Master Thesis  2018/2019

"Collision avoidance by steering and braking interventions"

Background

Transportation systems are increasingly relying on communication technologies and automated control to enable safer, smarter, and greener solutions. An area of particular interest is evasive collision avoidance. While Automated Braking Systems (ABS) purely rely on braking actuation, and Lane Keep Assist (LKA) solely on steering actuation, there are however several scenarios where a combination of braking and steering actions can be beneficial.

Project description

In this thesis we aim to develop and implement a threat-assessment and control algorithm combining braking and steering manoeuvres. This work is motivated by scenarios where existing safety systems, using either braking- or steering-only, are suboptimal.

The resulting threat-assessment and decision-making algorithm should be integrated and tested in cutting edge simulation environments as well as in real-vehicles. A scientific publication is also expected at the end of this project.

Based on preliminary results on the effectiveness of combined braking and steering manoeuvres, the purpose of this thesis is to design and implement an efficient threat assessment and decision-making algorithm for collision avoidance. The goals of the project are:

- Elaborate an extensive state-of-the-art on the subject (both industrial and academic)
- Define an appropriate theoretical framework
- Develop and implement the proposed safety control system
- Test and experiment the algorithm in simulation environments and real vehicles
- Benchmark results with respect to production-grade solutions
- Document the project in the form of a scientific publication in a renowned conference

Qualifications

- A highly motivated student from a master program on Electrical engineering, Mechatronics, Computer Science or any pertinent domain, with an interest in control algorithms and data analysis.
- The ideal candidate should have interest in both the theoretical and experimentation aspects of the problem.
- Solid programming skills are required. Experience with MATLAB is an asset.
- Effective communication skills in English both in oral and written.

The thesis students will gain competences on

- Active safety functions
- Critical control systems
- Automotive engineering
- Software design for a market leading technology

Further information and contacts

Please send in individual applications with CV, motivational letter and grade transcripts (undergraduate and graduate education) at the following link:


If you wish to partner with someone, simply note that in your application. For questions regarding the project, please contact:

Gabriel Campos (gabriel.campos@zenuity.com, +46 7 288 95 50)