Feature and Product Markup Languages in Service-Oriented CAX Collaboration

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Abstract

The competitive and open market nature demands different vendors to collaborate during the product life cycle and to reduce the product's time to market. In this paper, we propose an infrastructure to enable the concurrent collaboration of heterogeneous Computer Aided tools for concurrent engineering aspect X (CAX) at the feature level using a Service Oriented Architecture (SOA) approach. A Feature Markup Language (FML) and a Product Markup Language (PML) are proposed as the modeling and communication media for feature and product information representation and exchanges which can be independent to operating system and programming language. How to employ the concept of software factory to leverage FML as a Domain Specific Language (DSL) is discussed for the process of feature development and distribution. Moreover, the underlying architecture is described to enable CAX information sharing in real-time preserving the semantics and consistency.

Keywords: Collaborative engineering; Markup languages; Product lifecycle management

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Mr. Adel Khaled is pursuing his PhD degree in software engineering at University of Alberta. For the past 4 years, he has held the positions of technical manager and software architect at Netways, an e-Solution company based in Riyadh. Adel has an extensive experience with .NET framework and has been working with .NET since early releases. He has over 7 years of experience in software development with Microsoft technologies developing client-server windows based applications, web services and distributed applications. He has implemented several projects using Microsoft technologies such as Content Management Server, SharePoint Portal Server, Microsoft Message Queuing, MS SQL Server and BizTalk.

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Dr. Yongsheng Ma joined Department of Mechanical Engineering, University of Alberta, Canada as an associate professor since September, 2007. Before that, he had been with Nanyang Technological University (NTU), Singapore, from 2000 for 7 years. His main research areas include product lifecycle management, feature-based product and process modelling. Dr. Ma received his B. Eng. from TsingHua University, Beijing, China in 1986. He obtained both his M. Sc. and PhD degrees from Manchester University, UK in 1990 and 1994 respectively. He lectured at Ngee Ann Polytechnic from 1993 to 1996 and worked as a senior researcher at the Singapore Institute of Manufacturing Technology from 1996 to 2000.

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Dr. James Miller has been with the Department of Electrical and Computer Engineering at the University of Alberta as a full professor since 2000. He is also an adjunct professor at the University of Calgary. His research interest is in software and systems engineering. Dr. Miller received the B.Sc. and Ph.D. degrees in computer science from the University of Strathclyde, Scotland. He has investigated in the areas of software verification, validation and evaluation issues across various domains, including embedded, web-based and ubiquitous environments; and published over one hundred refereed journal and conference papers. He currently serves on the program committee for the IEEE International Symposium on Empirical Software Engineering and Measurement; and sits on the editorial board of the Journal of Empirical Software Engineering.