

Proceedings of the Artificial Intelligence and Manufacturing Research Planning Workshop

This workshop was born during the annual meeting of the American Association for Artificial Intelligence, Special Interest Group for Manufacturing's (AAAI/ SIG-MAN) in August 1995 in Montreal. It was recognized that, although there are a number of researchers in artificial intelligence and manufacturing and a small but growing number of deployed applications in government and industry' researchers and practitioners come from a diverse set of backgrounds and affiliations. We made a goal of contacting a number of government finding organizations with the notion of pulling together researchers and practitioners into one workshop to exchange ideas and to develop, in the context of small discussion groups, ideas for a report which can help to shape the course of research and development in the near future.

Over the past decade, artificial intelligence concepts and techniques have been productively applied to diverse aspects of manufacturing decision-making, ranging from product and process development, to production management, to process diagnosis and quality control. It is no longer a question of whether AI technologies will have an impact on manufacturing but one of better understanding and exploiting the broad potential of AI in this domain. New manufacturing concepts and philosophies such as lean manufacturing, agile manufacturing, virtual manufacturing and holonic manufacturing place increasing emphasis on the need for more intelligent manufacturing systems, and there is general consensus that AI technologies will play a key role in the

manufacturing enterprise of the future.

One continuing obstacle to more rapid development and application of AI in manufacturing is the low bandwidth of communication (of problems, approaches and solutions) between the manufacturing and AI research disciplines. From an AI standpoint, manufacturing is seen as a rich application area and research driver. However, too often work has proceeded without good understanding of the actual problems faced by manufacturing organizations, and the solutions developed are consequently seen to offer only marginal practical gain. From the manufacturing side, there is general recognition that AI has important contributions to make, but there is also limited understanding of AI technologies and their relevance to manufacturing problems.

The aim of this workshop is to bring together experts and practitioners in both artificial intelligence and manufacturing, and bridge the gaps between problem and solution perspectives. The specific focus of the workshop is to build greater mutual understanding of important research challenges and technological potential in this field, break down the cultural barriers that currently exist between these two disciplines, and foster future interaction and collaboration with these two communities toward the realization of intelligent manufacturing systems.

Much of the research in AI and manufacturing is sponsored at least in part by government organizations. The workshop provided a venue for researchers from a

variety of government organizations along with their industry contractors to exchange information regarding relevant technologies with academic and industry researchers. We hope that such an exchange will enhance research efforts by unifying researchers of like interests from a variety of organizations.

Specific topics of interest include AI in venous manufacturing life-cycle activities' including design, engineering, production planning, scheduling and control, process diagnosis and control, recycling and re-manufacturing; AI and business process reengineering; AI and issues of enterprise integration, including enterprise modeling, architectures for coordination and collaborative, distributed decision-making the role of AI in supporting new manufacturing concepts such as agility, virtual manufacturing, etc.

To emphasize broad-based coverage and consensus on issues, we solicited participation from within the programs of several organizations that sponsor or are otherwise involved in intelligent manufacturing research, including the National Science Foundation, Sandia National Laboratories/Department of Energy, the National Institute of Standards and Technology, and the Advanced Research Projects Agency. We gratefully acknowledge the contributions of each of these organizations, along with that of AAAI Press, which made the workshop possible.

The workshop is a collaborative effort supported by the tune and talents of a number of people from a variety of organizations. Their efforts are greatly appreciated. Mark Boddy assisted with the workshop agenda and speaker suggestions, Maria Gini posted workshop announcements in the AAAI/SIGMAN newsletter and on the web, George Luger coordinated the Proceedings effort, John Mitchiner organized the workshop tours, Bill Regli assisted with finding efforts, Steve Smith handled the workshop funds, and Kelly Gomez assisted in many ways with workshop preparation. Many thanks to Patti Sanchez who put in her time coordinating the workshop and making it a success.

Leslie Interrante, *Chair*

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