METHODOLOGY DEVELOPMENT OF ML BASED DIGITAL TWINS

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TECHNISCHE
UNIVERSITÄT
DARMSTADT

BACHELOR THESIS **MASTER THESIS** **ADP**

☐ **AERO SPACE ENG.** ☐ **MECH. ENG.**

➤ Digital Twins
➤ Software based design
➤ Machine learning

Motivation

At VIAME, we are developing new concepts for lightweight design in several sectors (transportation, energy, machining,…). This research project will focus on an optimized data-based framework for Digital Twin (DT) generation of robot systems that can speed up design and evaluation. Machine Learning (ML) techniques will be applied to infer system models based on information obtained either from high-fidelity simulations or measurements. Suitability of ML methods will be assessed for various degrees of nonlinearity, non-smoothness, modelling uncertainty and parametric dimensionality in robotic applications. The thesis will be performed remotely at Ecole Central de Lyon, France.

Tasks

- Assessment of modelling approaches for industrial robot systems
- ML-based DT for lightweight design and dynamic optimisations in robots
- DT evaluation and introduction of transfer learning

Desirable

- Experience in FEM simulation
- Background in Artificial Intelligence.

Start

September 2025

CENTRALE
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