

Junseok Kwon

CONTACT INFORMATION	Assistant Professor, School of Computer Science and Engineering, Chung-Ang University <i>Address:</i> 310-735, 84 Heukseok-Ro, Dongjak-gu, Seoul 06974, South Korea. <i>Tel:</i> +82 10 8693 7455, +82 2 820 5914 <i>E-mail:</i> , jskwon@cau.ac.kr <i>Homepage:</i> http://cau.ac.kr/~jskwon/
CITIZENSHIP	The Republic of Korea
RESEARCH INTERESTS	Computer vision and machine learning: Deep learning, visual tracking, dehazing, objectness, surveillance, event detection, video summarization, object recognition, and Monte Carlo method
EDUCATION	Seoul National University , Seoul, Korea <ul style="list-style-type: none">• Ph.D., Electrical Engineering and Computer Science, Mar 2008 ~ Feb 2013 Thesis: Robust visual tracking with uncertainty analysis of probabilistic models Adviser: Prof. Kyoung Mu Lee• M.S., Electrical Engineering and Computer Science, Mar 2006 ~ Feb 2008 Thesis: Unpredictable motion tracking methods using Wang-Landau Monte Carlo Adviser: Prof. Kyoung Mu Lee• B.S., Electrical Engineering, Mar 1998 ~ Feb 2006
RESEARCH EXPERIENCE	ETH Zurich , Switzerland Postdoctoral Researcher, Jun 2013 ~ Dec 2014 <ul style="list-style-type: none">• Research in computer vision and machine learning with Prof. Luc Van Gool.• Collaboration with postdocs and students at ETHZ (Dr. Ralf Dragon, Dr. Matthieu Guillaumin, Dr. Radu Timofte, Santiago Manen).• Topic: Visual tracking using ground plane and motion prior. Automation and Systems Research Institute , Seoul National University, Korea Senior Researcher, Mar 2013 ~ May 2013 <ul style="list-style-type: none">• Research with Prof. Kyoung Mu Lee in the computer vision lab., SNU.• Collaboration with students at CVL (Dong Woo Park, Junha Roh, Janghoon Choi).• Topic: Visual tracking using modeling with uncertainty analysis of probabilistic models.
PROFESSIONAL ACTIVITIES	Reviewer of international conferences Computer Vision and Pattern Recognition (CVPR) 2012~2020 International Conference on Computer Vision (ICCV) 2013, 2015, 2017, 2019 European Conference on Computer Vision (ECCV) 2012, 2014, 2016, 2018, 2020 Asian Conference on Computer Vision (ACCV) 2010, 2012, 2014, 2016 British Machine Vision Conference (BMVC) 2017, 2018

Reviewer of international journals

IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
International Journal of Computer Vision (IJCV)
IEEE Transactions on Image Processing (TIP)
IEEE Transactions on Multimedia (TMM)
IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
IEEE Transactions on Industrial Informatics (TII)
IEEE Signal Processing Letters (SPL)
Computer Vision and Image Understanding (CVIU)
Pattern Recognition (PR)

Editor of international journals

Member of the Editorial Committee, ETRI Journal (2017.08~)

Area Chair

Asian Conference on Computer Vision (ACCV) 2018

Finance Chair

ACM Multimedia (ACM MM) 2018

Demo Chair

International Conference on Computer Vision (ICCV) 2019

INDUSTRIAL
EXPERIENCE

Software R&D Center, Samsung Electronics, Korea
Senior Researcher,

Jan 2015 ~ Feb 2016

- Research in computer vision and deep learning.

HONORS AND
AWARDS

2019.02. 31th Image Processing and Image Understanding : Silver Prize
2018.02. 30th Image Processing and Image Understanding : Silver Prize
2017.09. 28th BMVC Best Reviewers
2014.11. 12th ACCV Best Reviewers
2012.11. 11th ACCV Best Reviewers
2012.06. 25th CVPR Doctoral Consortium
2012.02. 18th Samsung Humantech Thesis Prize : Bronze Prize
2011.02. 23th Image Processing and Image Understanding : Best Poster
2011.02. 17th Samsung Humantech Thesis Prize : Gold Prize
2010.02. 16th Samsung Humantech Thesis Prize : Honor Prize

PROJECT
EXPERIENCE

The technology development for event recognition/relational reasoning and learning knowledge based system for video understanding **July 2017 - Dec 2021**

- Funded by IITP, Korea
- Aimed at developing the multi-object tracking system based on deep learning
Visual Recognition Algorithms based on Deep Learning in the application of Intelligent Robots **Aug 2018 ~ Feb 2021**

