Uncertainty in Machine Learning: A Safety Perspective on Autonomous Driving

Abstract:
With recent efforts to make vehicles intelligent, solutions based on machine learning have been accepted to the ecosystem. These systems in the automotive domain are growing fast, speeding up the promising future of highly and fully automated driving, and respectively, raising new challenges regarding safety assurance approaches. Uncertainty in data and the machine learning methods is a key point to investigate one of the main origins of safety-related concerns. In this work, we inspect this issue in the domain of autonomous driving with an emphasis on four safety-related cases, then introduce our proposals to address the challenges and mitigate them. The core of our approach is on introducing monitoring limiters during development time of such intelligent systems.

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