Junhwa Hur

Contact Information

junhwa.hur@gmail.com
(+49) 157-8082-0713

Google Scholar
GitHub
Portfolio Website

Research Interest

Computer Vision, Machine Learning
Self-Supervised Learning, Multi-Task Learning, Active Learning, Meta-Learning
Visual Scene Understanding
Computer Vision for Autonomous Driving

Education

Technische Universität Darmstadt — Oct. 2015 –
Darmstadt, Germany

Ph.D. candidate in Department of Computer Science
- Dissertation: Joint Motion, Semantic Segmentation, Occlusion, and Depth Estimation
- Advisor: Prof. Stefan Roth Ph.D.

Seoul National University — 2011 – 2013
Seoul, South Korea

M.Sc. in Department of Electrical and Computer Engineering
- Thesis: Multi-Lane Detection in Highway and Urban Driving Environment
- Advisor: Prof. Seung-Woo Seo Ph.D.

Pohang University of Science and Technology — 2007 – 2011
Pohang, South Korea

B.Sc. in Department of Electronics and Electrical Engineering
- Magna Cum Laude
- Advisor: Prof. Jin-Soo Lee Ph.D.

Academic Experience

Technische Universität Darmstadt — Oct. 2015 – Oct. 2020
Darmstadt, Germany
RA & TA in Department of Computer Science
- Researching on visual understanding of dynamic scenes:
  Motion, depth, occlusion and semantic segmentation via (self-)supervised learning
- TA for computer vision lectures, student thesis/project advising

Seoul National University — Sep. 2011 – Dec. 2013
Seoul, South Korea
RA in Department of Electrical and Computer Engineering
- Researching a computer vision system for autonomous driving

Work Experience

Korea Institute of Science and Technology (KIST) — Feb. 2014 – Aug. 2015
Seoul, South Korea
Internship in Imaging Media Research Center
- Dense correspondence estimation for 3D modeling of non-rigid objects

Hyundai Mobis Technical Research Institute — Winter 2010
Yong-in, South Korea
Internship in Power Electronics Department

Publications

Junhwa Hur and Stefan Roth, "Self-Supervised Multi-Frame Monocular Scene Flow", in Proc. of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021, *(to appear)*

Junhwa Hur and Stefan Roth, "Self-Supervised Monocular Scene Flow Estimation", in Proc. of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020, **Oral Presentation**

Junhwa Hur and Stefan Roth, "Iterative Residual Refinement for Joint Optical Flow and Occlusion Estimation", in Proc. of the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019

Simon Meister, **Junhwa Hur** and Stefan Roth, "UnFlow: Unsupervised Learning of Optical Flow with a Bidirectional Census Loss", in Proc. of the AAAI Conference on Artificial Intelligence (**AAAI**), 2018, **Oral Presentation**

Junhwa Hur and Stefan Roth, "MirrorFlow: Exploiting Symmetries in Joint Optical Flow and Occlusion Estimation", in Proc. of the International Conference on Computer Vision (**ICCV**), 2017

Junhwa Hur and Stefan Roth, "Joint Optical Flow and Temporally Consistent Semantic Segmentation", in Proc. of the ECCV Workshop on Computer Vision for Road Scene Understanding and Autonomous Driving (**ECCVW**), 2016, **Best paper award**

Junhwa Hur, Hwasup Lim, Changsoo Park, Sang Chul Ahn, "Generalized Deformable Spatial Pyramid: Geometry-Preserving Dense Correspondence Estimation", in Proc. of the IEEE Computer Vision and Pattern Recognition (**CVPR**), 2015

Junhwa Hur, Hwasup Lim, Sang Chul Ahn, "3D Deformable Spatial Pyramid for Dense 3D Motion Flow of Deformable Object", in Proc. of the International Symposium on Visual Computing (**ISVC**), 2014

Seung-Nam Kang, Soo-Mok Lee, **Junhwa Hur**, and Seung-Woo Seo, "Multi-lane Detection based on Accurate Geometric Lane Estimation in Highway Scenarios", in Proc. of the IEEE Intelligent Vehicles Symposium (**IV**), 2014

Junhwa Hur, Seung-Nam Kang, and Seung-Woo Seo, "Multi-lane Detection in Urban Driving Environments using Conditional Random Fields", in Proc. of the IEEE Intelligent Vehicles Symposium (**IV**), 2013.

