The O^{3}neida Publications Series

This book is one of a series of books to be produced within O^{3}neida on various subjects related to distributed automation.

O^{3}neida is a Canadian not-for-profit corporation. O^{3}neida Europe is a not-for-profit association headquartered in Brussels, Belgium. Together they form the hub of the O^{3}neida networks. Their joint mission is to operate as a network of networks fostering the development and deployment of distributed industrial automation technologies based on open standards.

These standards include, among others, the Foundation for Intelligent Physical Agents (FIPA), the Device Profile for Web Services (DPWS), Web Crawler (WC), and International Electrotechnical Commission (IEC) 61131 and 61499.

This book introduces ontologies as a formal representation of knowledge, focusing mainly on the application of OWL (Ontology Web Language) to the factory automation domain. In this scenario, ontologies emerge as a sound solution for representing knowledge about manufacturing processes, equipment, and products in a machine-interpretable way. This knowledge can then be used with automated problem-solving methods to (re)configure the control software that coordinates and supervises manufacturing systems.

The rest of this book is organized into three chapters that introduce an ontology theoretical framework, followed by ten additional chapters offering the practical application of ontologies for knowledge modeling in the factory automation domain.

Future volumes in the O^{3}neida/ISA series on automation will address other equally pressing issues, the next being *Smart Embedded Systems for Product Lifecycle Management*. O^{3}neida will also publish materials on automation objects as part of this series.

Finally, this book is the result of a concerted effort by many O^{3}neida members. I thank them all for their dedication and commitment to O^{3}neida as volunteers. I particularly thank Professor Jose Luis Martinez Lastra from the Factory Automation Systems and Technologies Laboratory of the Department of Production Engineering at the Tampere University of Technology in Finland for leading

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– Antonio Valentini
Chief Executive Officer
O^{3}neida