A Software Engineering Approach to Digital Twin Architecture: The HUman at home projecT and Twin Cooperation of roBot and human project case studies

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In the robotic arm case study, DTs of the interacting human and robot are used for motion planning in pick-and-place tasks.

Our deployment metamodel can describe the combination of software and hardware used, including: ROS, Unity, Kinect, Xsens body suit, Kinova j2n4s300 robotic arm, etc.

The transformation of this model into executable deployment descriptors is being studied.

In the home automation case study, DTs are used to handle and predict the interactions between a smart appartement and its inhabitants.

The validation of our metamodel is twofold:

- Modeling of CPS architectures including DTs of sensors/actuators and AI models,
- Full implementation as executable deployment descriptors of the modeled elements using Ansible scripts.