(How) Is AI Impacting Manufacturing?
A Panel

CHAIR:

Mark S. Fox
Center for Integrated Manufacturing
    Decision Systems
Carnegie Mellon University
Pittsburgh, Pennsylvania 15213
USA

PANELISTS:

E.J. van de Kraats
Shell Research BV
Postbus 60
2280ABRijswijkZ-H
The Netherlands

Dennis O'Connor
Intelligent Systems Technology Group
Digital Equipment Corporation
290 Donald Lynch Blvd.
Marlborough, MA 01752
USA

Karl Kempf
Intel Corp.
3065 Bowers Avenue
Santa Clara, CA 95051
USA

Summary

Manufacturing research is broadly concerned with tasks performed throughout the product manufacturing life cycle:

- Design,
- Planning,
- Production,
- Distribution,
- Field Service, and
- Reclamation.

Decision making at each stage requires creativity, the ability to deal with complexity and coordination with other activities in the cycle. As such, manufacturing represents a fertile domain in which to apply Artificial Intelligence.

The potential of AI for solving manufacturing problems was was recognized in the early 1980s, resulting in the initiation of a large number of application projects [Fox 86]. Some of the first commercially successful systems, such as XCON at Digital [Bachant & McDermott 84 84], OPGEN at Hazeltine [Freedman & Frail 86], and GENAID at Westinghouse [Osborne 86] have arisen out of the manufacturing domain.

Given the plethora of manufacturing related AI projects underway in the last decade, it is time to review our experiences. In particular, it would be useful to examine the following questions:

1. Has AI made any contributions to solving manufacturing problems?
2. Are the contributions measurable, if so, how?
3. What can we do now that we could not do in the past?
4. What does it take to build, deliver and maintain "real" AI systems?
5. How much and what types of AI are causing the impact?
   - a little vs a lot.
   - sophisticated vs unsophisticated.
   - expert systems vs knowledge based systems
6. Is the cost worth the effort?

Each of the panel members were chosen to represent a different industry.

Dr. van de Kraatz, as head of the Shell's Research

group in The Netherlands, has overseen the construction and delivery of a number of AI based systems for the chemical processing industry.

Mr. O'Connor, director of Digital Equipment's Intelligent Systems Technology Group, is responsible for the construction and fielding of many of Digital's AI based systems such as XCON and XSEL, in the computer industry.

Dr. Kempf is a Principal Scientist in Intel's Knowledge Applications Lab and has been responsible for a number of AI based applications for process planning and factory scheduling, in both aerospace and semiconductor industries.

References

[Bachant & McDermott 84]   Bachant, J., and McDermott, J, "RI Revisited: Four Years in the Trenches," *AI Magazine,* Vol. 5, No. 3,1984, pp. 21-32.

[Fox 86]   Fox, M.S., "Industrial Applications of Artificial Intelligence," *Robotics,* Vol. 2,1986, pp. 301-311.

[Freedman & Frail 86]   Freedman, R.S., and Frail, R.P., "OPGEN: The Evolution of an Expert System for Process Planning," *AI Magazine,* Vol. VII, No. 5,1986, pp. 53-57.

[Osborne 86]   Osborne, R.L., "Online, Artificial Intelligence-Based Turbine Generator Diagnostics," *AI Magazine,* Fall 1986, pp. 97-103.