Junhwa Hur, "Multi-lane Detection in Highway and Urban Driving Environment", Master's thesis, Seoul National University, 2013

Teaching Assistantship

Computer Vision I, *TU Darmstadt, Germany* Winter 2016/17, 2018/19

- An introductory computer vision course for undergraduate/graduate student
- Organizing assignments, exercise classes, and exam questions

Computer Vision II, *TU Darmstadt, Germany* Summer 2016

- An advanced computer vision course for undergraduate/graduate student
- Organizing assignments, exercise classes, and exam questions

Visual Computing Lab, *TU Darmstadt, Germany* Summer 2017

- Practical labs on solving current problems in computer vision
- Supervising students working on assigned projects

Advanced Topics in Computer Vision & Machine Learning Summer 2016, 2017
TU Darmstadt, Germany

- Paper reading seminars on the recent topics of computer vision and machine learning
- Advising students for understanding and presenting assigned papers

Project Lab Deep Learning for Computer Vision Winter 2016/17 – 2019/20
TU Darmstadt, Germany

- Practical lab that groups of students work on computer vision deep learning projects
- Supervising and advising groups to complete assigned projects below:
  - End-to-end Unsupervised Learning of Optical Flow (Winter 2016/17)
  - Image Inpainting Conditioned on Semantic Labels (Winter 2017/18)
  - Two-frame Depth Estimation Using the Epipolar Constraint (Winter 2018/19)
  - Piecewise monocular depth estimation by plane fitting (Winter 2019/20)

Student Thesis (Co-)Supervision

M.Sc. Thesis Supervision, *TU Darmstadt, Germany*

- Hui Jin, "Single Image Depth Prediction Jointly with Semantic Segmentation"
- Moritz Willig, "Analysing and Overcoming the Dataset Bias for Optical Flow Backbone Networks"
- Isheeta Jha, "Learning to Detect Moving Objects using a Single Stream of Motion Cues"

B.Sc. Thesis Supervision, *TU Darmstadt, Germany*

- Simon Meister, "Motion R-CNN: Instance-level 3D Motion Estimation with Region-based CNNs"
- Maximilian Kircher, "Jointly Estimating Optical Flow and Semantic Image Segmentation with Neural Networks"

Awards and Honors

Outstanding Reviewer Award 2020
Asian Conference on Computer Vision (for the best 66 reviewers)

Outstanding Reviewer Award 2020
European Conference on Computer Vision (for the best 216 out of 2830 reviewers)

Doctoral Consortium 2020
IEEE/CVF Conference on Computer Vision and Pattern Recognition

Outstanding Reviewer Award 2020
IEEE/CVF Conference on Computer Vision and Pattern Recognition (for the best 141 out of 3664 reviewers)

Best Paper Award 2019
21. Darmstädter Computer Graphik Abend 2019, Impact on Science

Outstanding Reviewer Award 2019
IEEE/CVF Conference on Computer Vision and Pattern Recognition (for the best 246 out of 2800 reviewers)

Best Paper Award 2019
21. Darmstädter Computer Graphik Abend 2018, Impact on Science

Outstanding Reviewer Award 2018
IEEE/CVF Conference on Computer Vision and Pattern Recognition (for the best 164 out of 2000 reviewers)

Best Paper Award 2016
ECCV Workshops 2016 - Computer Vision for Road Scene Understanding and Autonomous Driving

2nd Winner Prize 2013
Korea Autonomous Vehicle Contest

National Science and Engineering Scholarship 2007 – 2011
Korea Student Aid Foundation, covering full tuition

Merit based Scholarship 2007 – 2008
Pohang University of Science and Technology

Professional Service

Conference Reviewing

- Conference on Computer Vision and Pattern Recognition (CVPR), 2018 – 2021
- International Conference on Computer Vision (ICCV), 2019 – 2021 (biannual)
- European Conference on Computer Vision (ECCV), 2018 – 2020 (biannual)
- Asian Conference on Computer Vision (ACCV), 2018 – 2020 (biannual)
- Winter Conference on Applications of Computer Vision (WACV) 2021
- NeurIPS 2020 Workshop on Self-Supervised Learning - Theory and Practice
- ICML 2021 Workshop: Self-Supervised Learning for Reasoning and Perception
- International Conference on Intelligent Transportation (ITSC) 2015

Journal Reviewing

- IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2019 – 2021
- IEEE Transactions on Image Processing (T-IP), 2019 – 2020
- IEEE Robotics and Automation Letters (RA-L), 2020
- IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT), 2020
- IEEE Transactions on Intelligent Transportation Systems (T-ITS), 2014
- IEEE Intelligent Transportation Systems Magazine (ITSM), 2016 – 2018
- Pattern Recognition (PR), 2020

Talks

"Self-Supervised Learning of Monocular Scene Flow"

- Seoul National University, April, 2021
- CVPR Oral Presentation, June, 2020

"Self-Supervised Learning of Depth and Motion from Monocular Images"

- MaLGa - Machine Learning Genoa Center, December, 2020