

Human Modeling in the Digital Factory

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In the paradigm of the digital factory human beings have to be considered as the focal point of technologies, activities and information; technologies and products must be conceived to be at the service of the operators and of the end-users, improve the quality of the work, operate in an attractive and safe environment during the interaction with the machines. Moreover, human factors including skills, competencies and needs should be considered since the early stage of the development process and continuously considered during the product and process lifecycle. In such a context, while it is common practice to create virtual prototypes of products, machines and systems, the creation of virtual prototypes of operators/end-users is not as so widespread. First, an overview of the virtual humans/digital human models (DHM) that can be considered along the design and manufacturing processes is presented. A brief historical description will be introduced as well as the main problems to be faced and the potential of such models. Then, a taxonomy that subdivides DHMs into five main categories is presented including applicative examples for both design and manufacturing processes.

The integration of DHMs with Virtual/Augmented Reality technology and Motion Capture systems will be also considered respectively to improve the level of interaction and realism within the virtual environment and to drive the virtual human and facilitate the evaluation of comfort and prediction of injuries that could rise when executing a task.