- Funded by NRF, Korea
- Aimed at developing the intelligent robots system based on deep learning
Long-term visual tracking system based on deep learning **Mar 2017 ~ Feb 2020**
- Funded by NRF, Korea
- Aimed at developing the long-term visual tracking system based on deep learning
Unmanned Air Vehicle tracking system **June 2018 ~ Aug 2019**
- Funded by Hyundai Rotem Co., Ltd
- Aimed at developing the Unmanned Air Vehicle tracking system
Multi-object tracking system based on deep learning **May 2017 ~ Nov 2017**
- Funded by SK Telecom Co., Ltd
- Aimed at developing the multi-object tracking system based on deep learning
VarCity - semantic and dynamic city modeling **Jun 2013 ~ Dec 2014**
- Funded by the European Research Council (ERC).
- Aimed at creating inverse procedural models, which are built for existing cities, and creating dynamic living 3D city models, which allows for deeper immersion than in current city representations.
Event reasoning and summarization in surveillance videos **Sept 2011 ~ Jun 2012**
- Funded by Microsoft Research Asia
- Aimed at summarizing surveillance videos and detecting rare events in the videos at the same time.
Model based people detection and tracking **Dec 2009 ~ Nov 2010**
- Funded by LG Electronics Co., Ltd
- Aimed at detecting and tracking predestination with the real-time speed.
IR based object detection **May 2008 ~ Apr 2009**
- Funded by Samsung Thales Co., Ltd
- Aimed at detecting and tracking small targets in the IR videos.

PUBLICATIONS

Journal

- **Junseok Kwon**, Particle Swarm Markov Chain Monte Carlo for Robust Visual Tracking with Adaptive Template Update, *Applied Soft Computing (ASC)*, Accepted, 2020. [pdf]
- Suhyeon Ha and **Junseok Kwon**, Visual Tracking Enhancement by Trajectory Simulation based on Hidden Semi-Markov Model, *Electronics Letters*, vol. 56, no. 2, Jan, page 85-87, 2020. [pdf]

- **Junseok Kwon**, Robust Visual Tracking based on Variational Auto-encoding Markov Chain Monte Carlo, *Information Sciences* (INFSCI), vol. 512, Feb, page 1308-1323, 2020. [pdf]
- **Junseok Kwon**, Rare Event Detection by Quasi-Wang-Landau Monte Carlo Sampling with Approximate Bayesian Computation, *Journal of Mathematical Imaging and Vision* (JMIV), vol. 61 , no. 9, Nov, page 1258-1275, 2019. [pdf]
- Junghee Cho, **Junseok Kwon**, and Byung-Woo Hong, Adaptive Regularization via Residual Smoothing in Deep Learning Optimization. *IEEE Access*, vol. 7, page 122889-122899, 2019. [pdf]
- Jinhee Park, Dokyeong Kwon, Bo Won Choi, Ga Young Kim, Kwang Yong Kim, and **Junseok Kwon**. Small Object Segmentation with Fully Convolutional Network based on Overlapping Domain Decomposition. *Machine Vision and Applications* (MVA), vol. 30 , no. 4, June, page 707 -716, 2019. [pdf]
- Sung Woo Park, and **Junseok Kwon**, Orthogonal Object Proposal and Its Application, *IET Computer Vision*, vol. 13 , no. 4, June, page 420 -427, 2019. [pdf]
- Guisik Kim, and **Junseok Kwon**. Visual Tracking with Adaptive Initial Configuration and Likelihood Landscape Analysis. *IET Computer Vision*, vol. 13 , no. 1, Feb, page 1-7, 2019. [pdf]
- Janghoon Choi, **Junseok Kwon**, and Kyoung Mu Lee. Real-time Visual Tracking by Deep Reinforced Decision Making. *Computer Vision and Image Understanding* (CVIU), vol. 171, June, page 10-19, 2018. [pdf]
- **Junseok Kwon**. Uncertainty Calibrated Markov Chain Monte Carlo Sampler for Visual Tracking based on Multi-Shape Posterior. *Journal of Mathematical Imaging and Vision* (JMIV), vol. 60, no. 5, page 681-691. 2018. [pdf]
- **Junseok Kwon**, and Hansung Lee. Visual Tracking Based on Edge Field with Object Proposal Association. *Image and Vision Computing* (IVC), vol. 69, January, page 22-32. 2018. [pdf]
- **Junseok Kwon**, Radu Timofte, and Luc Van Gool. Leveraging Observation Uncertainty for Robust Visual Tracking. *Computer Vision and Image Understanding* (CVIU), vol. 158, page 62-71. 2017. [pdf]
- **Junseok Kwon** and Kyoung Mu Lee. Adaptive Visual Tracking with Minimum Uncertainty Gap Estimation. *IEEE Transaction on Pattern Analysis and Machine Intelligence* (TPAMI), vol. 39, no. 1, page 18-31. 2017. (**Impact Factor:17.730**)
- **Junseok Kwon**, Ralf Dragon, and Luc Van Gool. Joint Tracking and Ground Plane Estimation. *IEEE Signal Processing Letters* (SPL), vol. 23, no. 11, page 1514-1517. 2016. [pdf]
- **Junseok Kwon**, Ralf Dragon, and Luc Van Gool. Tracking by Switching State Space Models. *Computer Vision and Image Understanding* (CVIU), vol. 153, page 29-36. 2016. [pdf]
- Radu Timofte, **Junseok Kwon**, and Luc Van Gool. PICASO: PImage Correspondences And SOft Match Selection for Fast Tracking. *Computer Vision and Image Understanding* (CVIU), vol. 153, page 162-153, 2016. [pdf]
- **Junseok Kwon** and Kyoung Mu Lee. A Unified Framework for Event Summarization and Rare Event Detection from Multiple Views. *IEEE Transaction on Pattern Analysis and Machine Intelligence* (TPAMI), vol. 37, no. 9, page 1737-1750. 2015. [pdf] (**Impact Factor: 17.730**)

