Research on Risk Detection of Autonomous Vehicle Based on Rapidly Exploring Random Tree

ABSTRACT

There is no doubt that the autonomous vehicle is an important developing direction of the auto industry, and, thus, more and more scholars are paying attention to doing more research in this field. Since path planning plays a key role in the operation of autonomous vehicles, scholars attach great importance to this field. Although it has been applied in many fields, there are still some problems, such as low efficiency of path planning and collision risk during driving. In order to solve these problems, an automotive vehicle-based rapid exploration random tree (AV-RRT)-based non-particle path planning method for autonomous vehicles is proposed. On the premise of ensuring safety and meeting the requirements of the vehicle's kinematic constraints through the expansion of obstacles, the dynamic step size is used for random tree growth. A non-particle collision detection (NPCD) collision detection algorithm and path modification (PM) path modification strategy are proposed for the collision risk in the turning process, and geometric constraints are used to represent the possible security threats, so as to improve the efficiency and safety of vehicle global path driving and to provide reference for the research of driverless vehicles.