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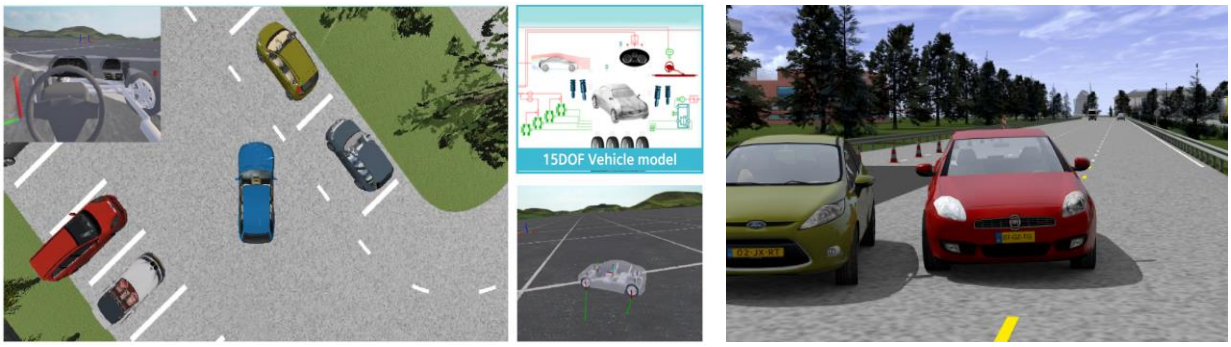
Thesis Proposal

Simulation-based Testing of Autonomous Driving Control Systems

Autonomous driving that aim for more safety, comfort, and environmentally friendly vehicles, have been growing rapidly in automotive industry recently. Siemens PLM Software is developing the autonomous vehicle technologies from prototype to production at various levels: from chips, software algorithms and low-level integrated sub-systems, to sensor models, driving scenario simulation, and full vehicle-level simulation (https://www.plm.automation.siemens.com//autonomous-vehicles.html).

We are looking for outstanding students who are eager to do their Master thesis on autonomous driving topics in a dynamic and international research environment.



Thesis Goal

This thesis topic focuses on system level testing and verification of autonomous driving functionalities. One of the main challenges in autonomous driving industry is validating software algorithms such as planning, control, and sensor fusion, in a closed-loop fashion, where vehicle dynamics, sensor configurations, and various traffic scenarios are taken into account. First, given the scenario (i.e. adaptive cruise control), an optimizer will identify critical scenarios where the designed controller may not satisfy the requirements (i.e. collide or drive too close to other car). After that, these critical scenarios will be exploited for furthur control algorithm developments.

The company provides various tools to support the research activities, for example, Siemens Amesim for vehicle dynamics modelling, HEEDS design exploration software, PreScan for sensor (camera, lidar,…) and traffic environment modelling, a miniature car setup for embedded control implementation, and other autonomous driving platform for deep learning and sensor fusion algorithm implementations.

Candidate profile

Background in either control systems, robotics, computer science, or mathematics, familiar with programming. Experience with optimization, vehicle dynamics, ROS or autonomous vehicles is a plus.

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The work will be performed in collaboration with the R&D Team in Siemens PLM Software, Belgium. Do not hesitate to contact us if you are interested or have any question.