

Dongchan Kim

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PROFESSIONAL APPOINTMENTS **Assistant professor, Department of Artificial Intelligence** Mar 2025 - Present
• Hanyang University, ERICA

EDUCATION **Hanyang University**
• Ph.D in Automotive Engineering (Advisor: Prof. Kunsoo Huh) Mar 2015 - Feb 2022
• B.S in Automotive Engineering Mar 2011 - Feb 2015

RESEARCH INTERESTS Motion Planning, Trajectory Prediction, Vehicle State Estimation, Deep Learning, Reinforcement Learning, Self-Driving Vehicles.

RESEARCH EXPERIENCE **Motion Planning Engineer at 42dot (Selected)** Mar 2022 - Feb 2025
• Developed map-matching algorithm using deep learning-based lane detection and hdmap
• Developed data-driven human-like swerving algorithm
• Developed motion planning algorithm through deep learning-based trajectory distribution
• Developed imitation learning-based end-to-end motion planning algorithm
• Developed data-driven target lane decision algorithm

Hanyang University (Selected) Mar 2015 - Feb 2022
Advisor: Prof. Kunsoo Huh
• Collaborated with Hyundai motor company; Developed driving style based trajectory prediction of the ego vehicle for ADAS application
• Collaborated with Lotte Data Communication company; Developed multi agent reinforcement learning algorithm to control multiple mobile robots in simulation using Unity ML-Agents
• Developed hierarchical motion planning framework with state-lattice and A* based algorithms for *long-term* planner and particle swarm optimization for *short-term* planner, verified the algorithm in proving ground
• Developed integrated deep ensemble-nonlinear Kalman filters sideslip angle estimation algorithm, verified through simulations and experiments
• Developed RNN-based path prediction algorithm with deep ensemble, verified through experimental dataset
• Implemented QP formulated Model Predictive Controller (MPC) for trajectory planning, demonstrated in highway merge scenarios in simulations and experiments
• Collaborated with Hyundai motor company; contributed to ADAS evaluation project, identified vehicle system with sequential quadratic programming (SQP) and genetic algorithm (GA), tested autonomous emergency braking system (AEB) and lane keeping assist system (LKAS) based on the identified model

PUBLICATIONS

Journals

- [1] **D. Kim** and K. Huh, "Neural Motion Planning for Autonomous Parking," International Journal of Control, Automation and Systems, April 2023. (IF: 2.5) [doi](#)
- [2] **D. Kim**, G. Kim, H. Kim and K. Huh, "A Hierarchical Motion Planning Framework for Autonomous Driving in Structured Highway Environments," IEEE Access, Feb 2022. (IF: 3.4) [doi](#)
- [3] **D. Kim**, H. Shon, N. Kweon, S. Choi, C. Yang and K. Huh, "Driving Style-based Conditional Variational Autoencoder for Prediction of Ego Vehicle Trajectory," IEEE Access, Dec 2021. (IF:

3.4) [doi](#)

- [4] **D. Kim**, G. Kim, S. Choi and K. Huh, "An Integrated Deep Ensemble-Unscented Kalman Filter for Sideslip Angle Estimation With Sensor Filtering Network," IEEE Access, Nov 2021. (IF: 3.4) [doi](#)
- [5] G. Kim, **D. Kim**, Y. Ahn and K. Huh, "Hybrid Approach for Vehicle Trajectory Prediction Using Weighted Integration of Multiple Models," IEEE Access, May 2021. (IF: 3.4) [doi](#)
- [6] **D. Kim**, K. Min, H. Kim and K. Huh, "Vehicle sideslip angle estimation using deep ensemble-based adaptive Kalman filter," Mechanical Systems and Signal Processing, Oct 2020. (IF: 7.9) [doi](#)
- [7] K. Min, **D. Kim**, J. Park and K. Huh, "RNN-based Path Prediction of Obstacle Vehicles with Deep Ensemble," IEEE Transactions on Vehicular Technology, Oct 2019. (IF: 6.1) [doi](#)
- [8] J. Park, **D. Kim** and K. Huh, "Emergency Collision Avoidance by Braking and Steering in Critical Situations," International Journal of Automotive Technology, Jan 2021. (IF: 1.5) [doi](#)

