Bridging the Gap: From Fundamental AI Research to Real-World Challenges

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Strong Worldwide Cross-Domain Reach

Automotive Powertrain

Autonomous Driving Perception

Industry 4.0 Logistics

Bosch Center for AI
Welcome to the Real World

Automotive Powertrain System

- Dynamic System Behavior
- Dirty Data
- Hysteresis Effects
- Real-time online execution
- Strong Nonlinearities
- Limited Computational Resources
I. Safe Active Learning

II. (Transient) Gaussian Processes
   Sparsification
   Numerical Stability

III. Hardware Acceleration
Model-Based Policy Search for Automatic Tuning of Multivariate PID Controllers
Andreas Doerr, Duy Nguyen-Tuong, Alonso Marco, Stefan Schaal, Sebastian Trimpe

ICRA 2017 - submission 1225
Supplementary material:
Introducing Control Theory Standards into Reinforcement Learning


Autonomous Agent Decision Making under Constraints

Linear Transient Logic (LTL) Policy Synthesis

Goals & constraints

Formulation as Directed Graph + Decomposition for Multiple Agents

\[ M_1 = \left( \forall i \in \{1,2,3,4\} \left( h_i \land c \land \Diamond \neg c \right) \right) \]

Deliver drinks to rooms \( h_1 \ldots h_4 \).
Consider limited drinks and battery consumption.

The Marginal Difference between Cats and Modems

Autonomous Driving Perception: Adversarial Threats

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