

Digital Twins and Artificial Intelligence Engineering



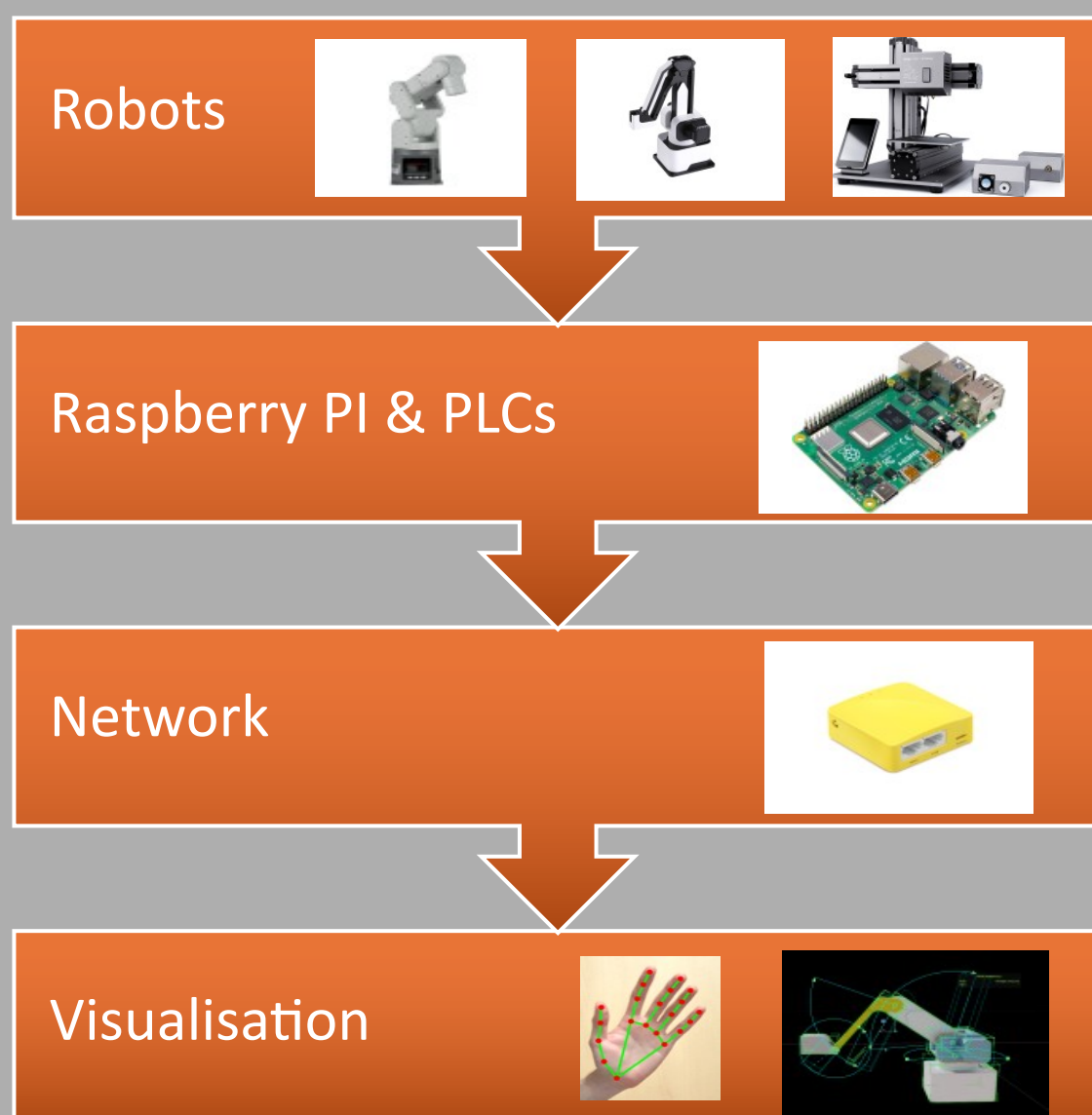
Mercedes-Benz

Project Team

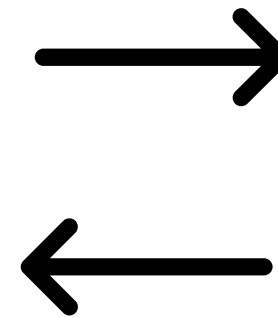
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Project description: In collaboration with Mercedes-Benz engineering IT, this SEP project explores how small-scale industrial machines can be represented as Digital Twins. By connecting machine data, APIs, and digital visualization tools, we developed a prototype that links physical systems to their digital counterparts. The goal is to validate core building blocks on smaller machines as a first step toward larger production scenarios and more integrated industrial environments. The main deliverable is a proof-of-concept demonstrator that integrates connected devices (robots and PLC-based systems) with monitoring and interactive digital representations.

