

Soonmin Hwang

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Experience

External Technical Advisory

42DOT, KOREAN AUTONOMOUS DRIVING COMPANY (ACQUIRED BY HYUNDAI MOTOR GROUP)

Seoul, South Korea

Feb. 2022 - Present

Postdoc Researcher

THE ROBOTICS INSTITUTE, CARNEGIE MELLON UNIVERSITY

Pittsburgh, Pennsylvania, US

Sep. 2021 - Present

Sr. Machine Learning Scientist

AUTOPILOT TEAM, TESLA

Palo Alto, California, US

May. 2019 - Feb. 2021

Full-time Research Intern

COMPUTER VISION GROUP, QUALCOMM RESEARCH

Vienna, Austria

Jul. 2016 - Nov. 2016

Full-time Intern

MIXED REALITY LAB. (PROF. JONG-IL PARK)

Hanyang Univ., Seoul, S.Korea

Nov. 2010 - Feb. 2011

Honors & Awards

2018	KAIST R&D Report	Research Highlights of 2017 (IROS'16, AAAI'18)
2018	Travel Grant	Research Supporting Program for CVPR 2018, Kakao Corp.(\$4,300)
2018	Honorable Mention	The 24th HumanTech Paper Award, Samsung Electronics Co. Ltd, (\$2,000, acceptance rate 6.5%)
2017	Gold Prize	The 23th HumanTech Paper Award, Samsung Electronics Co. Ltd, (\$10,000, acceptance rate 0.7%)
2016	1st Place	NVIDIA Deep Learning Contest, NVIDIA Korea
2016	Bronze Prize	Korea Invention Patent Exhibition (KINPEX)

Research Interests

Perception for Autonomous Driving

- Object Detection, Learning based depth estimation, Semantic segmentation, Image enhancement, 3D scene understanding

Sensor Fusion for Robust Perception

- RGB camera, Thermal infrared camera, 3D LiDAR / Adaptive fusion

Path Planning and Navigation

- Social robot navigation in dynamic real world environment

Education

KAIST (Korea Advanced Institute of Science and Technology)

PH.D. IN ELECTRICAL ENGINEERING

Daejeon, S.Korea

Mar. 2014 - Feb. 2019

- Dissertation: Learning based Adaptive Visual Sensor Fusion for Robust Pedestrian Detection
- Advisor: Prof. In So Kweon

KAIST (Korea Advanced Institute of Science and Technology)

M.S. IN ELECTRICAL ENGINEERING

Daejeon, S.Korea

Feb. 2012 - Feb. 2014

- Thesis: A Hierarchical Classifier Model based on Deformable Part Models and Random Forest for Robust Pedestrian Detection
- Advisor: Prof. In So Kweon

Hanyang University

B.S. IN ELECTRONICS AND COMPUTER ENGINEERING

Seoul, S.Korea

Mar. 2007 - Feb. 2012

- Recognize and Play Sheet Music on Android Smartphone

Projects

Embedded AI Based Fully Autonomous Driving Software and MaaS Technology Development

KOREA INSTITUTE FOR ADVANCEMENT OF TECHNOLOGY (KIAT)

Apr. 2022 - Present

- Accurate 3D object detection from multiple sensors for embedded system
- Trajectory prediction of dynamic objects through continuous time-series multi-sensor data
- Learning to plan ego-path in dynamic environments

Automatic Emergency Braking for Pedestrian Protection

MINISTRY OF TRADE, INDUSTRY AND ENERGY OF KOREA (MOTIE)

Jun. 2013 - Jun. 2018

- Accurate pedestrian detection using multiple sensor fusion

Personal Plug and Play DigiCar (P3 DigiCar)

NATIONAL RESEARCH FOUNDATION OF KOREA

Mar. 2012 - Feb. 2017

- Robust pedestrian detection using monocular camera

DATMO: Detection and Tracking Moving Object using 3D LiDAR

LIG-NEX1 Co. LTD, S.KOREA

Apr. 2015 - Nov. 2015

- On-road object detection and tracking (pedestrian, car) using 3D-LiDAR
- Camera & 3D LiDAR fusion

Monocular Vision based Natural Feature Extraction for Cognitive Model

MINISTRY OF KNOWLEDGE ECONOMY OF KOREA

Sep. 2012 - Dec. 2013

- Porting developed natural feature algorithm to embedded system

Publications

* indicates equal contribution.

UMHE: Unsupervised Multispectral Homography Estimation

UNDER REVIEW

Nov. 2022

Jeongmin Shin, Jiwon Kim, Seokjun Kwon, Namil Kim, **Soonmin Hwang**, Yukyung Choi

Instant Domain Augmentation for LiDAR Semantic Segmentation

UNDER REVIEW

Nov. 2022

Kwonyoung Ryu*, **Soonmin Hwang***, Jaesik Park

T2FPV: Constructing High-Fidelity First-Person View Datasets From Real-World Pedestrian Trajectories

UNDER REVIEW

Sep. 2022

Benjamin Stoler, Meghdeep Jana, **Soonmin Hwang**, Jean Oh

TransDSSL: Transformer based Depth Estimation via Self-Supervised Learning

IEEE ROBOTICS AND AUTOMATION LETTERS (RA-L)

Aug. 2022

Daechan Han*, Jeongmin Shin*, Namil Kim, **Soonmin Hwang**, Yukyung Choi

Gated Bidirectional Feature Pyramid Network for Accurate One Shot Detection

MACHINE VISION AND APPLICATIONS (MVA)

Mar. 2019

Sanghyun Woo, **Soonmin Hwang**, Ho-Deok Jang, In So Kweon

KAIST Multispectral Recognition Dataset in Day and Night

IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS (TITS)

