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12-30-2018

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Gana G S
gana2016@gmail.com

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G S, Gana, "Internet of Things and the Future Scope in Libraries" (2018). *Library Philosophy and Practice (e-journal)*. 2221.
<https://digitalcommons.unl.edu/libphilprac/2221>

Internet of Things and the future scope in Libraries

Gana. G. S.

Research Scholar

Dept. of Library and Information Science

Annamalai University

Abstract:

IoT is a unique technology that gained its momentum in recent years. Though the technology acquires its potential libraries like organizations are in a stage of infancy to adopt the IoT technology. IoT is established in any organization with the help of interconnected identifiable embedded computing devices within the existing infrastructure. So that the use of technology allows us a greater chance for achieving a prosperous library management system with maximum efficiency at least effort. Automation of Library services is suitable approach where various devices can be managed at a single place by implementing Internet of Things. The idea behind the IoT and its future scope in libraries is to provide an user friendly approach towards libraries and at the same time ensuring a systematic library services so as to properly utilize the time and energy of employees.

Keywords: IoT, ILS, RFID

Introduction

Libraries are trying to serve their users with potential applications of internet and technologies that anticipated the use of Internet of Things for the intelligent use of space and resources. “IoT refers to the networked interconnection of everyday objects, which are often equipped with ubiquitous intelligence” (Xia et al., 2012). In doing so libraries must be equipped with adequate technological infrastructure such as various readers, recognition devices and software. While adopting a new technology the existing technologies cannot be avoided but at the same time it is highly important to find a technological component to interlink with these features as in an integrated library system (ILS). The increasing availability of broadband internet connection with cheaper cost and devices with Wi-Fi connectivity made us possible to access the plethora of resources and services. Likewise, the objects in the IoT can be a human or a device that are able to collect and transmit data without

any compromise in patron privacy. Some of the features of IoT is the remote monitoring in the case of activities over the communication network, data transmission in faster and effective manner, and controlling power to carry out the overall simultaneous activities without any hindrance. The features for library applications are very vast not only centered with the opportunities for access of resources but also the library operations and as a teaching tool. IoT devices can also monitor the furniture movement, counting the number of visitors, allowing smart card entry, digital signage for users and other services. Some suggest that the IoT will be connected as part of a larger cloud network at those devices those working are not mobile devices but computing devices. They do not have traditional interfaces – they are more like probes that collect data. For example in many organizations RFID (Radio Frequency Identification detection) is using as because of the fact that they uses radio waves to detect each individual items. The main aim is to carry data in suitable tags and to get it back, by machine readable means to satisfy particular applications need. Within a library these RFID tags are used to create self-check mechanism with automation of every activities. The RFID is

very convenient for a library management. The concept of Internet of Things can be located in a RFID library in its functioning like, when the book is carried to the counter, electronic article surveillance bit in the RFID tag can be activated for issuing and deactivated for returning.

Architecture of IoT

In the internet of Things it uses a combination of computing devices connected by Wireless Sensor Network (WSN), M2M (Machine To Machine), Smart most modern Devices, Artificial intelligence, internet technologies, wireless network etc. The basic architecture of IoT is as shown in the below table.

IoT Layers	Functionalities
Application	Organization, institution, Industry, Supply Chain, Surveillance
Services	Configuration management, Device modelling, Management, Data flow, Security control
Internet	Wi-Fi, Ethernet
Gateway	LAN, WAN, MAN
Connectivity	Broadband, 24X7 utility
Sensors	Barcode, RFID tags, Actuators
Objects	Resources

Table 1: IoT architecture

IoT Elements

Understanding the six elements of IoT helps to gain a better insight into its real meaning and functionalities of IoT (Ala Al-Fuqaha et.al, 2015). These elements are illustrated as below.

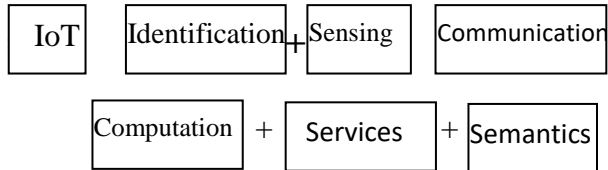


Fig 1: IoT Elements

Libraries and IoT

The potential of IoT in library is very high. Libraries can add more value added services too their users by IoT. The objects are all connected and made available at a single point over network. Librarians are playing a vital role in connecting users with the resources. In the same way RFID is connecting machines with objects. But the IoT differs in such a way that it will interact mostly with the books and other collections available in the library. IoT can be implemented in various areas of a library. They are given below.

Collection management Process

The RFID tag associated with a document in a library enables a visual representation of the item that can be

identified using sensors or devices like readers. Each patron is associated with a RFID member card so that it helps to identify the patron and carry out the process of issue/return process. Here, IoT will inform the users about the due related matters of books, reminders, reserve online etc. Using suitable devices or tags the borrowing records details of patrons and search history is made available over the network. IoT is also a good aspect in assisting with the stock verification and locate the misplacement of books.

Accessing Resources

Smart phones and other related technologies available in the present environment are very much promising for the IoT. Applications in smart phones enables a patron to find the location of a library, helps to enter the gateway to resources of that library. Before issue or return he/she may purchase the book if needed from the online sources. The map or location application in a smart device automatically guides the users to the particular items and provides additional details regarding the resources.

Information Literacy

Information literacy is the competency or skill of a person to utilize the technology by acquiring the skills and retrieving the needed document. Libraries having a facility of providing information literacy help the users to retrieve their own document in fast effective and efficient way without any hesitation. They do not need to move here and there for their resources.

Induction to Patrons about IoT

Induction or Orientation about the resources and materials in a library is another facility or service that can be offered to the patrons for providing the overview of Internet of Things in a library. Whenever the users enter the library and moving to a section the digital technology can provide a more enriched experience by explaining more about the special collections getting maximum utilization of resources. This may be enabled using most modern digital technologies in audio – video formats.

Conclusion

Even though there are successful initiatives in IoT among libraries there is still a huge gap in the implementation of IoT. In the subject literature, a belief seems to be prevalent about the rapid and inevitable

progress of IoT technologies (Gubbi et al., 2013; Xu et al., 2014; Roy, 2015). The literature is saying that according to some authors “The Internet-of-Things may represent the next big leap ahead in the ICT sector” (Miorandi et al., 2012).The advancement in technology has brought the traditional libraries to develop into a digital source of accessing information. So Libraries can be assured as a place where there is a large scope in storing knowledge with the IoT.

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