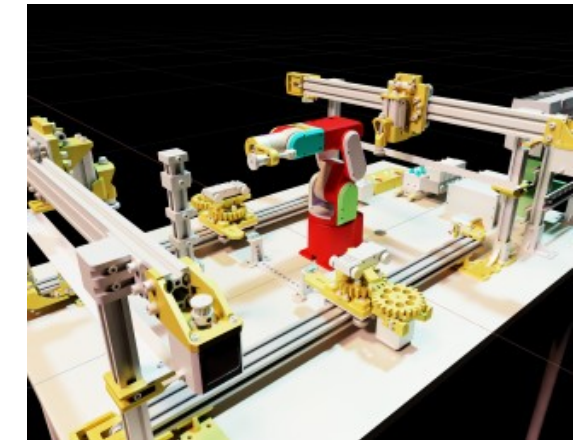
System Architecture:



Physical Robot:

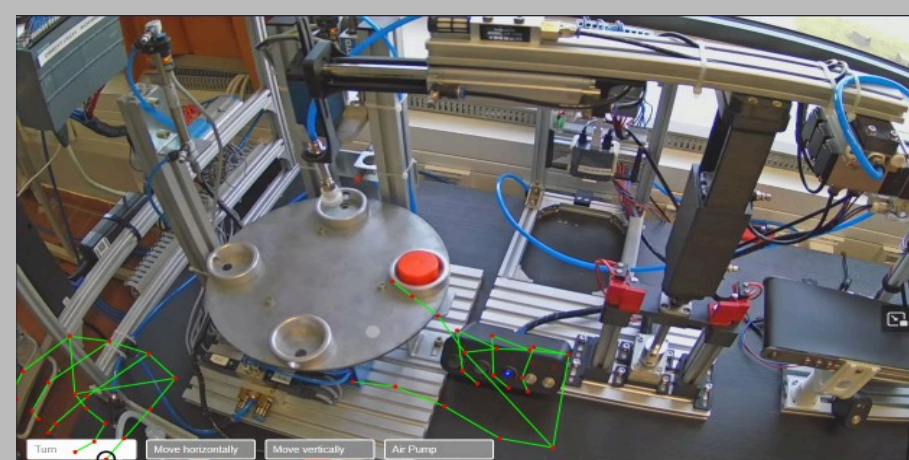


Digital Twin in Omniverse:

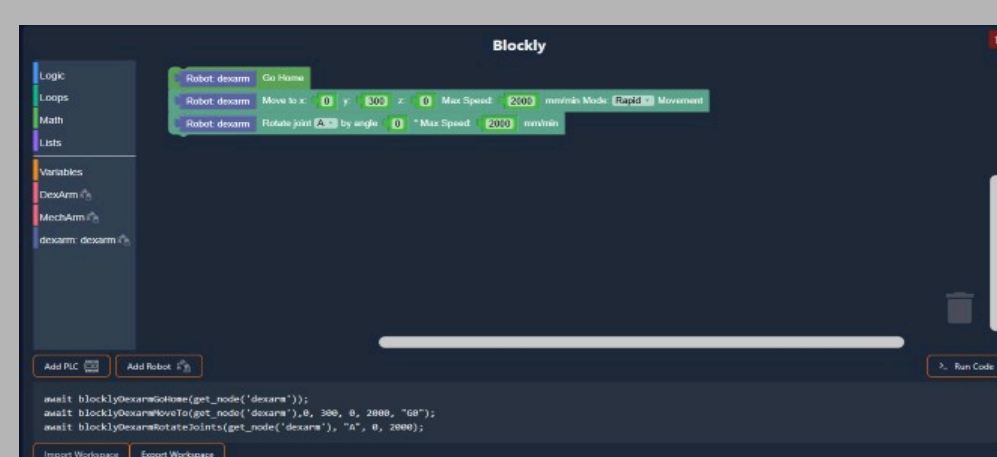


The long term vision of this demonstrator is to lay the groundwork for a fully digital simulation of future production lines. This allows engineers to create and test new factory prototypes without having to physically build them before, resulting in a potentially huge cost saving in product and production engineering. To make interaction with the system accessible, we implemented a custom Blockly integration that enables visual programming of the machines. This allows even users without prior programming or computer science knowledge to interact with and control the system. Our project bridges the gap between physical control of machines and virtual control of their simulated counterparts by enable virtual commissioning of physical machines as well as controlling them simultaneously. Thus, allowing for new ways of prototyping manufacturing.

AR Interaction with the Physical System



Custom Blockly Command Blocks



Mercedes-Benz:
Digital Twins
(Video)



Further
Information:



Technologies:

