the most innovative technologies at Samsung Electronics, awarded for the work on "Face Liveness Detection using Dual-Pixel Cameras," in 2021
- **Outstanding thesis award**, Graduate School of Convergence Science and Technology, Seoul Nat. University, 2019
- **Honorable mention award** in multi-person pose tracking challenge, awarded for the work "LimbFlowNet: Multi-Stride Pose Tracker and Estimator", PoseTrack Challenge 2018 (ECCV 2018 Workshops)
- **3rd place** in cultural event recognition challenge, awarded for the work "Cultural Event Recognition by Subregion Classification", ChaLearn Looking at People Challenge 2015 (CVPR 2015 Workshops)
- National Science and Engineering Undergraduate Scholarship, Korea Student Aid Foundation, 2006-2009

SKILLS

Python, C/C++, CUDA, MATLAB, Tensorflow, JAX, PyTorch, OpenGL, GLSL, HTML, Java, C#, Objective-C, Swift