

WONGUN CHOI

625 Massachusetts Ave, Cambridge MA 02139

wgchoi@gmail.com

EDUCATION

University of Michigan, Ann Arbor

September 2008 - June 2013

Master and Ph.D.

Electrical and Computer Engineering

Seoul National University, Seoul

Mar 2001 - Feb 2008

Bachelor

Electrical Engineering

Emphasis on Signal Processing

WORK EXPERIENCE

Aibee, Cambridge, MA, USA

Sep 2018 - Present

Algorithm Scientist - lead core algorithm research and product development.

- Aibee is an early stage start up (founded in late 2017) aiming to provide state-of-the-art AI solution to offline businesses.
- Leading a core RnD project for high accuracy 3D human tracking with identity recognition. Responsible for designing the algorithm modules, implementing some of the algorithms, building the pipeline system, and managing about 10 researchers and engineers team.
- Designed and implemented the core multiple target tracking algorithm that is deployed to many of the core products.
- Responsible for building a new RnD team for Boston office.

ISEE, Cambridge, MA, USA

Oct 2017 - Aug 2018

Perception Tech Lead - lead technical design and development of real-time perception system for autonomous vehicle.

- ISEE is an autonomous driving start up with a theme of building humanistic autonomous vehicle that can reason like human-beings.
- In charge of all the research and engineering efforts related to perception problems (from sensors to semantic representation). Leading the start-ups research and engineering direction as a founding member of the team.
- Design and implement dynamic object detection and tracking algorithms using multiple sensors including cameras and Lidars. The implemented system runs in real time on the autonomous driving platform with high accuracy.
- Design and implement a robust lane estimation algorithm by fusing multiple algorithms, including deep neural network and traditional computer vision approaches. Also, closely worked with planning and control engineers to improve the driving behavior of the vehicle by optimizing the output of the lane estimation.
- Design and implement the localization algorithm and mapping method. The implemented localization and mapping system drastically improved the reliability and capability of our driving system.
- Leading multiple longer-term research projects in collaboration with multiple interns.
- Closely working with the co-founders to refine the companys research and engineering direction.

NEC Laboratories America, Cupertino, CA, USA

Jul 2017 - Sep 2017

Senior Researcher

- Leading multiple research projects and mentoring junior researchers and interns. Few highlights of the achievements are listed below:
- Proposed and co-implemented a novel algorithm to predict the trajectory of other vehicles in driving environment using deep neural networks and inverse optimal control for learning the model (in collaboration with an intern Namhoon Lee). The proposed model achieves significantly better accuracy in future prediction compared to simple motion based prediction or RNN based regression methods. The work is published at CVPR 2017 as a spotlight presentation ([link](#)).
- Proposed a novel learning mechanism to learn a compact neural network based object detection models with knowledge distillation (in collaboration with an intern Guobin Chen). Our proposed learning algorithm achieves significantly faster speed (4 times when using CPU) compared to the baseline models while compromising the accuracy very little. The work is published at NIPS 2017 ([link](#)).

NEC Laboratories America, Cupertino, CA, USA

Jul 2013 - Sep 2017

Research Staff Member

- Leading multiple research projects related to computer vision problems. Few highlights of the achievements are listed below:
- Lead a research project on multiple target tracking. Proposed a novel algorithm (NOMT) which achieved the best result on multiple public benchmarks including KITTI (as of Mar 2015) and MOT benchmark (as of May 2016). The algorithm is adopted as a core of NECs various computational solutions. The work is published to ICCV 2015 ([link](#)).
- Lead a research project on detecting 3D objects from a single image using a (geometrically) ensemble of cascaded boosting algorithm (in collaboration with an intern Yu Xiang). The proposed algorithm achieved a state-of-the-art performance on challenging KITTI benchmark (note: before CNN era). The work is published to CVPR 2015 as an oral presentation ([link](#)).
- Lead a research project on efficiently detecting objects from a single image using CNN with scale dependent pooling (in collaboration with an intern Fan Yang). The algorithm demonstrated superior detection accuracy on small / far-away objects. The proposed algorithm achieved a state-of-the-art performance on challenging KITTI benchmark. The algorithm is adopted as a core of NECs various computational solutions. The work is published to CVPR 2016 ([link](#)).

Willowgarage, Inc., Menlo Park, CA, USA

Mar 2011 - Jun 2011

Research Intern

- Designed and implemented a robust people tracking algorithm for a mobile robot (PR2). The work is published to ICCV Workshop and PAMI.

University of Michigan, Ann Arbor, MI, USA

May 2009 - May 2013

Graduate Student Research Assistant

- Focussed on computer vision research projects with an emphasis on 3D scene understanding and machine learning. Had been the lead research student for the following projects:
- Collective Human Activity Recognition in Videos.
- An online multiple target tracking algorithm for a mobile platform.
- 3D indoor scene understanding given a single image.

