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Smart and Sustainable Manufacturing Systems

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Relevant Topics Include

- Information and domain specific modeling, semantics and architecture for manufacturing systems
- Cyber-physical infrastructure for design, analysis and control of smart manufacturing systems
- Model-based systems engineering and machine-to-machine communications
- Multi-layer networks and control
- Life cycle engineering and sustainability
- Supply chain modeling for smart manufacturing
- Real-time data analytics for predictive modeling for manufacturing system performance
- Uncertainty quantification and propagation including verification and validation
- Manufacturing process (continuous and discrete) characterization for sustainable manufacturing
- Material information modeling across the product life cycle
- Resiliency and recovery of smart manufacturing systems and supply chains
- Cloud computing and manufacturing services
- Digital manufacturing
- Digital thread for additive manufacturing

We welcome research papers, industry case studies and application papers, survey papers, and technical notes. We advocate for papers that have strong theoretical content and demonstrate manufacturing industry applications.

Objectives

This journal fosters transdisciplinary research that crosses the boundaries of information science, systems engineering and engineering design, manufacturing, and product life cycle with a focus on how to make manufacturing systems smarter and sustainable.



EDITOR-IN-CHIEF
Dr. Sudarsan Rachuri
Federal Program Officer
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Office of Energy Efficiency and Renewable Energy
Dept. of Energy
Washington, DC, USA

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Featured Papers

An Agent Based Distributed Shop Floor Control System for a Job Shop Environment

Abstract

In addition to the inherent dynamism associated with any shop floor, a job shop environment exhibits certain additional features that promotes the use of decentralized over centralized decision support systems on the benchmark of responsiveness. The current work first highlighted the system level and operational complexities associated with a job shop environment and very objectively established the need for a decentralized decision support system for such set ups. ... The work also highlights the fact that the advantage of agent features can be leveraged in true sense and systems based on them could be successful only if means of integrating heterogeneous functions are taken into account.



M. Kumari, N. Chilwant, A. Prajapati, and M. S. Kulkarni
Dept. of Mechanical Engineering,
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Toward a Digital Thread and Data Package for Metals-Additive Manufacturing

Abstract

Additive manufacturing (AM) has been envisioned by many as a driving factor of the next industrial revolution. Potential benefits of AM adoption include the production of low-volume, customized, complicated parts/products, supply chain efficiencies, shortened time-to-market, and environmental sustainability. Work remains, however, for AM to reach the status of a full production-ready technology.... To address these challenges in part, this paper discusses the building of data models to support the development of validation and conformance methodologies in AM. We present an AM information map that leverages informatics to facilitate part producibility, process repeatability, and part-to-part reproducibility in an AM process....



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Concept-Based Text Mining Technique for Semantic Classification of Manufacturing Suppliers

Abstract

Small-to-medium sized enterprises in the manufacturing sector are increasingly strengthening their web presence in order to improve their visibility and remain competitive in the global market. With the explosive growth of unstructured content on the Web, more advanced methods for information organization and retrieval are needed. ... In this paper, a technique for automated characterization and classification of manufacturing suppliers based on their textual portfolios was presented. A probabilistic technique that adopts Naïve Bayes method was used as the underlying mathematical model of the proposed text classifier. To improve the semantic relevance of the results, classification was conducted at the conceptual level.... It was concluded that the proposed concept-based classification technique outperforms the traditional term-based methods with respect to accuracy, robustness, and cost.



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A Classification Scheme for Smart Manufacturing Systems' Performance Metrics

Abstract

This paper proposed a classification scheme for performance metrics for smart manufacturing systems. The discussion focused on three such metrics: agility, asset utilization, and sustainability. For each of these metrics, we discussed classification themes, which we then used to develop a generalized classification scheme. In addition to the themes, we discussed a conceptual model that may form the basis for the information necessary for performance evaluations. Finally, we present future challenges in developing robust, performance-measurement systems for real-time, data-intensive enterprises.



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