Report

Library in the Information Age

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Library in the Information Age

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Abstract

Some of the challenges to the libraries in the information age are the decreasing numbers of the analog books readers and the multiple sources of information available to readers. The availability of numerous sources disseminating information is what libraries have to fight. In this attempt, libraries need to embrace artificial intelligence; digital tools; innovative and creative physical spaces; and re-designing and configure as to how libraries interact with its readers. This article aims to suggest and review the directions and the digital changes that the libraries around the world are adopting in the era of the information age.

1. Introduction

Interestingly this article itself is an e-content and strives to address the audience consuming e-contents. It is not surprising that a shift from analog world to digital world is occurring. The era we live in now is the Information Age\(^1\) some other may say the Digital Age\(^1\). Sophisticate computers, smartphones, and the internet have reached to a vast population that otherwise practiced access to information via the print (analog) medium. Moreover, the libraries have been traditionally serving as the excellent source of information. Referred to the very first sentence in this article, the learning and reading habits of the people are radically changing.

E-learning, like the Coursera\(^2\), is offering a vast amount of e-contents and materials that otherwise earlier mostly available through the practice of the analog mode of learning and reading books and journals, preliminarily, accessed through the libraries. The habits of consuming digital information and the digital practices have increased to an alarming level. As such that the universities considering to scraping handwritten exams\(^3\). The access to digital media can be understood from the following commentary: “Eventually, the Venn diagram of those who lack smartphones and those who lack homes may nearly overlap exactly.”\(^4\)

However, the demand for print media is not as worse as often portrayed. This is certain from the recent report of a decline in e-books sales\(^5\). Therefore, questioning the relevance of libraries is unnecessary; whereas reviewing and re-defining libraries is necessary to serve today’s increasing digital demographic population. Libraries need to position themselves as the source of information dissemination for learning, education, and social benefits.

Recently, Massachusetts Institute of Technology (MIT) created a task-force that should recommend changes that the MIT libraries should adapt in the digital age. In general, the recommendation was on the future of the libraries\(^6\). Some of the recommendation reads as follows:

For the improvement of community and library relationship, “re-design of MIT libraries’ physical space” was recommended—this may be case specific, much information should be read in the full recommendation\(^6\). The emergence of the digital age is as such that there are some digital tools like the “Measure the future library physical space”\(^7\)” that can help libraries to improve their physical spaces.
Another recommendation tells to digitize the analog collections; to discover new ways of using, sharing, and preserving knowledge; and to promote new methodology for discovering and organization of information, people, ideas, and networks.” Reference to an intelligent information system for libraries, in other words, intelligent library systems was emphasized much earlier. However, apart from existing automated library system, the importance artificial intelligence enabled system has become imperative for the future libraries.

On the front of libraries sustainability, MIT task force recommends that the libraries should serve as the “institute’s memory” that preserves the records of research and learning. Finally, the task force recommends establishing a section of research in information science and scholarly communication.

Now, let us view the prospect of the libraries in 2020 and beyond. How and what the libraries should adopt in order to remain relevant and remain at the center stage for its role of information dissemination. We will see various concepts addressing artificial intelligence (AI) and machine learning (ML) for the future libraries; and digital and innovative tools which are enabling the libraries to match the speed of the digital age.

2. Library as a Laboratory

We first like to address a concept of the library as a laboratory service. A traditional library typically offers services, such as the searching books, reading books, accessing information about the present experience and sharing information of the present experiences. Alongside the current library functionality, how about:

experiencing the experience and
generating information and experience?

This can undoubtedly be achieved. Library 2.0: the future of the library in the digital age conference brings concepts and ideas to the surface that can re-design library's physical spaces. Additionally, among many priorities set by Arts Council England—in their research: envisioning the library of the future—is the exploitation of the digital tools.

Makerspace is one of such concept that brings “a create lab space” for art, design, learning, and education. The “maker space” helps attracting and building community relationships with the libraries. In addition to maker space, performance space as the multi-user space, including video and sound equipment for making and editing videos, is the concepts that libraries are offering to the community to explore their creative endeavor, and thus, making a close relation with libraries.

Some libraries also see an increase in their revival by re-designing library physical spaces by a mix of informal and formal seating. Despite such libraries has 20% e-books in circulations and has the observation that the “books [printed books are] more of an architectural presence in our branches [New York Public Library (NYPL)]” as viewed by vice president of capital planning at the NYPL. The potential threat of analog books being disappearing—contrary to the report of fall in e-book sales—genuinely has a call for innovation that what the future library should offer. The library Incubator project aims to bring responsiveness to the libraries physical spaces. Some of the projects of library Incubator project are Sketchbook project and Local Music project engage peoples and bring their active participations in the libraries.

