

Artificial Intelligence In CAD/CAM

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Abstract

CAD/CAM systems currently are undergoing major changes. These changes are due to the emerging new CAD/CAM systems that incorporate expertise or knowledge and are known as knowledge-based system. Hence the new CAD/CAM systems have some 'intelligence' in them. With the incorporation of artificial intelligence (AI), the design lead time is claimed to be cut drastically in the process of redesigning or modifying the design for a new model. Hence a new CAD/CAM system claimed to cut down design time more than half in some cases. This drastic reduction of lead time has enhanced the competitiveness dramatically. This paper looks in-depth about the practicality AI in CAD/CAM, evaluating into the current status of AI in CAD/CAM systems and compares the conventional CAD/CAM system with those that have AI.

1.0 Introduction

CAD/CAM or computer-aided design/computer aided manufacturing started as CAD and was basically 2-dimensional design and draughting. Today, CAD/CAM applications have covered many engineering functions, ranging from simple draughting aids to full-fledged 3-dimensional modeling and design tools. Additional to that, inclusion of attribute information in database, assigning physical meanings to the graphical representation of components, etc. has made CAD/CAM a competitive factor in this increasing competitive market.

CAD/CAM has enabled new methodology in design and manufacturing such as concurrent engineering or simultaneous engineering to reduce lead time [35]. Reduction of product lead time is a significant competitive advantage as demonstrated by Cusumano [17].

Therefore inclusion of design expertise within CAD software has been desired. The incorporation of judgmental design knowledge will allow distribution of rare expert design and manufacturing knowledge to a wide range of designers and engineers. This will improve the overall design performance and reduce the design time. Hence with the incorporation of knowledge and expertise into the system, AI has become a new feature in CAD/CAM.

2.0 The Importance of AI to CAD/CAM

Some powerful CAD/CAM software in the market includes various features such the analysis functions within them to optimize design. Current CAD/CAM system requires the designer to consider not only the designing aspects but also the manufacturing aspects. Hence the designer needs to have both design and manufacturing knowledge to enable him or her to design effectively. Therefore there is a need to incorporate the design and manufacturing concept as well as the experience of a good designer in a CAD/CAM system. With these features incorporated, the CAD/CAM system can assist the designer 'intelligently' in making a decision and to come up with new product.