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Implementing Smart Factory of Industrie 4.0: An Outlook

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Abstract


With the application of Internet of Things and services to manufacturing, the fourth stage of industrialization, referred to as Industrie 4.0, is believed to be approaching. For Industrie 4.0 to come true, it is essential to implement the horizontal integration of inter-corporation value network, the end-to-end integration of engineering value chain, and the vertical integration of factory inside. In this paper, we focus on the vertical integration to implement flexible and reconfigurable smart factory. We first propose a brief framework that incorporates industrial wireless networks, cloud, and fixed or mobile terminals with smart artifacts such as machines, products, and conveyors. Then, we elaborate the operational mechanism from the perspective of control engineering, that is, the smart artifacts form a self-organized system which is assisted with the feedback and coordination blocks that are implemented on the cloud and based on the big data analytics. In addition, we outline the main technical features and beneficial outcomes and present a detailed design scheme. We conclude that the smart factory of Industrie 4.0 is achievable by extensively applying the existing enabling technologies while actively coping with the technical challenges.

Keywords


KeyWords Plus: CYBER-PHYSICAL SYSTEMS; BIG DATA; ENERGY; ARCHITECTURE; ALGORITHM; NETWORKS; TECHNOLOGIES; CHALLENGES; SECURITY; RESOURCE

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