PUBLICATIONS

[\[Link\]](#) to my Google Scholar Profile.

Journals and Books

[4] W. Choi, Y.-W. Chao, C. Pantofaru, S. Savarese. *Indoor Scene Understanding with Geometric and Semantic Contexts*, IJCV, 2014.

- [3] W. Choi and S. Savarese, *Understanding Collective Activities of People from Videos*, PAMI, 2014
- [2] W. Choi and S. Savarese. *Recognizing Complex Human Activities via Crowd Context*, Book Chapter, *Augmented Vision and Reality*, Springer 2013.
- [1] W. Choi, C. Pantofaru, S. Savarese. *A General Framework for Tracking Multiple People from a Moving Camera*, in PAMI, 2013.

Conferences and Workshops

- [19] T. Zhao, Y. Xu, M. Monfort, W. Choi, C. Baker, Y. Zhao, Y. Wang, Y. N. Wu, *Convolutional Spatial Fusion for Multi-Agent Trajectory Prediction*, CVPR, 2019 (to appear).
- [18] T. H. Vu, W. Choi, S. Schuster, M. Chandraker, *Memory Warps for Long-Term Online Video Representations and Anticipation*, WACV, 2019.
- [17] G. Chen, W. Choi, X. Yu, T. Han, M. Chandraker, *Learning Efficient Object Detection Models with Knowledge Distillation*, NIPS, 2017
- [16] N. Lee, W. Choi, P. Vernaza, C. Choy, P. Torr, M. Chandraker, *DESIRE: Distant Future Prediction in Dynamic Scenes with Interacting Agents*, CVPR, 2017.
- [15] S. Schuster, P. Vernaza, W. Choi, M. Chandraker, *Deep Network Flow for Multi-Object Tracking*, CVPR, 2017.
- [14] F. Yang, W. Choi, Y. Lin, *Exploit All the Layers: Fast and Accurate CNN Object Detector with Scale Dependent Pooling and Cascaded Rejection Classifiers*, CVPR, 2016
- [13] W. Choi, *Near-Online Multi-target Tracking with Aggregated Local Flow Descriptor*, ICCV, 2015.
- [12] Y. Xiang, W. Choi, Y. Lin and S. Savarese, *Data-Driven 3D Voxel Patterns for Object Category Recognition*, CVPR (oral), 2015.
- [11] W. Choi, Y. Chao, C. Pantofaru and S. Savarese, *Discovering Groups of People in Images*, ECCV, 2014.
- [10] R. Tokola, W. Choi, and S. Savarese, *Breaking the chain: liberation from the temporal Markov assumption for tracking human poses*, ICCV, 2013
- [9] W. Choi, Y.-W. Chao, C. Pantofaru, S. Savarese. *Discovering Groups of People in Images*, ECCV, 2014.
- [8] R. Tokola, W. Choi, and S. Savarese, *Breaking the chain: liberation from the temporal Markov assumption for tracking human poses*, ICCV, 2013.
- [7] G. Gemignani, W. Choi, A. Ferone, A. Petrosino, and S. Savarese, *A Bayesian Approach to Tracking Learning Detection*, ICIAP, 2013.
- [6] Y. Chao, W. Choi, C. Pantofaru and S. Savarese, *Layout Estimation of Highly Cluttered Indoor Scenes using Geometric and Semantic Cues*, ICIAP, 2013.
- [5] W. Choi, Y.-W. Chao, C. Pantofaru, S. Savarese. *Understanding Indoor Scenes using 3D Geometric Phrases*, in CVPR (oral - 3.2% acceptance rate), 2013.
- [4] W. Choi and S. Savarese. *A Unified Framework for Multi-Target Tracking and Collective Activity Recognition*, in ECCV (oral - 2.8% acceptance rate), 2012.
- [3] W. Choi, C. Pantofaru, S. Savarese. *Detecting and Tracking People using an RGB-D Camera via Multiple Detector Fusion*, Workshop on Challenges and Opportunities in Robot Perception in conjunction with ICCV, 2011.

[2] W. Choi and S. Savarese. *Multiple Target Tracking in World Coordinate with Single, Minimally Calibrated Camera*, in ECCV, 2010.

[1] W. Choi, K. Shahid, S. Savarese. *What are they doing? : Collective Activity Classification Using Spatio-Temporal Relationship Among People*, Workshop on Visual Surveillance in conjunction with ICCV, 2009.

AWARDS

NECLA Business Contribution Award, NEC Laboratories, 2015

NEC Spot Recognition Award, NEC Laboratories, 2014 and 2016

Best poster presentation award, University of Michigan, 2015

Korea Science and Technology Scholarship, xxx, Spring and Fall 2007.