Feb. 2018

Yukyung Choi, Namil Kim, **Soonmin Hwang**, Kibaek Park, Jae Shin Yoon, Kyunghwan An, In So Kweon

StairNet: Top-Down Semantic Aggregation for Accurate One Shot Detection

[Lake Tahoe, USA](#)

IEEE WINTER CONF. ON APPLICATIONS OF COMPUTER VISION (WACV)

Mar. 2018

Sanghyun Woo, **Soonmin Hwang**, In So Kweon

[The 24th HumanTech Paper Award, Samsung Electronics, Honorable Mention \(\\$2,000\)](#)

Multispectral Transfer Network: Unsupervised Depth Estimation for All-day Vision

THE THIRTY-SECOND AAAI CONFERENCE ON ARTIFICIAL INTELLIGENCE (AAAI)

Namil Kim*, Yukyung Choi*, **Soonmin Hwang**, In So Kweon

[The 23th HumanTech Paper Award, Samsung Electronics, Gold Prize \(\\$10,000\)](#)

[KAIST R&D Report, Research Highlights of 2017](#)

[New Orleans, USA](#)

Feb. 2018

Thermal Image Enhancement using Convolutional Neural Network

THE INTERNATIONAL CONFERENCE OF INTELLIGENT ROBOTS AND SYSTEMS (IROS)

Namil Kim*, Yukyung Choi*, **Soonmin Hwang***, In So Kweon

[Deep Learning Contest, NVidia Korea, 1st Place](#)

[KAIST R&D Report, Research Highlights of 2017](#)

[Daejeon, S.Korea](#)

Oct. 2016

Fast Multiple Objects Detection and Tracking Fusing Color Camera and 3D LIDAR for Intelligent Vehicles

INTERNATIONAL CONFERENCE ON UBIQUITOUS ROBOTS AND AMBIENT INTELLIGENCE (URAI)

Soonmin Hwang*, Namil Kim*, Yukyung Choi, Seokju Lee, In So Kweon

[Xian, China](#)

Aug. 2016

Thermal-Infrared based Drivable Region Detection

IEEE INTELLIGENT VEHICLES SYMPOSIUM (IV)

Jae Shin Yoon, Kibaek Park, **Soonmin Hwang**, Namil Kim, Yukyung Choi, In So Kweon

[Gothenburg, Sweden](#)

Jun. 2016

Low-Cost Synchronization for Multispectral Cameras

INTERNATIONAL CONFERENCE ON UBIQUITOUS ROBOTS AND AMBIENT INTELLIGENCE (URAI)

Soonmin Hwang, Yukyung Choi, Namil Kim, Kibaek Park, Jae Shin Yoon, In So Kweon

[Goyang, S.Korea](#)

Oct. 2015

Geometrical Calibration of Multispectral Calibration

INTERNATIONAL CONFERENCE ON UBIQUITOUS ROBOTS AND AMBIENT INTELLIGENCE (URAI)

Namil Kim, Yukyung Choi, **Soonmin Hwang**, Kibaek Park, Jae Shin Yoon, In So Kweon

[Goyang, S.Korea](#)

Oct. 2015

ARTRIEVAL: Painting Retrieval Without Expert Knowledge

IEEE INTERNATIONAL CONFERENCE ON IMAGE PROCESSING (ICIP)

Namil Kim, Yukyung Choi, **Soonmin Hwang**, In So Kweon

[Québec, Canada](#)

Sep. 2015

All-Day Visual Place Recognition: Benchmark Dataset and Baselines

IEEE INTERNATIONAL CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION WORKSHOPS (CVPRW-VPRICE)

Yukyung Choi, Namil Kim, Kibaek Park, **Soonmin Hwang**, Jae Shin Yoon, In So Kweon

[Boston, USA](#)

Jun. 2015

Multispectral Pedestrian Detection: Benchmark Dataset and Baselines

IEEE INTERNATIONAL CONFERENCE ON COMPUTER VISION AND PATTERN RECOGNITION (CVPR)

Soonmin Hwang, Jaesik Park, Namil Kim, Yukyung Choi, In So Kweon

[Google scholar citation: 615](#)

[Boston, USA](#)

Jun. 2015

A Two Phase Approach for Pedestrian Detection

ASIAN CONFERENCE ON COMPUTER VISION WORKSHOPS (ACCV WORKSHOPS)

Soonmin Hwang, Tae-hyun Oh, In So Kweon

[Singapore, Singapore](#)

Nov. 2014

Evaluation of Vocabulary Trees for Localization in Robot Applications

INTERNATIONAL CONFERENCE ON CONTROL, AUTOMATION AND SYSTEMS (ICCAS)

Soonmin Hwang, Chaehoon Park, Yukyung Choi, Donggeun Yoo, In So Kweon

[Gwangju, S.Korea](#)

Oct. 2013

Patents

Single-shot adaptive fusion method and apparatus for robust multispectral object detection

KR 10-2431419 (2022.08.08))

[Registered](#)

Apparatus and Method for Depth Estimation Based on Thermal Image, and Neural Network Learning Method

KR 10-1947782 (2019.02.07), US 11062470 (2021.07.13)

Registered

Apparatus and Method for Thermal Image Enhancement

KR 10-1821285 (2018.01.17)

Registered

Method and Apparatus for Detecting Smoke from Image

KR 10-1932543 (2018.12.19), US 09443149 (2016.09.13)

Registered

Pattern Board for Geometrical Calibration in Multi-Spectral Camera System, Calibration Apparatus, and Calibration Method Thereof

KR 10-2016-0122950 (2016.09.26)

Pending