

## Data Models for Visualization Service of Scholarly Journal and Article Information

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### 1. Introduction

The scholarly journal or scientific and technical periodical, born in 1665 [1], is an important medium conveying new knowledge discovered by researchers in different disciplines. Journals have been published in printing form but now electronic journals are dominant thanks to information technology. An electronic journal consists of a contents linked with article's full-texts, in general, which are traditionally being constructed in PDF (Portable Document Format). Recently, the content of journals is increasingly produced in XML (eXtensible Markup Language) for the purpose of information sharing. JATS (Journal Article Tag Suits) [2] is a typical DTD (Document Type Definition) of an XML full-text of a journal article.

Internet users who live in the era of information flood want to get information intuitively and fast from the text. It is desirable to consider visual services of journal and article information in order to make the information more insightful and effective than text-based information. Therefore, it is required to develop data models for visualization of journal and article information. In this study, visualization strategies of journal and article information is investigated using a journal data model and an article data model developed based on JATS and Journal Front Matter DTD suggested by PubMed Central team of NLM (National Library of Medicine) of USA.

### 2. Data Models for Journals and Articles

#### 2.1. Data Model for Journal Information

JATS includes a couple of journal metadata such as journal title, ISSN, and publisher name. More data elements of a journal required in developing visual services of journal information should be added. PubMed Central team of NLM is developing a journal front matter DTD which includes more data elements other than journal metadata of JATS [3]. But it is not only incomplete but also being tried in different view other than visualization. In this study, an extended journal data model is developed as shown in the Table 1 based on user requirements.

[Table 1] Comparisons of Journal Metadata between Data Models

Data Group	JATS Journal Meta	Journal Front Matter DTD	Extended
Identification	Journal Title ISSN	Journal Title ISSN	Journal Title ISSN
Editorial Board		<i>Editorial Board</i>	Editorial Board <i>EIC</i>
Publisher	Publisher Name	Publisher Name	Publisher Name <i>Publication Country</i>
Subject		<i>Aims and Scope</i>	Aims and Scope <i>Subject Category</i>
Citation			<i>Impact Factor</i>
Copyright		<i>Copyright Holder Name</i>	Copyright Holder Name <i>Publication Frequency</i>
Others			<i>Language</i> <i>Number of Article</i> <i>Launched in</i>

\* Italicized parts show the extended metadata comparing with the left handed column.

#### 2.2. Data Model for Article Information

The Journal Publishing Tag Sets of JATS includes plenty of metadata about a journal article and few data elements are needed to be added for visual service of journal articles. Strategies for developing visualization services of article information can be established based on the JATS.

### 3. Service Strategies for Journal and Articles

#### 3.1. Service Scenario for Journal Information

Journal information can be visualized using Infographic, TreeMap, Map and Chart based on the extended journal model developed in this study as shown in Figure 2 (a).

#### 3.2. Service Scenario for Article Information

Article information can be visualized using Infographic and Tag Cloud based on the Journal Publishing Tag Sets of JATS as shown in Figure 2 (b).

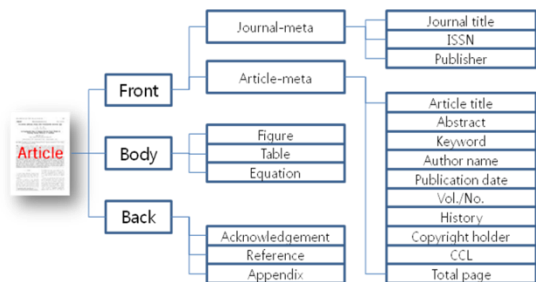


Figure 1. JATS Data Model for Articles

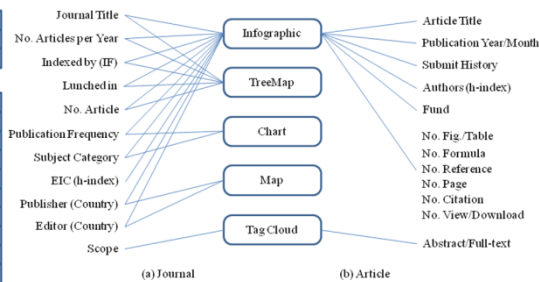


Figure 2. Visualization Service Strategies for Journal and Article Information

### 4. Conclusion and Future Work

In this study, visualization service strategies for journal and article information by relating data elements of journal and article to several visualization techniques such as Infographic, TreeMap, Map, Chart and Tag Cloud. All core data of journal and article information can be visualized in an Infographic page. Numeric or enumerated data can be visualized using TreeMap or Chart while data related with country such as “editor country” in a Map. Finally, Abstract and full-text can be used for creating Tag Clouds.

In conclusion, the possibility of visualization service is shown by developing data models for visualization of journal and article information extending data models of JATS and Journal Front Matter DTD of NLM. The implementation of visualization of journal and article information should be performed in the future.

### 5. Acknowledgement

This research was performed as a part of the 2014 KISTI project, “Study on Visualization Service Scheme for Scholarly Information(K-14-L06-C10).”

### 6. References

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- [2] ANSI/NISO Z39.96-2012 JATS: Journal Article Tag Suite Version 1.0), National Information Standards Organization (NISO)
- [3] R. Carter, C. Funk, and R. Mooney, “The Front Matter : Capturing Journal Front Matter with JATS”, JATS-Con 2012, NCB, Bethesda, MD, 2012.