

عنوان مقاله:

Linear Time Varying MPC Based Path Planning of an Autonomous Vehicle via Convex Optimization

محل انتشار:

فصلنامه مهندسی برق و الکترونیک ایران، دوره 14، شماره 4 (سال: 1396)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

In this paper a new method is introduced for path planning of an autonomous vehicle. In this method, the environment is considered cluttered and with some uncertainty sources. Thus, the state of detected objects should be estimated using an optimal filter. To do so, the state distribution is assumed Gaussian. Thus the state vector is estimated by a Kalman filter at each time step. The estimation of the probabilistic distribution can be shown using an error ellipse for a constant collision probability. Analytical forms of error ellipses can be obtained by quadratic inequalities. These quadratic inequalities make the optimization problem nonconvex. Thus, these inequalities are relaxed by applying a linearization approach. Finally, the optimization problem is reformulated to a convex optimization problem. There are some strong algorithms for solving a convex optimization problem, so the consequent path planning method can be solved efficiently with considerable performance that will be obtained in the end of this paper

کلمات کلیدی:

Stochastic Path Planning, Path Planning Under Uncertainty, Linear Time-Varying MPC, Quadratic Programming, Error Ellipse, Convex Optimization

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