Planning report: Reinforcement learning for autonomous vehicles (WARA-CAT)

In this project, we will create a robot/agent in an open racing car simulation, TORCS. The team is to enter the TORCS Racing Board (TRB) and compete with other teams. The championship consists of races over approximately 500km on various suitable road tracks. The robots are rewarded with points for their rank in the races. Based on these results the standings of the driver and team championships are computed. There will be approximately one race every 3-4 Weeks.

There are a number of problems that we can tackle during the project:

1. car setup
2. optimal driving line
3. race strategy
4. car commutation and coordination
5. Overtaking of other cars in the race
6. Path following and low-level control
7. Handling emergency events

One or two of these will be chosen and solved by building a reinforcement agent that should learn a good policy for the simulation and the race. While the others can be implemented with simple heuristics.

There is a goal to implement the agent into a ReDV car and drive it on a test course.

Schedule:

3/10: Submit a team. Create an elementary robot and get used to the framework. Enter a race. Decide on which problems the project should focus on.

24/10: Enter the second race with a modified agent.

14/11: Enter the third race.

05/12: Enter the final race.

Deadlines:

* 30/9 Planning report describing what should be done, when and by whom. There should be a short description of the industrial and the scientific relevance of the project and how it relates to the research arenas.
* 31/10 Status report describing the progress made, how the project is relative to the plan and any changes made to the plan.
* 30/11 Status report describing the progress made, how the project is relative to the plan and any changes made to the plan.
* 18/12 The project should be finished and the videos and report should be finished.

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