AN INTELLIGENT DESIGN RETRIEVAL SYSTEM FOR MODULE-BASED PRODUCT

Vorapoch Angkasith

Dr. C. Alec Chang, Dissertation Supervisor

ABSTRACT

The manufacturing industry has shifted its approach from traditional manufacturing to agile manufacturing. The production of customized products will increase in response to the individual demands of customers. In exploring various industry trends, researchers have developed different approaches to designing structural products. The most popular and most commonly used approach in contending with structural products is the modularity approach. Moreover, there are several studies that address modularity with respect to structural representations. Even so, there is not yet a unified method for supporting product structure development and for integrating information. Another aspect that current research has not yet adequately addressed is product information retrieval. Those studies that did contend with product information retrieval, addressed one-level retrieval models, while ignoring structural products. Thus, limitations persist in current intelligent retrieval systems. To answer the aforementioned difficulty, a unified indexing scheme is introduced. In this study, the information can be put into numerical form as the proposed unified indexing scheme, which is represented by a component and structure matrix. The component and structure matrix is the way to

achieve an application of modular design retrieval because (1) it is a unique presentation of a structural product and provides a uniform representation; and (2) it lists all modules, as well as all components, in one representation. As a result of the proposed method, an intelligent retrieval system will give an enterprise the ability to communicate with its partners efficiently. Therefore, the aim of this research is to develop a system that will enable more efficient and more effective product-design retrieval systems for structural products, and to demonstrate this framework through a Web-based application using Web technology. To obtain reference designs after utilizing the unified indexing scheme, a Fuzzy-ART neural network is implemented in order to handle retrieval tasks.