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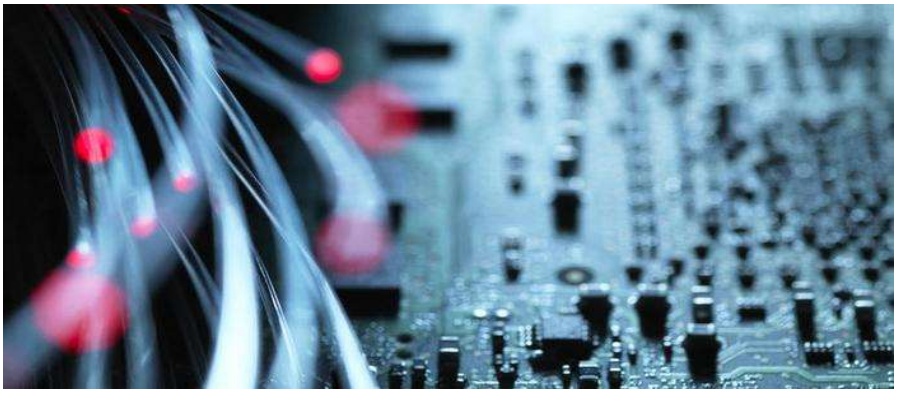
RWTH Technology

Automated Function Calibration



Challenge

Control functions in Electronic Control Units (ECUs) need to operate on non-linear and intricate systems in a variety of application domains. Their complexity entails that even highly qualified and experienced engineers cannot fully grasp all the interactions between individual components. The calibration effort of such functions is constantly increasing as the number of variants, actuators and on-board monitoring systems in modern control systems rises. Therefore, manually calibrated state-of-the-art controllers may not always yield optimal solutions. All in all, the whole function calibration is a very time- and cost-intensive process that is heavily depending on human engineers and prone to sub-optimal results.

Solution

Our invention automatizes the calibration of control functions. The fundamental idea is to replace the control function in question with a Reinforcement Learning agent to automatically learn a close-to-optimal solution for the underlying control problem without the need for human interaction. The trained agent is then used as target for (re-)calibration of the original control function through optimization in a second step to obtain an improved set of parameters that exploits the full potential of the function.

Advantages

- Fully automated and scalable calibration process
- Optimized function performance
- High interpretability of the results

Status

- Patent application filed
- Proof of concept and ongoing research

RWTH Aachen University is looking for partners for patent exploitation and joint development.

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Fields of application
Control applications (Automotive, Marine, Aerospace, Energy, Logistics, Production, etc.)

Keywords
Automation, Calibration, Reinforcement Learning, ECU, Control

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