Junhyeop Lee

Electric &Electronics Dept., Yonsei University, Seoul, South Korea

CONTACT INFORMATION

Tel +82-2-2123-7843
E-mail jun.lee@yonsei.ac.kr
Github https://junhyeop.github.io/

RESEARCH INTEREST

Computer Vision, Machine Learning, Deep Learning
- Multi-modality Analysis (RGB-Depth & Audio-Video)
- Unsupervised / Semi-supervised Learning & Representation Learning

EDUCATION

Ph.D. Candidate in School of Electrical and Electronic Engineering — **Sep.2015 – Present** (Expected Graduation Date: Feb.2022)
Yonsei University, Seoul, South Korea
GPA : 4.03/4.3 (4.18/4.5)

B.S. in School of Electronics and Avionics Engineering — Mar.2008 – Aug.2015
Korea Aerospace University, Goyang-si, South Korea
GPA : 4.07/4.5

Work EXPERIENCE

Research Intern — Dec.2019 – Jun.2020
Vision Computing Group, **Microsoft Research Asia**, Beijing, China
(Remote Work in Korea) Feb.2020-Jun.2020

R&D Intern — Aug.2013 – Jun.2014
Development Team, **Aeroprobe Co**, Christiansburg, VA, USA

RESEARCH EXPERIENCES

- **Road conditions and autonomous bus AI data** — Sep. 2020 – Mar. 2021
  - Leader
  - Funded by National Information Society Agency (NIA)
  - Abnormal Road Surface Detection and Segmentation on RGB images

- **Study on Audio, Video, 3D Map and Activation Map Generation System using Deep Generative Model** — Jul. 2019 – Dec. 2020
  - Researcher
  - Funded by Institute of Information & communications Technology Planning & Evaluation (IITP)
  - Develop an inpainting deep learning network for static LiDAR point cloud
  - Develop an Unsupervised Learning-based Method for 3D point cloud and Audio-Visual domain with MSRA

- **Development of the 3D Object Detection and Tracking for Single and Multi LiDAR ADAS** — Jul. 2019 – Dec. 2019
  - Leader
  - Funded by MANDO
  - Developed an algorithm for LiDAR down-sampling from 64 channel to low channel
  - Developed classification algorithm to classify dynamic and static

objects on driving scene
- Developed a false-negative removal algorithm for vehicle detection on 3D point cloud

- **Development of the high-precision natural 3D view generation technology using smart-car multi sensors and deep learning** Jan. 2017 – Nov.2019
  - Leader
  - Funded by Institute of Information & communications Technology Planning & Evaluation (IITP)
  - Developed an algorithm for LiDAR Odometry Estimation
  - Developed a ground segmentation algorithm to detect objects on road
  - Developed Multi-sensor Configuration Module for LiDAR, INS/GPS, and RGB

- **Anti-Spoofing Method of Recognition of 3D Subject with Structure-from-Motion** Dec. 2016 – May. 2018
  - Researcher
  - Funded by Korea Smart Authentication Corp (KoSAC)
  - Developed an algorithm for detecting spoofing attack on mobile device with camera pose estimation and its inner sensor fusion
  - Developed camera application for anti-spoofing with Android

- **Development of FFO(Functional Foot Orthosis) Method using 3D Printing Technology** Jun. 2016 – Dec. 2016
  - Researcher
  - Funded by Korea Small and Medium Business Administration
  - Developed a 3D insole editing tool to deform the template insole automatically fitting the patient's foot size for 3D printing

- **Development of 3D Face Data Generation and Editing Program for 3D Printing** Feb. 2016 – Dec. 2016
  - Researcher
  - Funded by Korea Small and Medium Business Administration
  - Developed a 3D reconstruction tool given only one frontal face RGB image for 3D printing
  - 2D RGB image to 3D point cloud reconstruction

PATENT

Domestic Application

1. "Apparatus And Method For Inpainting Depth of LiDAR"
   10-2020-0141887 (2020.10.29)

2. "Apparatus And Method For Correcting Errors Of Detected Objects Based On Point Cloud"
   10-2020-0141515 (2020.10.28)

3. "Apparatus and method for estimating camera pose and depth using images continuously acquired at various viewpoints"
   10-2019-0141508 (2019.11.07)

4. "Method and Device for Detecting Moving Object"
   10-2019-0135439 (2019.10.29)

5. "Ground and non-ground detection apparatus and method utilizing LiDAR"
   10-2018-0149266 (2018.11.29)

6. “Apparatus and method for detecting dynamic object”
   10-2018-0148370 (2018.11.27)

7. “Method for Real-time Odometry Estimation using Mono camera and IMU sensor”
   10-2017-0170347 (2017.12.12)

8. “Precise ego-motion estimating deep network through rearrangement of image sequences which can also allow the prediction of an automobile driving in reverse”
   10-2017-0170346 (2017.12.12)

