Soonmin **Hwang**

Ph.D student

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Summary

I am a Ph.D student advised by Prof. In So Kweon in EE department, KAIST. I worked as a fulltime research intern in computer vision group at Qualcomm Research Austria. My research interest are robust visual perception technologies for autonomous driving in day and night. I have broad interests about various computer vision algorithm for autonomous driving, e.g. object detection, segmentation, depth estimation, etc. I have been pursuing various computer vision algorithms to turn ultimate AI-powered sensors into reality.

Education

KAIST (Korea Advanced Institute of Science and Technology) — *Daejeon, S.Korea*

Ph.D. student — *Mar. 2014 - present*

- Topic: Object detection, Deep learning, Sensor fusion
- Advisor: Prof. In So Kweon

KAIST (Korea Advanced Institute of Science and Technology) — *Daejeon, S.Korea*

M.S. — *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 — *Seoul, S.Korea*

B.S. — *Mar. 2007 - Feb. 2012*

- Recognize and Play a Music Score on Android Smartphone

Research Interests

Computer vision for self-driving cars

- Object detection (e.g. pedestrians, cars) / Semantic segmentation
- Image enhancement / 3D scene understanding

Deep learning for computer vision

- Dynamic neural network
- Adversarial machine learning for computer vision

Sensor fusion

- RGB camera + Thermal camera (Long wavelength IR)
- RGB camera + 3D LiDAR

Work experience

Full-time Research Intern — *Vienna, Austria*

Computer Vision Group, Qualcomm Research — *Jul. 2016 - Nov. 2016*

- Lane marker detection using deep neural network

Full-time Intern — *Hanyang Univ., Seoul, S.Korea*

Mixed Reality Lab. (Prof. Jong-Il Park) — *Nov. 2010 - Feb. 2011*

- Development of view morphing system for relics

Projects

Automatic Emergency Braking for Pedestrian Protection

Ministry of Trade, Industry and Energy of Korea (MOTIE) — *Jun. 2013 - PRESENT*

- 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

KAIST Multispectral Recognition Dataset in Day and Night

IEEE Transactions on Intelligent Transportation Systems **(TITS)** — *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

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

New Orleans, USA

The Thirty-Second AAAI Conference on Artificial Intelligence **(AAAI)** — *Feb. 2018*

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

Thermal Image Enhancement using Convolutional Neural Network

Daejeon, S.Korea

The International Conference of Intelligent Robots and Systems **(IROS)** — *Oct. 2016*

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

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

Xian, China

International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) — *Aug. 2016*

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

Thermal-Infrared based Drivable Region Detection

Gothenburg, Sweden

IEEE Intelligent Vehicles Symposium **(IV)** — *2016*

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

Low-Cost Synchronization for Multispectral Cameras

Goyang, S.Korea

International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) — *Oct. 2015*

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

Geometrical Calibration of Multispectral Calibration

Goyang, S.Korea

International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) — *Oct. 2015*

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

ARTRIEVAL: Painting Retrieval Without Expert Knowledge

Québec, Canada

IEEE International Conference on Image Processing **(ICIP)** — *2015*

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

All-Day Visual Place Recognition: Benchmark Dataset and Baselines

Boston, USA

IEEE International Conference on Computer Vision and Pattern Recognition Workshops (CVPRW-VPRICE) — *Jun. 2015*

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

Multispectral Pedestrian Detection: Benchmark Dataset and Baselines

Boston, USA

IEEE International Conference on Computer Vision and Pattern Recognition **(CVPR)** — *Jun. 2015*

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

A Two Phase Approach for Pedestrian Detection *Singapore, Singapore*

Asian Conference on Computer Vision Workshops (ACCV Workshops) *Nov. 2014*

Soonmin Hwang, Tae-hyun Oh, In So Kweon

Evaluation of Vocabulary Trees for Localization in Robot Applications *Gwangju, S.Korea*

International Conference on Control, Automation and Systems (ICCAS) *Oct. 2013*

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

Honors & Awards

2018	**Encouragement prize**	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)

Skills

Languages Python, MATLAB, C/C++

Libraries PyTorch, Caffe, OpenCV, QT, PCL, MFC, and others