- **Junseok Kwon** and Kyoung Mu Lee. Tracking by Sampling and Integrating Multiple Trackers. *IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 36, no. 7, page 1428-1441. 2014. [pdf] (**Impact Factor: 17.730**)
- **Junseok Kwon** and Kyoung Mu Lee. Highly Non-Rigid Object Tracking via Patch-based Dynamic Appearance Modeling. *IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 35, no. 10, page 2427-2441. 2013. [pdf] (**Impact Factor: 17.730**)
- **Junseok Kwon** and Kyoung Mu Lee. Wang-Landau Monte Carlo-based Tracking Methods for Abrupt Motions. *IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI)*, vol. 35, no. 4, page 1011-1024. 2013. [pdf] (**Impact Factor: 17.730**)

Conference

- Dong Wook Shu*, Sung Woo Park*, and **Junseok Kwon**, 3D Point Cloud Generative Adversarial Network Based on Tree Structured Graph Convolutions. *IEEE/CVF International Conference on Computer Vision (ICCV)*, Seoul, Korea, 2019. [pdf]
- Janghoon Choi, **Junseok Kwon**, and Kyoung Mu Lee, Deep Meta Learning for Real-Time Target-Aware Visual Tracking. *IEEE/CVF International Conference on Computer Vision (ICCV)*, Seoul, Korea, 2019. [pdf]
- Guisik Kim, Jinhee Park, Suhyeon Ha and **Junseok Kwon**, Bidirectional Deep Residual learning for Haze Removal. *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, Long beach, USA, 2019. [pdf]
- Sungmin Cho, Bowon Choi, Do-Hwi Kim, and **Junseok Kwon**, Multi-Domain Attentive Detection Network, *The 26th IEEE International Conference on Image Processing (ICIP)*, Taipei, Taiwan, 2019. [pdf]
- Guisik Kim, Dokyeong Kwon, and **Junseok Kwon**, LOW-LIGHTGAN: Low-Light Enhancement via Advanced Generative Adversarial Network with Task-Driven Training, *The 26th IEEE International Conference on Image Processing (ICIP)*, Taipei, Taiwan, 2019. [pdf]
- Sungyong Baik, **Junseok Kwon**, and Kyoung Mu Lee, Learning to Remember Past to Predict Future for Visual Tracking, *The 26th IEEE International Conference on Image Processing (ICIP)*, Taipei, Taiwan, 2019. [pdf]
- Dohyun Kim, Joongheon Kim, **Junseok Kwon**, and Tae-Hyung Kim. Depth-Controllable Very Deep Super-Resolution Network, *International Joint Conference on Neural Networks (IJCNN)*, Budapest, Hungary, 2019. [pdf]
- Sung Woo Park and **Junseok Kwon**, Sphere Generative Adversarial Network Based on Geometric Moment Matching. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Long beach, USA, 2019. (**Oral presentation, 5.5% acceptance rate**) [pdf]
- Dohyun Kim, **Junseok Kwon**, and Joongheon Kim. Low-Complexity Online Model Selection with Lyapunov Control for Reward Maximization in Stabilized Real-Time Deep Learning Platforms. *IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, Miyazaki, Japan. 2018. [pdf]
- Guisik Kim, Suhyeon Ha, and **Junseok Kwon**. Adaptive Patch based Convolutional Neural Network for Robust Dehazing. *The 25th IEEE International Conference on Image Processing (ICIP)*, Athenes, Greece. 2017. [pdf]

