Professorship Autonomous Vehicle Systems
Department of Mobility Systems Engineering
TUM School of Engineering and Design

SA/MA

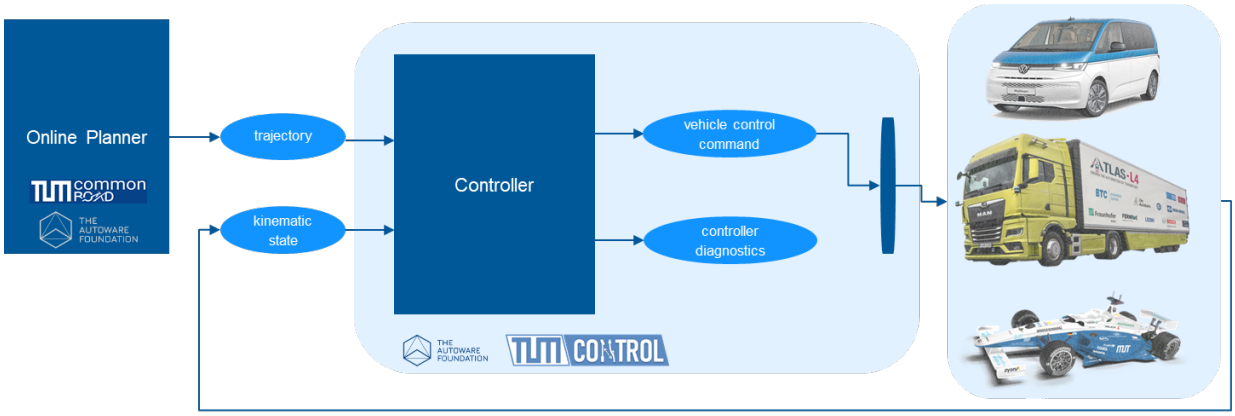
Motion control of autonomous vehicles with stochastic nonlinear Model Predictive Control

Are you looking for a chance to work on cutting-edge technology that will shape the future of transportation? Then look no further! Our research institute is currently seeking a student to work on a exciting thesis that involves the motion control of autonomous vehicles with stochastic nonlinear Model Predictive Control (MPC).

As you know, controlling the vehicle's dynamics to follow a planned trajectory is a challenging task in the world of autonomous driving. MPC is a common approach for this task, but it has its limitations. Traditional MPC formulations do not take into account parametric uncertainty or disturbances which can lead to suboptimal solutions [1]. However, by using a stochastic nonlinear MPC approach [1-2], we can address these limitations and make predictions that are more accurate and less conservative.

In this thesis, you will have the opportunity to conduct literature research, familiarize yourself with our TUM Control simulation framework, develop a suitable stochastic nonlinear MPC for trajectory following, evaluate the controller's performance and robustness, and write a scientific thesis report.

This is a rare opportunity for you to be a part of a team working on state-of-the-art technology that will shape the future of transportation and to gain hands-on experience by working on real-world problems. If you're interested in taking on this challenge, please let us know by sending an initiative application. Don't miss out on this exciting opportunity to make a real-world impact!



[1] Liniger, Alexander, et al. "Racing miniature cars: Enhancing performance using stochastic MPC and disturbance feedback." *2017 American Control Conference (ACC)*. IEEE, 2017.

[2] Rawlings, James Blake, David Q. Mayne, and Moritz Diehl. *Model predictive control: theory, computation, and design*. Vol. 2. Madison, WI: Nob Hill Publishing, 2017.

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