

Examining the Use of Big Data for Library and Information Services: Current Status and Future Prospects

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1. Introduction

After the transition to an information society, rapid changes in the information environment have transformed paradigms in various industries and such changes continue to proliferate around the world. Especially, the smart industry with the latest technology has become one of the major industries these days. There is no doubt that the use of social media has increased along with people's widespread use of smart devices, such as smart phones and tablets, and this has caused a flood of data. As the amount of data in our world has been exploding, the variety of the data has also been increasing. Accordingly, libraries and information service centers that deal with much information for users should adjust to the changing information environment and new technology. In the era of big data, users' expectations for information services in libraries are reasonably high and libraries need to build up their infrastructure and provide new information services.

2. Methods

This study aimed to demonstrate the direction of the analysis and utilization of big data that might be utilized in the library and information service field in the future through an analysis of scholarly work, dissertations, and relevant research with the main topic of big data, which recently has been a focus of research in diverse areas. First, the study conducted a trend analysis of the concept and current status of big data, identified the meaning of big data through the analysis, and analyzed and proposed cases utilized in each field at home and abroad by type. Second, through an analysis of scholarly work and scientific papers regarding big data analysis technology, the study determined the interested topics among researchers and research trends. Accordingly, the study analyzed major current issues regarding big data technology. Third, the study summarized actual user information services offered in libraries through an analysis of cases of big data utilization at libraries using examples from both home and abroad as well as of relevant existing studies. By integrating these findings, the study is able to utilize the results for determining big data analysis utilization services that may be applied by libraries in the future library and information service environment.

3. Concept and current status of big data

Big data, which has been defined in many studies, is too huge compared with existing data; thus, its concept has been defined as a data set that is difficult to analyze with general analytical techniques. As there have recently been some cases in which big data has generated economic value utilizing data while expanding from the IT field and as big data is increasingly being utilized for offering solutions for improvements that solve social issues that were difficult to identify in the past, the field of utilization of big data has been extended to various areas. Consequently, many governments throughout the world have pursued and are operating an additional organization to pursue a big data policy. In classifying the cases referred to of utilization of an analysis of big data, they may be classified into an analysis of internal data (usage log) of an institute offering a recommendation service using the usage performance and information of customers, a web data analysis using data on the web that analyses the latest overall trends which are difficult to predict in real-time, and a social network analysis that extracts patterns in which user responses and personal profiles are combined in social media.

4. Research trend of big data analysis related technology

Along with a growing interest in big data in diverse areas, scholarly communications regarding various scientific fields have been made accordingly. Most of the analytical techniques utilized in research are the ones already used in the fields of statistics, computer science, and data mining. Currently, algorithms of these analytical techniques have been applied to the process of big data by improving those suited to large data processing. Owing to a recent increase of unstructured data such as social media, in particular text mining, opinion mining, social network analysis, and cluster analysis among analytical techniques have drawn attention.

[Table 1] Current status of research into big data analytical techniques

Researcher name	Research content
Thelwall, Wilkinson and Uppal (2010)	Based on comments displayed on MySpace, one of the social network services, the comments were divided into positive and emotional emotions, and such emotions were analyzed by gender and age [1].
Cheney (2013)	Newspaper and news contents were analyzed utilizing text mining, and afterward text mining was proposed as a new utilizable research method in the academic field [2].
Song (2013)	Aimed at social media involving tweets and blogs, detailed customer responses were identified in real-time through a case analysis concerning the reputation of medical institutions, and matters for improvement were proposed [3].

5. Utilization of big data at the library

It has been deemed possible to prepare actual solutions that can be utilized at a library based on the concept of big data defined in existing studies. Also, it is possible to develop and offer adequate information services to users utilizing big data, and this appears to be an opportunity for supporting the promotion of the use of a library. Currently, in considering the utilization of big data at the library and information service field, big data utilization may be classified into a big data analysis area and a big data collection area, which can be reviewed in many relevant studies. In particular, in the big data analysis area, the area of deducing new services through examining service utilization from data analysis based on the usage log within a library and various types of data appears to be the main utilization case.

[Table 2] Case studies on the utilization of big data at a library

Researcher name	Research content
Lim, and Chinnasamy (2013)	As a case study on the utilization of big data at the National Library Board in Singapore, systems were made for the offering of information services through an analysis of structured data and unstructured data within the library [4].
Stone, and Ramsden (2014)	In a Library Impact Data Project, library user data of college students at 8 colleges in the UK was analyzed in order to discover any correlation between the use of a library and scholastic achievement [5].
Kim (2013)	From a study on the creation of a library website for KAIST on the basis of an analysis of web log data (semi-structured), ideas were proposed for improving relevant services utilized during the creation of the website [6].

6. Conclusion

Case studies on the utilization of big data and relevant academic research remain unsatisfactory in the library and information science field including the library and information service field. In taking a look into big data analysis and utilization cases at libraries based on case studies reviewed to date, it is determined that there has been a focus on the development of user-oriented information services that offer adequate information needed by users through an analysis of user log data and web data. In the future, it will be possible also for many libraries to analyze big data utilizing data mining and text mining based on an analysis and utilization cases of big data that were utilized in various corporations and institutes, and this is expected to furnish information and services that draw high satisfaction from library users through an analysis that connects data in diverse fields including data within the library.

7. References

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