- Guisik Kim, and **Junseok Kwon**. Robust Pixel-wise Dehazing Algorithm based on Advanced Haze-Relevant Features. *The 28th British Machine Vision Conference (BMVC)*, London, UK. 2017. [pdf]
- Santiago Manen, **Junseok Kwon**, Matthieu Guillaumin, and Luc Van Gool. Appearances can be deceiving: Learning visual tracking from few trajectory annotations. *The 13th European Conference on Computer Vision (ECCV)*, Zurich, Switzerland. 2014. [pdf]
- **Junseok Kwon** Junha Roh, Kyoung Mu Lee, and Luc Van Gool. Robust Visual Tracking with Double Bounding Box Model . *The 13th European Conference on Computer Vision (ECCV)*, Zurich, Switzerland. 2014. [pdf]
- **Junseok Kwon** and Kyoung Mu Lee. Interval Tracker: Tracking by Interval Analysis . *The 27th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Ohio, USA. 2014. [pdf]
- Junha Roh, Dong Woo Park, **Junseok Kwon**, and Kyoung Mu Lee. Visual Tracking using Joint Inference of Target State and Segment-based Appearance Models. *The 26th Asia Pacific Signal and Information Processing Association Conference (APSIPA)*, Kaohsiung, Taiwan. 2013. (Oral presentation) [pdf]
- **Junseok Kwon** and Kyoung Mu Lee. Minimum Uncertainty Gap for Robust Visual Tracking. *The 26th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Portland, USA. 2013. [pdf]
- Dong Woo Park, **Junseok Kwon**, and Kyoung Mu Lee. Robust Visual Tracking using Autoregressive Hidden Markov Model. *The 25th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Providence, USA. 2012. [pdf]
- **Junseok Kwon** and Kyoung Mu Lee. A Unified Framework for Event Summarization and Rare Event Detection. *The 25th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Providence, USA. 2012. [pdf]
- **Junseok Kwon** and Kyoung Mu Lee. Tracking by Sampling Trackers. *The 13th IEEE International Conference on Computer Vision (ICCV)*, Barcelona, Spain. 2011. (**Oral presentation, 3.7% acceptance rate**) [project page] (**Cited by 431**)
- **Junseok Kwon** and Kyoung Mu Lee. Visual Tracking Decomposition. *The 23th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, San Francisco, USA. 2010. (**Oral presentation, 4.5% acceptance rate**) [project page] (**Cited by 1330**)
- **Junseok Kwon** and Kyoung Mu Lee. Simultaneous Video Synchronization and Rare Event Detection via Cross-Entropy Monte Carlo Optimization. *The 12th IEEE International Conference on Computer Vision Workshop (ICCVW)*, Kyoto, Japan. 2009. (Oral presentation) [pdf]
- **Junseok Kwon** and Kyoung Mu Lee. Tracking of a Non-Rigid Object via Patch-based Dynamic Appearance Modeling and Adaptive Basin Hopping Monte Carlo Sampling. *The 22th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Miami, USA. 2009. [project page] (**Cited by 257**)
- **Junseok Kwon** and Kyoung Mu Lee. Tracking of Abrupt Motion using Wang-Landau Monte Carlo Estimation. *The 10th European Conference on Computer Vision (ECCV)*, Marseille, France. 2008. [project page]

PATENTS

Junseok Kwon and Kyoung Mu Lee. KOR Patent 1011077360000, Method for tracking object on visual (Jan, 2012)

Junseok Kwon, Sungmin Cho, Jinwook Paeng, Chanil Kim, and Taehong Kim. KOR Patent 10-2018-0084266, Nose pattern recognition system and method based on deep learning (July, 2018)

Sung Woo Park and **Junseok Kwon**. KOR Patent 10-2019-0011377, System and Method for Data Processing using Sphere Generative Adversarial Network Based on Geometric Moment Matching (Jan, 2019)

Sung Woo Park and **Junseok Kwon**. KOR Patent 10-2019-0011369, System and Method for Log Euclidean Metric Learning using Riemannian Submanifold Framework on Symmetric Positive Definite Manifolds (Jan, 2019)

Do-Hwi Kim, Sun Ho Lee, Sung Min Cho, Bo Won Choi, and **Junseok Kwon**. KOR Patent 10-2019-0020931, Method and apparatus for object recognition based on visible light and infrared fusion image (Feb, 2019)

Guisik Kim, Dokyeong Kwon, and **Junseok Kwon**. KOR Patent 10-2019-0077222, System and Method for Improving Low Light Level Image Using Generative Adversarial Network (June, 2019)

Dong Wook Shu, Sung Woo Park, and **Junseok Kwon**. KOR Patent 10-2019-0177096, 3D Point Cloud Generative Adversarial Network Based on Tree Structured Graph Convolutions (Dec, 2019)

Sung Woo Park, Dong Wook Shu, and **Junseok Kwon**. KOR Patent 10-2019-0177099, Evaluation Method for Unsupervised 3D Point Cloud Generation (Dec, 2019)