Human-centric Digital Twin: a Transdisciplinary View

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Abstract. Due to the rising digitalization in the past few years, even more data can be collected from smart products and sensors to describe the real world, goods, environments, and newly humans including those mutual interactions. Digital twin (DT) has become a key word in engineering, society, and medicine, which is also a hot topic in research for creating virtual data-driven replicas of real objects and simulating their behaviors to predict and optimize the entire system functioning. DTs can mirror the physical entities throughout their lifecycle and create real-time connections between the physical and virtual worlds to monitor and control physical objects from any location. Physical objects can be any living or non-living object, such as humans, machines, robots, cars, buildings, plants, food, or economy. Numerous papers related to DT in various industries have been presented, but very few are focusing on the human-related aspects and the quality of the human machine interaction. In this context, how to shape a human-centric digital twin (HCDT)? The paper states the needs of a human-centric approach in the design and development of DT and presents a set of significant applications of HCDT in different fields, from industry to medicine, from economics to society, discussing the positioning of the HCDT concept in the landscape of transdisciplinary engineering, which is also subject of a workshop during the conference.

Keywords. Human-centric approaches, Digital Twin, Human-machine interaction, Transdisciplinary Engineering.

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