Journal of Intelligent Manufacturing

Call for Special Issue

Holonic and Multi-Agent technologies for service and computing oriented manufacturing

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Aim and scope

This call for paper aims at shedding light on new emerging holonic and multi-agent systems operating in a service- and computing oriented manufacturing environment, using the latest ICT technologies for manufacturing environment such as but not only: MAS and SoMAS (Service oriented Multi-Agent Systems), mobile agents, Web services and Cloud, virtualization, big data and analytics.

Of interest are recent advances and on-going research in holonic and agent-based systems for manufacturing. Industrials are seeking for models and solutions that are not only able to provide efficient overall production performance, but also to face reactively a growing set of unpredicted events. One important research activity in the field focuses on holonic/multi-agent control systems that integrate predictive/proactive and reactive mechanisms into agents/holons. The demand for large scale systems running in complex and even chaotic environments requires the consideration of new paradigms and technologies that provide flexibility, robustness, agility and responsiveness. Holonic systems are, actually by definition, targeting challenges that include coping with the heterogeneous nature of manufacturing systems and their on-line interactive nature in combination with competitive pressures. Multi-agent systems is a suitable approach to address these challenge by offering an alternative way to design control systems, based on the decentralization of control functions over distributed autonomous and cooperative entities. Also, the concepts of Intelligent Product (or active product) and related techniques for product-driven automation are of interest.

Virtualization of manufacturing execution system workloads offers a set of design and operational advantages to enterprises, the most visible being improved resource utilization and flexibility of the overall solution. At the manufacturing execution system level, cloud computing adoption refers mainly to virtualization of MES workloads. While MES implementations are different and usually depend directly on the actual physical shop floor layout, the general MES functions are aligned with the set of functions defined by ISA-95.03 specification. To achieve high levels of productivity growth and agility to market changes, manufacturers will need to leverage Big Data sets to drive efficiency across the networked
enterprise. There is need for a framework allowing the development of manufacturing cyber physical systems that include capabilities for complex event processing and Big Data analytics, which are expected to move the manufacturing domain closer towards digital- and cloud manufacturing within the contextual enterprise.

Service orientation is emerging at multiple organizational levels in enterprise business, and leverages technology in response to the growing need for greater business integration, flexibility and agility of manufacturing enterprises. Close related to IT infrastructures of Web Services, the Service Oriented Enterprise Architecture represents a technical architecture, a business modelling concept, an integration source and a new way of viewing units of control within the enterprise. Business and process information systems integration and interoperability are feasible by considering the customized product as "active controller" of the enterprise resources – thus providing consistency between material and informational flows. The areas of Service Oriented Computing and Multi-agent Systems are getting closer, both trying to deal with the same kind of environments formed by loose-coupled, flexible, persistent and distributed tasks. An example is the new approach of Service Oriented Multi-agent Systems (SoMAS).

Attention is paid in this special issue to the framework for manufacturing integration, which matches plant floor solutions with business systems and suppliers. This solution focuses on achieving flexibility by enabling a low coupling design of the entire enterprise system through leveraging of Service Oriented Architecture (SOA) and Manufacturing Service Bus (MSB) as best practices.

This CFP is intended to put the focus on these challenges and solutions and especially, on the way emerging “service-oriented” resource behaviours and complex, “big data” models are used in resource allocation, maintenance, virtualization, shop floor dynamic reconfiguring and integration to build-up intelligent, agile and sustainable manufacturing control systems.

The following are topics of interest:
- Holonic Manufacturing Execution Systems (HMES)
- Service-oriented agents in distributed control
- Multi-agent technologies for shop floor reengineering
- Intelligent products
- Product driven automation and distributed intelligence
- Bio-inspired, self-organizing manufacturing control systems
- Predictive resource maintenance
- Power efficiency and resource service evaluation
- Service Oriented Enterprise Architectures (SOEA)
- Manufacturing Integration Framework (MIF)
- Virtualization in Cloud manufacturing
- Complexity and big data in computing-oriented manufacturing

Contributions must present sound applications to intelligent, agile, reconfigurable, efficient or sustainable manufacturing systems.

Submission Procedure and timeline

1. Authors are requested to email an extended abstract (in pdf format) of a maximum of 1000 words to André Thomas at andre.thomas@univ-lorraine.fr before 18th of December, 2014.
Important note: This abstract should contain the tentative title of the paper, the authors list (with the corresponding author identified). The main contribution and the results must be pointed out.

2. Authors will be informed by email if their abstracts are accepted or not by **mid-January, 2015**.

3. Accepted authors are required to submit their full papers via the journal’s submission system available at [https://www.editorialmanager.com/jims/](https://www.editorialmanager.com/jims/) and are invited to take care when submitting their paper, to select this special issue. The deadline for full paper submission is **15th of April, 2015**.

   *Important note: submissions via email or any other means are not allowed.*

4. Authors will be informed of the results of the first round of revision by **June, 2015**.

   *Important note: at this stage, only high quality papers that require limited (minor) modifications will be considered for publication to meet the deadlines.*

5. Selected authors may have to re-submit a revised version of their articles by **the end of July, 2015**.

6. Authors will be informed of the final decisions by **August, 2015**.

7. Expected publication date as “online first” paper: **early 2016**.

**For more information, any question**

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