

Open Thesis (BA, MA)

State Estimation for Shared Autonomous E-Scooters

Description:

Shared micromobilty solutions like e-scooters have the potential to serve as a sustainable and convenient response to the increasing number of shortdistance commutes. As part of the MobiLab initiative, the IST develops an autonomous e-scooter that allows for optimal redistribution, autonomous charging and flexible demand satisfaction. A crucial requirement for the final application are



precise estimates of the system states. The goal of this thesis is to develop an estimator by fusing a eral sensor measurements, e.g., IMU, encoders, etc. to get a better estimate of the

- roll (leaning) angle of the e-scooter to improve the performance of the stabilizing controller.
- ground slope to improve the driving behavior.

The thesis consists of developing a state estimation concept, implementing it in simulation (and potentially on the hardware), and evaluating the performance of the state estimator.

Prerequisites:

- Programming experience, e.g., MATLAB or C is helpful
- Interest in topics related to state estimators and observers

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| | Area: State Estimation Autonomous Vehicles |
| ing sev- | Properties: |
| et a | Type: BA , MA |
| e perfor- | 20% literature |
| cept, | 30% concept development |
| ard- | 30% implementation |
| nator. | 20% evaluation |
| elpful | Beginning: |
| bservers | as soon as possible |

 $More\ information:\ www.ist.uni-stuttgart.de/lehre/bama$

Aushang vom September 20, 2023