Real-Time Path Planning for Trajectory Control in Autonomous Driving

Hye Young An*, Won Seok Choi*, Seong Gon Choi*

**Information & Communication Engineering, Chungbuk National University, Cheongju-si Chungcheongbuk-do, Korea*

youngflow@chungbuk.ac.kr, wschoi@chungbuk.ac.kr, choisg @chungbuk.ac.kr

***Abstract*— We propose an algorithm that enables real-time path planning and trajectory control of autonomous vehicles utilizing the detected lane, minimum turning radius, and driving radius. Path planning and trajectory control for autonomous driving are the key technologies in dynamic environments. For trajectory control, steering angle calculation is essential. This calculation mainly uses the next position information from GPS and predefined paths. For path planning and trajectory control, autonomous vehicles use sensors or communication systems to obtain information about their surroundings. However, it may be difficult to obtain the required path information for trajectory control because of environmental factors and surrounding conditions. To alleviate these uncertainties, we propose an algorithm that utilizes the next position generated in real time based on the detected lane information obtained from various sensors. The next position is generated by the intersection and midpoint based on the detected lane, minimum turning radius, and driving radius considering speed. Then, the steering angle is calculated based on the generated next position using a pure tracking algorithm. We simulated four different speeds at a roundabout. The obtained simulation results show that our algorithms work well in real-time driving at various speeds.**

***Keyword*— Path trajectory, Roundabout, Path tracking, Minimum turning circle**

Hye Young An received B.S. degree in the College of Computer Science, Chungnam National University, Korea in 2001. She is currently a M.S. candidate in School of Electrical & Computer Engineering, Chungbuk National University. Her research interests include Autonomous vehicle, Optimization, AI, IoT.

Won Seok Choi received B.S. and Ph.D. degrees in the College of Electrical and Computer Engineering, Chungbuk National University, Korea in 2008 and 2015, respectively. He is currently a researcher at the Research Institute of Computer and Information Communication (RICIC), Chungbuk National University. His research interests include Vehicle network, AI, Energy saving network, SDN, NFV, and NGN.

Seong Gon Choi received his B.S. degree in electronics engineering from the Kyeongbuk National University, in 1990, as well as his M.S. and Ph.D. degrees from the Information Communications University, South Korea, in 1999 and 2004, respectively. He is currently a Professor at the College of Electrical and Computer Engineering, Chungbuk National University. His research interests include V2X, AI, smart grid, IoT, mobile communication, high-speed network architecture, and protocol.