

## Autonomous Racing – Code Performance Optimization

As part of the Roborace project at the Chair of Automotive Technology, we are developing software for an autonomous racing car called DevBot. Our software stack covers the entire pipeline from perception to trajectory planning and control. In May 2018, the software was presented to the public for the first time during the Formula E event in Berlin.



Since then, we added lots of functionality. Since the CPU of the used Nvidia PX2 is relatively weak, we run more and more into computing time problems. However, we see a lot of potential for optimizing code performance since most of the software is written in Python using the numerical math library NumPy.

In this IDP, the code performance shall be analyzed and optimized such that the code runs fast and reliable providing the same functionality. Furthermore, some simple unit tests shall be introduced to improve code stability.

Working packages:

- Short literature search on code optimization and unit tests
- Analysis of the provided Python functions to determine typical bottlenecks and unsafe behavior
- Decision for and application of a method to optimize code performance, e.g. using Cython to translate the functions to C code
- Integration of simple unit tests
- Evaluation of the reworked functions against the previous versions in terms of computing time and functionality

Should you be interested in this topic or in another topic in the context of the Roborace project, please send your transcript and CV to:

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