

54th CIRP Conference on Manufacturing Systems

A meta-model for modular composition of tailored human digital twins in production

Elias Montini^{a, c,*}, Andrea Bettoni^a, Michele Ciavotta^b, Emanuele Carpanzano^a, Paolo Pedrazzoli^a

^a*DTI- University of Applied Sciences and Arts of Southern Switzerland, Galleria 2 Via Cantonale 2c, Manno, Switzerland, 6928*

^b*DISCO University of Milan-Bicocca, Viale Sarca, 336, Milan, Italy, 20126*

^c*Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria, Piazza Leonardo da Vinci 32, 20133 Milano, Italy*

* Corresponding author. Tel.: +41 (0)58 666 65 66; fax: +41 (0)58 666 66 20. E-mail address: elias.montini@supsi.ch, elias.montini@polimi.it.

Abstract

Multiple and diverse factory digital twins have been proposed in the literature. However, despite the recognized growing importance of workers in smart and autonomous industrial settings, such models still lack or oversimplify human representation.

Human digital twins must include human monitoring and behavioural data and models based on psychophysical status, knowledge, skills, and personal needs to manage production systems that aim, at the same time, to achieve process performance and workers' wellbeing. This paper proposes a metamodel based on data, events, and connectors that supports the modular composition of tailored human digital twins. This work also addresses an industrial application of the metamodel for preliminary validation.

© 2021 The Authors. Published by Elsevier B.V.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Peer-review under responsibility of the scientific committee of the 54th CIRP Conference on Manufacturing System

Keywords: Type your keywords here, separated by semicolons ;
