Knowledge Representation and Decision Support for Managing Product Obsolescence

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Abstract

Custom low volume products and systems, such as those utilized by military and avionics applications, often make use of commercial high-tech components. In the past decade, technology has advanced very rapidly causing such components to have a shortened life span. Newer and better technologies are being introduced frequently, rendering components obsolete. Obsolescence of components has created a significant problem for custom low volume products and systems such as ships, submarines and aircraft that can be in use for decades. There are several approaches to mitigating the effects of obsolescence such as lifetime or last time buys, part substitution, redesign, aftermarket sources, emulation, or reclamation. Difficult and strategic decisions need to be made on when to invest, what technology to invest in, or whether to wait until a future point in time when a new technology may be available. While the impact and pervasiveness of obsolescence problems are growing, existing tools and solutions are lacking the needed information and knowledge to do much more than focus on reactively managing obsolescence. Current methods and tools are limited by data conflicts and data inexplicitness, incompleteness, inconsistency, and limited support for decision making. In this presentation, two approaches are introduced. First, a hybrid ontology approach based on a comprehensive obsolescence knowledge representation schema is introduced. This enables integrating heterogeneous data resources found in existing obsolescence management tools. Second, a decision support model for strategic obsolescence management is introduced, which determines the optimal design refresh plan to minimize the life cycle cost impact of obsolescence.

Biography

Dr. Liyu Zheng recently joined RTKL, Inc., a global architecture, planning and design firm, as a designer in operational modeling and simulation in healthcare. Previously she was a postdoctoral research associate in the Department of Industrial and Manufacturing Systems Engineering at Iowa State University. She earned her Ph.D. in Industrial and Systems Engineering from Virginia Tech with a focus on data integration, knowledge environments and decision support for product obsolescence management. More broadly, her research interests include support for engineering applications for product and systems design. She received both her BS and MS degrees in Automation from Zhejiang University in China. She is a member of IIE.

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