Open Project (Hiwi)

Implementation of a path-following MPC for the autonomous E-Scooter

Description:

In recent years, we have developed an autonomously driving e-scooter that balances itself and can be called via an app. To do this, the e-scooter must know the possible path between its current location and the new location specified by the user. For this reason, the e-scooter is equipped with a GPS sensor to determine its own location. Using a map consisting of a grid of GPS coordinates, a suitable connection under consideration of local obstacles is obtained via Model Predictive Control (MPC).

Your task would be to implement an available MPC scheme on the hardware of the e-scooter. More precisely, this involves the implementation of the MPC on a Raspberry Pi using data measured by GPS and ultrasonic sensors. As a starting point, you can build on a Python implementation of this MPC scheme solving the task in simulation.

Prerequisites:

- Experience with Python
- Background in control theory or optimization
- Experience with Model Predictive Control (optional)

Supervisor:

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Area:

Control Theory
Informatics
Electronics

Properties:

Type: Hiwi
5% literature
10% simulation
35% implementation
50% experiments

Beginning:

anytime

Further information on www.ist.uni-stuttgart.de/lehre/bama

Aushang vom October 4, 2023