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Feature-based ERP system for the integration of design and manufacturing

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Customer-oriented manufacturing demands engineering design and production planning to be fully integrated. This study proposes a generic feature association method and a detailed framework for the implementation of an advanced Enterprise Resource Planning (ERP) system that can unify product and process models in order to fulfill customer orders with small batch and high variation production nature. A conceptual solution is introduced for the information integration between design configuration features and manufacturing process features. To achieve this, three feature classes, customer feature, capacity feature and welding feature are suggested. Specific effort has been spent to model welding features which are currently not well studied. With the associative integration between product design and process feature domains, a preliminary order acceptance and scheduling prototype system has been implemented within an ERP order management system and its semantic model is demonstrated within a unified and multi-facet feature framework.

Biography

Yongsheng Ma is currently a Professor at the Department of Mechanical Engineering, University of Alberta, and a registered Professional Engineer, Canada. He has joined University of Alberta since 2007. He is also a member of ASEE and SME. He teaches capstone design projects, engineering economics and manufacturing processes. His main research areas include feature-based product and process modeling, CADCAM, and product lifecycle management. He received his BEng degree from Tsinghua University, Beijing in 1986, MSc and PhD degrees from UMIST, UK in 1990 and 1994 respectively. Before joining University of Alberta, from 2000 to 2007, he had been an Associate Professor in the school of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore. He publishes actively in top international journals, and has recently published a new book, *Semantic Modeling for Product and Process Engineering*. He had been an associate editor of *IEEE Transaction of Automation Science and Engineering* (2009-2013). Since 2012, he has served as an editor of *Advanced Engineering Informatics* published by Elsevier. In 2012, he won the prestigious ASTech award sponsored by Alberta Science and Technology Leadership Foundation. He started his career as a polytechnic lecturer in Singapore (1993); and then a senior research fellow and group manager (1996-2000) at Singapore Institute of Manufacturing Technology. He is currently a member of General Faculty Council (GFC) of University of Alberta and a university senator from July, 2013.

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