Interdisciplinary Project:
Continuous Integration and Deployment for an Autonomous Driving Software Stack

It is widely agreed in research and industry that Autonomous Driving is one of the most complex technologies emerging right now. Further, testing in real world scenarios is dangerous, costly and can cause severe damage to prototypes and environment. It is therefore highly appreciated to evaluate the software in a simulation environment prior to vehicle testing. To achieve realistic conditions, it is crucial to choose the right testing scenarios and evaluate the software frequently in all of them.

During this project, a pipeline for automated testing of an Autonomous Driving Software Stack based on an existing simulation environment shall be developed. The software stack is used within the Roborace Project of the TUM and is therefore under constant change and is used for driving on real world race tracks frequently. The focus of this work is on the control and trajectory planning software parts, which are written in Simulink and Python. The test environment itself should be written in Python. An important part of the work is the ability to scale the testing pipeline to a large number of testcases, which could be achieved e.g. by containerization.

Tasks:

- Review of the existing continuous integration and deployment pipeline
- Comparison of Python testing environments
- Design of a testing pipeline & a suitable monitoring system
- Validation of the developed system under real world development conditions

Prerequisites:

- Basics in shell programming for Ubuntu
- Basics in source control with git
- Basics in Python
- Interest in software engineering and result-driven working attitude

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