CHAPTER 9

Motion planning and control for autonomous vehicle collision avoidance systems using potential field-based parameter scheduling

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9.1 Introduction

The tremendous growth of advanced driver assistance systems development in realizing autonomous driving has been seen around the world from academia, industry, as well as military and commercial organizations. Over the last two decades, research in this area has become one of the most active topics in intelligent transportation systems studies [1]. The introduction of intelligent functions in autonomous vehicles is seen as a positive influence toward reducing the risk of accidents to enhance road safety and provide effective traffic control [2,3]. Autonomous vehicles have been suggested as an emerging and effective solution to driver error due to crashes [4]. A vehicle collision avoidance system constitutes the main advanced active safety-related features in intelligent vehicles [5] that aims to reduce collision severity and human error [6]. Driver error is the main factor of traffic accidents, accounting for over 90% of all police-reported accidents [7,8].

Collision avoidance by a steering assistance system has been taken up as another option to address the main aim of preventing forward collision

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