

Chapter 46

Technique for Transformation of Data From RDB to XML Then to RDF

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ABSTRACT

This chapter will clearly show the need for better mapping techniques for Relational Database (RDB) all the way to Resource Description Framework (RDF). This includes coverage of each data model limitations and benefits for getting better results. Here, each form of data being transform has its own importance in the field of data science. As RDB is well known back end storage for information used to many kinds of applications; especially the web, desktop, remote, embedded, and network-based applications. Whereas, EXtensible Markup Language (XML) in the well-known standard for data for transferring among all computer related resources regardless of their type, shape, place, capability and capacity due to its form is in application understandable form. Finally, semantically enriched and simple of available in Semantic Web is RDF. This comes handy when with the use of linked data to get intelligent inference better and efficient. Multiple Algorithms are built to support this system experiments and proving its true nature of the study.

INTRODUCTION

Transformation of data depends on data models along with their limitations and dependencies. Data modeling plays the most crucial part for all what we see around us even in business, government, economics, social and daily life entities for analyzing facts and producing results. Data models like hierarchical, network and relational have their own importance and long history. But above all others relational data model gained its importance due to its record keeping capabilities along with maintaining the data integrity. Due to which majority of data found in the world are kept and stored in Relational Database

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(RDB). A relation in RDB is build-up on a combination of rows and columns where each cell represents a single piece of information titled under a field. A field represents a column and a row represents an instance of record concerning current relation in a table. Data model of RDB is a combination of the datatype, constraint, and functional dependency on data (Codd, 1970). Information concerning each element of data against a relation is kept in the form of the schema (structure defined for data to be stored in a relation) and data values (actual literals stored in table cells). In web, RDB is used at backend for storage of data. Inventions like the internet in networking imposed the need of intermediate language which can make data supported among all systems attached nearby. Which also brought the creation of XML as an intermediate language. Having said so, it became most common language after 0's and 1's bits, which actually are close to machine with high-level understanding and interpretation, used as machine-processable language. Support of data types among RDB, XML, and RDF during mapping play necessary role when trying to transforming one's data model into another. Customization of data types are possible in XML Schema (XMLS) (Biron, Malhotra, & Consortium, 2004).

When it comes to importance, XML as a standard for the data transformation is commonly and majorly used among applications, devices, operating systems and computers. For the Web as HTML rules are built in XML and XML is a language freely customizable by other to support their data in any other electrical network supported device. Which makes it more and more useful all over where remote access to data comes. Now almost all smart devices support XML. This is the reason that's why XML became most famed and well-known standard for data-based communication all around the World. Whereas, a web page is less organized and semi-structured while making searching of data complicated and more inaccurate (Rusu et al., 2013). In web, for searching and accessing resources like people, videos, audios, and images etc. search engines are used as a tool on the web (Hepp, Leymann, Domingue, Wahler, & Fensel, 2005). Despite gradual improvement introduced in these search engines, a dramatic increase in the volume of web contents produces loss of technological improvements. To resolve this issue, representation of web contents are required to be transformed into machine processable format. Semantic Web (SW) has introduced machine processable form with the help of Resource Description Framework (RDF) (Antonioni & Van Harmelen, 2004).

SW has gained a large fame due to its capability of enhanced methods and intelligent data seeking mechanisms which made it a great innovation in next generation of the web. Different transformation models and techniques are introduced to transform web contents mapped up into SW (Pham Thi Thu Thuy, Lee, & Lee, 2009; Pham Thu Thi Thuy, Lee, Lee, & Jeong, 2007, 2008; Van Deursen, Poppe, Martens, Mannens, & Walle, 2008). RDF is a language to show data in the form of triples; subject, predicate and object forming a statement in SW (Manola, Miller, & McBride, 2004). Furthermore, different graph representations are introduced for SW based data. SW have a big impact on data in producing hierarchal relationship by mapping resources used in graph-based representation. This SW graph based data representation formats for RDF include JSON, Turtle, RDF/XML, RDFa, and TriG (Manola et al., 2004). Whereas, RDF/XML is the most commonly used representation due to its capability to exchange data among computers, operating systems, and applications. RDF/XML is built upon on XML as its name also suggests. Whereas, RDF/XML as built-up on XML is complex than JSON, Turtle, and N-Triple data representatives but commonly adaptive due to it's adaptive and compatible nature due to XML (Manola et al., 2004). Improvements in RDF did lead us to OWL language which was actually inclusion of constraints and inference elements in RDF. This made language somewhat complex and less compatible and more specialized for machine learning purposes only. This was not the actual cause or

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