GUIDANCE-BASED ON-LINE MOTION PLANNING FOR AUTONOMOUS HIGHWAY OVERTAKING

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ABSTRACT

In the context of intelligent transportation, this paper presents a novel on-line trajectory-generation method for autonomous lane changing. The proposed scheme is guidance based, real-time applicable, and ensures safety and passenger ride comfort. Based on the principles of *Rendezvous Guidance*, the passing vehicle is guided in real-time to match the position and velocity of a *shadow* target (i.e., rendezvous with) during the overtaking manoeuvre. The shadow target's position and velocity are generated based on real-time sensory information gathered about the slower vehicle ahead of the passing vehicle as well as other vehicles which may be travelling in the passing lane. Namely, the guidance principle is also used to prevent any potential collision with these *obstacle* vehicles. The proposed method can be used as a fully autonomous system or simply as a driver-assistance tool. Extensive simulations and experiments, some of which are presented herein, clearly demonstrate the tangible efficiency of the proposed method.