9. “Apparatus and Method for Detecting Moving Object”
   10-2017-0170348 (2017.12.12)

Domestic Registration

1. “Apparatus and method for detecting dynamic object”
   10-2140873 (2020.07.28)

2. “Ground and non-ground detection apparatus and method utilizing LiDAR”
   10-2114558 (2020.05.18)

3. “Apparatus and Method for Detecting Moving Object”
   10-2002228 (2019.07.15)

PUBLICATION

INTERNATIONAL JOURNAL

1. **Junhyeop Lee**, Sangwon Hwang, Woojin Kim, Sangyoun Lee, "SAM-Net: LiDAR Depth Inpainting for 3D static scene generation" IEEE ITS, 2020 **(2nd round Under Review)**

2. Woojin Kim, Sangwon Hwang, **Junhyeop Lee**, Sungmin Woo, Sangyoun Lee, "AIBM: Accurate and Instant Background Modeling for Moving Object Detection" IEEE ITS, 2021 **(Accepted & not published yet)**

3. Kyungjae Lee, **Junhyeop Lee**, Joosung Lee, Sangwon Hwang, Sangyoun Lee, "Brightness-based convolutional neural network for thermal image enhancement." IEEE Access, 2017

4. Kyungjae Lee, **Junhyeop Lee**, Sangwon Hwang, Sangyoun Lee, “Inversion of Spread-Direction and Alternate Neighborhood System for Cellular Automata-Based Image Segmentation Framework”, Journal of International Society for Simulation Surgery 2017

5. Sunjin Yu, Eungyeol Song, **Junhyeop Lee**, Sangyoun Lee, "3D Face Generation from Single Frontal Picture for 3D Printing." Advanced Science Letters 22.11 (2016)

INTERNATIONAL CONFERENCE

1. **Junhyeop Lee**, Zhirong Wu, Sangwon Hwang, Stephen Lin, Dogyoon Lee, Sungmin Woo, Woojin Kim, Sangyoun Lee, “3D Unsupervised Representation Learning via Part-Whole Contrast for Generalized Shape Analysis”, ICCV 2021 **(Submitted)**

2. Sungmin Woo, Dogyoon Lee, **Junhyeop Lee**, Sangwon Hwang, Woojin Kim, Sangyoun Lee, “CKConv: Learning Feature Voxelization for Point Cloud Analysis”, ICCV 2021 **(Submitted)**

3. Dogyoon Lee, Jaeha Lee, **Junhyeop Lee**, Hyeongmin Lee, Minhyeok Lee, Sungmin Woo, Sangyoun Lee, “Regularization Strategy for Point Cloud via Rigidly Mixed Sample”, CVPR 2021

4. Joosung Lee, Sangwon Hwang, Kyungjae Lee, Woojin Kim, **Junhyeop Lee**, Tae-young Chung, Sangyoun Lee, “AD-VO: Scale-Resilient Visual Odometry Using Attentive Disparity Map”, Arxiv 2020

5. Sungmin Woo, Sangwon Hwang, Woojin Kim, **Junhyeop Lee**, Dogyoon Lee, Sangyoun Lee,

"False Positive Removal for 3D Vehicle Detection with Penetrated Point Classifier", ICIP 2020

6. Woojin Kim, Sangwon Hwang, **Junhyeop Lee**, Jaesung Choi, Sangyoun Lee, "Moving Object Detection via Foreground and Background Segmentation", ICEIC 2019

7. **Junhyeop Lee**, Kyungjae Lee, Sangyoun Lee, "Photometric Stereo with Relit Images from a Single Frontal Face Image", ITC-CSCC 2016

DOMESTIC CONFERENCE

1. 이도균, 황상원, 이준협, 이상윤, "기하학적 손실 함수를 통한 이미지 기반의 카메라 포즈 예측의 안정성", 대한전자공학회 하계종합학술대회, 2019

2. 김우진, 이준협, 황상원, 이주성, 이상윤, "앙상블 기반의 비 고정식 카메라 상황 내 동적 객체 검출", 대한전자공학회 하계종합학술대회, 2018

3. 박성주, 이경재, 이준협, 정태영, 이상윤, "도로 표지에 강인한 차선검출에 관한 연구", 한국통신학회 하계종합학술발표회, 2017

SCHOLARSHIP

- Grade Scholarship from Korea Aerospace University, 1semister, 2015
- Grade Scholarship from Korea Aerospace University, 2semister, 2014
- Grade Scholarship from Korea Aerospace University, 1semister, 2013
- Grade Scholarship from Korea Aerospace University, 2semister, 2012
- Grade Scholarship from Korea Aerospace University, 1semister, 2012

SKILL

Programming Languages & Tools
Pytorch, Tensorflow, Python, Matlab, C/C++, Android

Communication Skill

LANGUATGE

Korean (Native), English (Fluent)