Chapter 2
BDD-Based Combinatorial Keyword Query Processing under a Taxonomy Model

Shin-ichi Minato
Hokkaido University, Japan

Nicolas Spyratos
Université de Paris-Sud, France

ABSTRACT

Digital libraries are one of the key systems for an IT society, and supporting easy access to them is an important technical issue between a human and an intelligent system. Here we consider a publish/subscribe system for digital libraries which continuously evaluates queries over a large repository containing document descriptions. The subscriptions, the query expressions and the document descriptions, all rely on a taxonomy that is a hierarchically organized set of keywords, or terms. The digital library supports insertion, update and removal of a document. Each of these operations is seen as an event that must be notified only to those users whose subscriptions match the document’s description. In this chapter, the authors present a novel method of processing such keyword queries. Our method is based on Binary Decision Diagram (BDD), an efficient data structure for manipulating large-scale Boolean functions. The authors compile the given keyword queries i

DOI: 10.4018/978-1-61520-851-7.ch002

Copyright © 2011, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.
Digital libraries are one of the key systems toward an IT society, and supporting easy access to them is an important technical issue between a human and an intelligent system. The publish/subscribe interaction paradigm provides subscribers with the ability to express their interest in classes of events generated by publishers. A system that supports this paradigm must be able to find, for each incoming event $e$, the subscriptions that match $e$, in order to determine which subscribers should be notified. Many typical web applications can be seen as variants of this general framework, including auction sites, on-line rental offices, virtual bookshops, etc. They act as brokers which store only descriptions of the published items.

We now consider a publish/subscribe system for digital libraries which continuously evaluates queries over a large repository containing document descriptions (Frej, 2006). The subscriptions, the query expressions and the document descriptions, all rely on a taxonomy that is a hierarchically organized set of keywords, or terms. The digital library supports insertion, update and removal of a document. Each of these operations is seen as an event that must be notified only to those users whose subscriptions match the document’s description.

In this chapter, we present a novel method of processing such keyword queries. Our method is based on Binary Decision Diagram (BDD) (Bryant, 1986), an efficient data structure for manipulating large-scale Boolean functions. We compile the given keyword queries into a BDD under a taxonomy model. The number of possible keyword sets can be exponentially large, but the compiled BDD gives a compact representation, and enabling a highly efficient matching process. In addition, our method can deal with any Boolean combination of keywords from the taxonomy, while the previous result considered only a conjunctive keyword set. In this chapter, they describe the basic idea of their new method, and then the authors show their preliminary experimental result applying to a document set with large-scale keyword domain under a real-life taxonomy structure.
A Comparative Study of Neural Network and Fuzzy Logic Control Based Active Shunt Power Filter for 400 Hz Aircraft Electric Power System
www.igi-global.com/article/a-comparative-study-of-neural-network-and-fuzzy-logic-control-based-active-shunt-power-filter-for-400-hz-aircraft-electric-power-system/188709?camid=4v1a