

DECISION MODELS FOR AUTONOMOUS VEHICLES

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Abstract: The market for autonomous vehicles (Level 4+ autonomy, or L4+) is expected to reach \$42B by 2025 (Bloomberg) and upwards of \$85B by 2030. The key issues in this context are i) localization, ii) perception, iii) decision logic, iv) control execution as well as v) validation/verification. These are central to effective functioning of autonomous vehicles and remain both research topics as well as subjects of significant development effort by industry.

The presentation provides an overview of the issues listed above and the outlook for future development in the relevant areas. In particular, we focus on decision and control for autonomous vehicles where matters of expediency and safety have to be balanced in a sensible manner in view of uncertainty in the behavior of other vehicles. We present approaches based on classical optimization as well as game theory, which offers a unique means of dealing with multi-player decision processes. The benefits and drawbacks of this approach and future outlook for its use in autonomous driving will also be discussed.