The library as a laboratory service is also can be view with the inclusion of 3D printers, vinyl cutter, and a laser cutter for art, designs, models, and tools. On the other hand, bioCurious let people be creative and gain knowledge (generate knowledge) through experiencing the stored
experience in a genetic engineering like a laboratory. The users then create new microbes, new plants, etc., using available open-source data and tools.

3. Library as an Artificial Intelligent System

In addition to making the library as a laboratory service and apart from the 3D printer and maker space, the website ebookfriendly\textsuperscript{21} recognizes that some digital age innovation and tools may enable libraries to catch-up with the information age.

With the information age, comes the new technologies that can be exploited to bring the interest of readers to the analog book. For example, a digital bookmarker\textsuperscript{21} for analog books helps track the books we read, the book we are currently reading, and recommendations for other related books. Similarly, an inexpensive library utensil: ivy guide\textsuperscript{22} immediately translates the texts marked on an analog book and takes note of the marked texts. More advanced AI and ML-based analog book reading tools and interface are Nimble\textsuperscript{23} and FingerLink\textsuperscript{24}. This digital book reading interfaces work using gesture recognition and exploit the advance of-the-shelf AI technology for the real-time translation of the analog texts, taking notes from the books, sharing the notes and the real-time images captured from the analog books, immediate availability of dictionary, and finding and searching references on the web.

In the race of digital age, the users are increasingly becoming tech-savvy and like to have quicker access to information with the help of digital tools. To such a tech-savvy user, the digital book reader like ArxivML\textsuperscript{25} reads e-books and journals, and thus provides a quicker access to the stored information.

Although the Human Analog Reference Robotic Interface (HARRI)—the Ask HARRI reference service\textsuperscript{26} was an April fool day prank, but such a chatbot system is well exist. Similar advance chatbot system\textsuperscript{27} are efficiently serving in the smartphones. Siri\textsuperscript{28} and Google Assistance\textsuperscript{29} are the virtual user assistance systems. Any such chatbot-like “autonomous access to the library” system may equip a library with a greater reach to the audience.

Advance autonomous access to the library may also be implemented by using Wearables/Augmented Reality. For example, libARi\textsuperscript{30} that stands for “augmented reality experience for library” offers access to library racks in a virtual manner. Similarly, virtual tour using Google street view system with book tagging and information retrieval system\textsuperscript{31} to access the library book racks have the potential to revolutionize users experience of the library.

4. Library as an Intelligent Information System

Automated systems like the Lucidea\textsuperscript{32} has started providing Cloud-based automation in the library management system for smartphone users. On top of it, autonomous robotic shelf scanning (AuRoSS) platform that can self-navigate through libraries at night, scanning radio frequency identification devices tags is in use to produce reports on missing and out-of-sequence books\textsuperscript{33}. These systems let the library manage itself with a high efficiency, which enhances the library’s dissemination ability to a broader audience.

On the front of information dissemination and creativity to attract readers, Espresso Book Machine (EBM)\textsuperscript{34} is an exciting concept of a self-serve system. EBM in its EspressNet allows publishers to feed e-books that are available for immediate print from the EBM. EMBs like system primarily a call for a wider and open system for faster, readily accessible books disposal system.

An example of an efficient automatic e-book purchase system\textsuperscript{35} is implemented by Florida Polytechnic University (FPU), where a student or a faculty can view an e-book the university doesn’t yet own, but
the university library will automatically purchase that e-book upon second viewing by a member of the university. If we combined the concept of “Bookless library” like the one in FPU with EBM concept, the libraries in the academic institutions, in particular, would be already in a match of the speed of information age.

Another emerging technology is the Blockchain technology that can be used by the libraries in some ways to ensure the rights of publisher, authors, and the concern owners of the e-books, research data and other digital materials that libraries currently manage and disseminate. Blockchain will also offer a scope to libraries to become decentralized and to become a secure distributed system. For example, Blockchain technology will enable libraries to manage and track any changes in the publicly distributed research data.

5. Library as an Experience

With the advent of artificial intelligence and internet of things (IoT) together, a huge amount of data is being collected through the various sensor in the physical worlds. On the other hand, our understanding how brain process information is getting better and better every day. Thus, it will not be so far to see that libraries will soon need to include various simulation models as an information sharing platform, where not only access to information will be given, instead the information will be eXPERIEENCED. For example, traveling to another planet.

6. Conclusion

It is certain that in the information age the libraries has to adopt innovative artificial intelligence (AI) and other sort of digital tools to grab the attention of the increasing digital demographic population. On this note, libraries must evolve to reach its audience by exploiting the same digital tools and platform that the population is attracted towards, like the use of social media and the automated and AI based creative systems. Moreover, on the final front, libraries should become primary source by overcoming numerous other sources of information and has to adopt a secure distributed system information sharing using the latest technology like the artificial intelligence and the Blockchain.

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