Environmental Perception for Autonomous Vehicle: Classic and Deep-Learning based Methods

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Automated driving is a key challenge about to change the future of mobility. It opens new dimensions for shared mobility and provides new solutions to traffic problems in large cities. Towards the goal of full autonomous driving in an open world context, technical and regulatory challenges have to be solved. Restricted automated driving in known limited areas is one such solution that simplifies technical complexity and the validation concept.

A crucial part for all levels of autonomous vehicles is the environmental perception including detection, tracking and classification of objects as well as the localization within the environment. Limitations in the use cases allow transferring proven classical methods from e.g. driver assistance systems or robotics to realize autonomous systems in restricted environments. However, the complexity of full automated driving solving all challenges in the open world requires more powerful methods for perception, planning and validation. Learning based algorithm have shown promising results and could become a key enabler in full autonomous driving.