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A multi-viewed semantic framework for Cyber-physical production system to support life cycle-using system Engineering approach

Cyber-physical production system (CPPS) are often considered as cyber and physical spaces which has interaction with humans and other smart devices. The challenge of their use are due to their ever-increasing intertwined entities, complex heterogeneity, dependency relation between product and production system and wide integration with humans. It is hinder by a lack of systemic understanding by defining and classifying CPPS entities, the human-CPPS interactions phenomenon, where the human and machines perceive and respond. There is a need of semantic framework to manage complexities, structural opacities and provide a systemic understanding of CPPS concept, not only in its design and other life cycle phase. This thesis proposes a theoretical contribution to the new notion of CPPS. A domain-independent understanding and a metamodel are proposed. A multi-viewed modular semantic framework is proposed. It defines, classifies the entities and illustrating their relations. As a validation of the proposition, the model is instantiated and reused in differents real application context. The thesis work was supported, and the genesis of laboratory of digital science of Nantes (LS2N)- CPPS platform project.

Mots-clés : Cyber-physical production system (CPPS), Human-CPPS integration, Semantics, System engineering approach, Modular architectures, LS2N- Platform project