Conferences

- [1] S. Choi, N. Kweon, C. Yang, **D. Kim**, H. Shon, J. Choi and K. Huh, "DSA-GAN: Driving Style Attention Generative Adversarial Network for Vehicle Trajectory Prediction," in IEEE International Conference on Intelligent Transportation Systems (ITSC), Indianapolis, IN, USA, Sep. 2021. [doi](#)
- [2] H. Kim, **D. Kim**, G. Kim, J. Cho, and K. Huh, "Multi-Head Attention-based Probabilistic Vehicle Trajectory Prediction," in IEEE Intelligent Vehicles Symposium (IV), Las Vegas, NV, USA, Oct. 2020. [doi](#)
- [3] K. Min, H. Kim, J. Park, **D. Kim** and K. Huh, "Interaction Aware Trajectory Prediction of Surrounding Vehicles with Interaction Network and Deep Ensemble," in IEEE Intelligent Vehicles Symposium (IV), Las Vegas, NV, USA, Oct. 2020. [doi](#)
- [4] H. Kim, G. Kim, J. Park, K. Min, **D. Kim** and K. Huh, "Action Conditioned Response Prediction with Uncertainty for Automated Vehicles," in International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS), Taipei, Taiwan, **Best Student Paper Award First Place**, Dec 2019. [doi](#)
- [5] Y. Song, **D. Kim** and K. Huh, "Autonomous Vehicle Trajectory Planning and Control Based on Traffic Motion Prediction," in International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS), Taipei, Taiwan, Dec 2019. [doi](#)
- [6] H. Kim, **D. Kim** and K. Huh, "Intention Aware Motion Planning with Model Predictive Control in Highway Merge Scenario," in Asia-Pacific Automotive Engineering Conference (APAC), Bangkok, Thailand, Apr 2019. [doi](#)
- [7] **D. Kim**, H. Kim and K. Huh, "Trajectory Planning for Autonomous Highway Driving Using the Adaptive Potential Field," in International Conference on Intelligent Transportation Systems (ITSC), Maui, HI, USA, Nov 2018. [doi](#)
- [8] **D. Kim**, H. Kim and K. Huh, "Local trajectory planning and control for autonomous vehicles using the adaptive potential field," in IEEE Conference on Control Technology and Applications (CCTA), Mauna Lani, HI, USA, Aug 2017. [doi](#)
- [9] H. Kim, J. Cho, **D. Kim** and K. Huh, "Intervention minimized semi-autonomous control using decoupled model predictive control," in IEEE Intelligent Vehicles Symposium (IV), Los Angeles, CA, USA, Jun 2017. [doi](#)

PATENTS

Vehicle and method for controlling the same US patent registered / [10384717](#) Aug 20, 2019
Vehicle Sideslip Angle Estimation Algorithm Using an Integrated Deep Ensemble-Kalman Filter
KR patent registered / [10-2307076](#) Sep 24, 2021

AWARDS

The 2nd Future Automotive Selected Paper Contest, First Place - [homepage](#) Oct 2020
• First place winner with a paper titled "Vehicle sideslip angle estimation using deep ensemble-based adaptive kalman filter" published in Mechanical Systems and Signal Processing (MSSP)

- Best Student Paper Award, First Place**, IEEE ISPACS (co-author) Dec 2019
- Capstone Design CEO Camp, Third Place** (team leader) Dec 2013
- Sponsor : ACE (Advancement for College Education)
- Smart Model Car Contest, First Place** (team member) July 2013
- Goal : To make intelligent model cars with various autonomous driving technologies such as lane tracking, smart cruise control and autonomous parking
 - Sponsor : ACE Lab, Freescale Semiconductor Korea, BMW Korea, MathWorks Korea, Continental, MANDO, Tektronix

SCHOLARSHIPS **Merit-based master/doctor unified program scholarship** Spring 2015 - Fall 2017

Merit-based scholarships Spring 2011 - Fall 2011, Fall 2012 - Fall 2014

COURSEWORKS **Hanyang University (Selected)**

- (Undergraduate) Probability and Statistics; Engineering Mathematics; Linear Algebra; Automatic Control; Embedded System; Vehicle Dynamics System
- (Ph.D) Artificial Intelligence; Computer Algorithms; Optimization; Vehicle Dynamics and Control; Automotive embedded system; Optimal Digital Control System; Real-time Optimal Control

Online courses

- Udacity C++ Nanodegree Program [certificate](#)
- Udacity Self-driving Car Nanodegree Program (First term)

SKILLS **Techniques** Python, Pytorch, Matlab, MATLAB Simulink, C++, ROS, Tensorflow, Git, LaTeX

Simulation Programs CarSim, CarMaker, Unity