Electric Vehicle Propulsion and Control – UNIVAQ

E-Pico Master's Thesis

Physics-Informed Neural Nets-based Model Predictive Control for Connected Autonomous Vehicles

Goals

The thesis proposal introduces a method for control of connected and autonomous vehicles using physic-informed neural network in particular situations. The absence of data or computational complexity are aspects to take into consideration. The model-based control strategy chosen is model predictive control, analysing the degree of possible decentralization.

Requirements

You should understand *Automatic control, Microscopic Traffic control, Automotive*.

Bibliography

[1] Cordiano Francesco, Physics-Informed Neural Network based Model Predictive Control for Constrained Stochastic Systems, Master Thesis at ETH Zurich, 2022. https://doi.org/10.3929/ethz-b-000551606

[2] Cuomo, S., Di Cola, V.S., Giampaolo, F. et al. Scientific Machine Learning Through Physics–Informed Neural Networks: Where we are and What's Next. J Sci Comput 92, 88, 2022. https://doi.org/10.1007/s10915-022-01939-z.

[3] A. Kosari, P. Popov and R. Roy, "Modelling Safety of Connected and Autonomous Vehicles (CAVs) under Cyber-Attacks on Perception and Safety Monitors," 2022 12th International Conference on Dependable Systems, Services and Technologies (DESSERT), Athens, Greece, pp. 1-7, 2022. https://doi.org/10.1109/DESSERT58054.2022.10018781

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