VDI/VDE Society Measurement and Automatic Control (GMA)
Technical Committee 5.15

Multi-Agent Systems

Industry 4.0

Machine Learning

Energy and Smart Grids

Material Handling

Energy Management

Production Control

Operations Scheduling

Transportation

Test Management

Multi-Agent Systems

Overview

The focus of the VDI/VDE-GMA Technical Committee 5.15 „Multi-agent systems“ lies on the investigation of agent-based applications in the industrial automation domain. Within the committee, members of German universities, Fraunhofer institutes as well as manufacturers and vendors of industrial automation systems investigate and adapt novel approaches, applications and methods for multi-agent systems in industrial automation systems.

Initial activities of the Technical Committee included the creation of a roadmap of possible applications of agents as well as their potentials in the industrial automation domain. Furthermore, a concept definition was made in order to achieve a consistent terminology for multi-agent systems. Standards for the development of multi-agent systems within the various application areas of industrial automation as well as application potentials were created. The results of the work of the Technical Committee were and are published within the series of standards VDI/VDE 2653 and in joint publications as well as presented at national as well as international workshops and conferences. The Technical Committee thus provides a platform for exchanging research results, ideas and experiences of researchers and appliers interested.

Meetings and activities

The Technical Committee meets regularly at the Institute of Automation and Information Systems at the Technische Universität München in order to discuss current research results. In addition, an expert forum is held every two years giving the opportunity to discuss the topic of multi-agent systems in industrial automation with national and international experts.

We would be pleased to share experiences with further national and international engineers interested in the development and application of multi-agent systems in industrial automation.

Standardization work

As part of the Technical Committee, the series of standards VDI/VDE 2653 is developed, which serves as a decision aid for the development and application of agent systems in industrial automation.

The following standards were already published in the series:

- VDI/VDE 2653 Part 1 (2010-06)
  Multi-agent systems in industrial automation – Fundamentals
- VDI/VDE 2653 Part 2 (2012-01)
  Multi-agent systems in industrial automation – Development
- VDI/VDE 2653 Part 3 (2012-03)
  Multi-agent systems in industrial automation – Application

As part of the subgroups of the Technical Committee, Industry 4.0, Machine Learning as well as Energy and Smart Grids, these standards are supplemented and expanded during 2014.

Book publication „Multi-agent systems in industrial automation“

In this work, many contributions that address prior work and state of the art originating from the work of the Technical Committee were collected. With this volume, the Technical Committee would like to contribute to the works concerning multi-agent systems by spreading the paradigm of agent-oriented software development in industrial automation and, by that, supporting the development of the agent systems of tomorrow.

Göhner, P. (Ed.): **Agentensysteme in der Automatisierungstechnik**, Xpert.press, Springer, Berlin Heidelberg, 2013 (German only)

Subgroup Industry 4.0

Industrial automation is a possible key factor for realising the vision Industry 4.0. Today, this is already shown by the intense interconnectedness in between embedded systems in the domain of industrial production as well as partly within operational and business applications over the Internet. In order to address these challenges, the paradigm of agent-orientation provides promising possibilities. For discussing this subject and for establishing multi-agent systems as a core technology for realising the vision of Industry 4.0, the subgroup “Industry 4.0” was founded.

Subgroup Machine Learning

The aim of the work of the subgroup “Machine Learning” is the establishment of learning multi-agent systems in industrial automation. Therefore, various technologies in the field of Machine Learning are identified and their potentials for applications within the domain of industrial automation are analysed. The aim is to create a methodological guideline for the application in industrial automation as well as a classification of the technologies and approaches. The findings will be made available within the series of standards VDI/VDE 2653.

Subgroup Energy and Smart Grids

The subgroup “Energy and Smart Grids” deals with the challenges of agent-based coordination and control of energy supply systems of the future. Thus, the subgroup strives towards discussing and processing relevant topics through personal contacts and direct exchange on the working levels of the participating universities and research institutions. The findings gained during this process are both integrated within the works of the research institutions as well as within joint publications.

Contact

VDI/VDE-GMA Committee 5.15

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