

P.O.Box 8718, Beijing 100080, China	Journal of Software, April. 2005,16(4):533-539
E-mail: jos@iscas.ac.cn	ISSN 1000-9825, CODEN RUXUEW, CN 11-2560/TP
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函数依赖和规范化在关系和XML间的传播

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Received 2004-07-09; Accepted 2004-09-08

Abstract

To combine XML with relations is a hotspot in research field. This paper studies the functional dependency and normalization propagation between relations and XML. First the paper gives the definition of functional dependencies and keys for XML; based on it, the concepts of redundancy and DTD normalization are defined. The paper then discusses the functional dependency propagation between relations and XML. When using a general mapping from relational schema to DTD, the paper shows that all the relational functional dependencies can be preserved in the DTD; and when applying a commonly used method to mapping DTD to relational schema, each functional dependency on relations has a corresponding one in the original DTD. The significance of functional dependency propagation lies in the normalization propagation. The paper proves that using the methods above, if the original relation is in BCNF, the generated DTD is normalized, and if the original DTD is normalized, the generated relations are in BCNF.

Tan ZJ, Shi BL. Propagating functional dependency and normalization between relations and XML. *Journal of Software*, 2005,16(4):533-539.

<http://www.jos.org.cn/1000-9825/16/533.htm>

摘要

XML和关系的结合是一个重要的研究领域, 讨论函数依赖和规范化在关系及XML间的传播问题. 首先引入XML上函数依赖和键的定义, 并进一步定义XML上的数据冗余和规范化DTD的概念. 分别讨论在关系和XML相互转化的过程中, 函数依赖的传播问题. 针对一种一般化的关系模式DTD表示, 证明原有关系中的函数依赖可以在生成的XML文档上得到表示. 针对一种常见的XML关系存储方法, 说明最终生成关系上的函数依赖与原有XML上函数依赖的对应关系. 函数依赖传播的核心意义在于规范化的传播. 证明使用上述方法时, 若原有的关系是满足BCNF的, 则发布得到的DTD也是规范化的; 若原始的DTD是规范化的, 则得到的关系存储也满足BCNF范式.

基金项目: Supported by the National High-Tech Research and Development Plan of China under Grant No.2002AA4Z3430 (国家高技术研究发展计划(863))

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