

Designing a Robust Online Library Information Searching and Retrieval System

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Abstract

The purpose of this study is to critically analyse the features provided by various search methods that are provided by various types of online library searching and information retrieval systems. Emphasis is given on the use of faceted search, federated search and Discovery tools available on the library portals of IITs, IIMs and NITs. A survey was conducted and data was collected online from 49 portals selected through simple random sample. Questionnaire method was used to collect information regarding issues and problems. It is found that despite availability of several advance features in searching, sorting, display options, hyperlinks, widgets, etc. still their takers are not much due to various problems such as limited on screen help, no information regarding search strategies used, etc. A conceptual model is proposed which is aimed at overcoming these problems while maximizing the users expectations.

Keywords

Information searching; Information retrieval systems; Online public access catalogue; Federated search; Faceted search; Discovery tool; Search mechanisms

Introduction

The libraries and information centres have been amongst the first and foremost areas where new and emerging computer technologies have always been lapped immediately. The interest and deployment of internet technologies along with blend of some other tools have fetched desired results also. Whenever any new tool is launched, it catches the attention of information scientists across the world they start experimenting with them to make the overall experience of users with information sources and their retrieval systems better than before. The information professionals are trying to match their pace with software developers to create efficient searching methods so that licensed and costly information sources get their potential users and vice a versa. In recent past, the online library searching methods have continuously been working with standard tools such as Discovery tool, federated search and faceted search as their main search mechanisms.

A discovery tool is a stand-alone catalog with advanced features of next generation online library searching that is developed independently from any integrates library software.

Libraries can use a discovery tool to replace its traditional OPAC or use it side by side with the discovery service (Lee & Yang, 2012). Federated search is the simultaneous search of multiple online databases or web resources and is an emerging feature of automated, web based library and information retrieval systems. It provides a single search interfaces which allows users to search multiple online resources simultaneously – subscription databases, library catalogs and other electronic resources – with one query, which gives results in one list. Moreover, federated search provides a single search box offering a Google like experience. Commonly available features of federated search are Limiters, Simple and advanced search, Clustering, Visual search interface, Faceted Results and RSS feeds/Search alerts (Vastrad& Kumar, 2011). Faceted search is a session-based interactive method for query formulation (commonly over a multidimensional information space) through simple clicks that offers an overview of the result set (groups and count information), never leading to empty result sets (Manioudakis&Tzitzikas, 2019). Faceted search is an information-retrieval technique which assumes that the data items being searched can be multi-classified into facets. Such classification paradigm assigns one or more facets to each data item, based on its properties. The items are retrieved based on these facets, where users can define which facets they want to include in the search results (Tunkelang, 2009).

“The term Next-Generation OPAC is used to describe library catalogues that have been developed to meet user needs and move beyond earlier OPACs, which could be seen as primarily designed from the perspective of experienced librarians with a need to conduct known-item searches” (Emanuel, 2009); (Merčun&Zumer, 2008); (Sadeh, 2007); (Large &Beheshti, 1997). The present research calls for comprehensive study of advancements in the search methods of various online library catalogue searching systems that are being used in the libraries of IITs, IIMs and NITs. This includes the analysis of websites and portals of these institutes and study of all types of searching methods and their advance features that are deployed by different types of software used in these libraries such as commercial software, open source software and in-house developed software. It also entails further analysis of advance features provided in their search methods.

Objectives

The study has following objectives:

1. To do critical analysis of internet technology based features of search methods that are provided in online library portals of these libraries.
2. To assess the utility of various advance search methods and search mechanisms.
3. To find out issues and problems faced by these libraries and reasons thereof while dealing with online library searching and retrieval systems.
4. To suggest a model for future generation of online catalogue system along with its search methods based on the study.

Scope of Study

The study emphasizes on advance features of search methods such as Faceted Search, Federated Search and Discovery Search. It includes the related aspects viz. approaches, access points, search strategies and search mechanisms applied in various types of search methods that are used in all types of software of IITs, IIMs and NITs. It also includes the study of search methods provided in library databases where ever necessary such as Web of Science, EBSCO, etc. Those institutes were selected for the study for which their online library portals were functional at the time of collecting the data. Therefore, a simple random sample was taken and 49 such institute libraries are selected.

Review of Literature

A case study of six academic libraries which has given a brief overview of a discovery service used in Israeli academic libraries Data collected from three public universities and three colleges were used to examine information behavior and discovery tool use among various user groups and institutions. Author has used librarian interviews and Google analytics transaction logs to uncover user-discovery system engagements. The key reasons that Israeli libraries adopted the discovery platform were its high relevancy, the quality of its metadata, and its ease of use and the Google-like interface. (Greenberg, 2019) Another study was conducted in which author explained the federated search, its characteristics, and some of its search strategies. They also demonstrate the benefits and limitations of federated search. Also various federated search technologies were also discussed. They have made an attempt to distinguish between popular and federated search engines. (Zhu & Jin, 2020) In another study, researchers have used Client/server communication protocols to retrieve hierarchical faceted subject metadata from generic and/or specialized controlled vocabularies. Findings of the study shows that disorganized displays are one of the key obstacles to effective faceted navigation in library, archive, and museum catalogues. Authors have given suggestions for creating and implementing more powerful exploratory search interfaces for libraries, archives, and museums. (Cuna&Angeli, 2020) A poll was conducted among Taiwanese instructors in training and in-service regarding online search tactics. The poll included 408 Taiwanese preschool instructors in training and in-service. Pre-service and in-service teachers' usage of search tactics was also affected by Internet experience. The outcomes of this study imply that in-service and pre-service teachers should be taught more about online searching tactics and evaluation criteria.(Chen et al., 2019)

Data Analysis and Discussion

The primary data was collected from the respondents through questionnaire in the form of facts, opinions and suggestions while the secondary data was collected from the portals of these IITs, NITs and IIMs libraries.

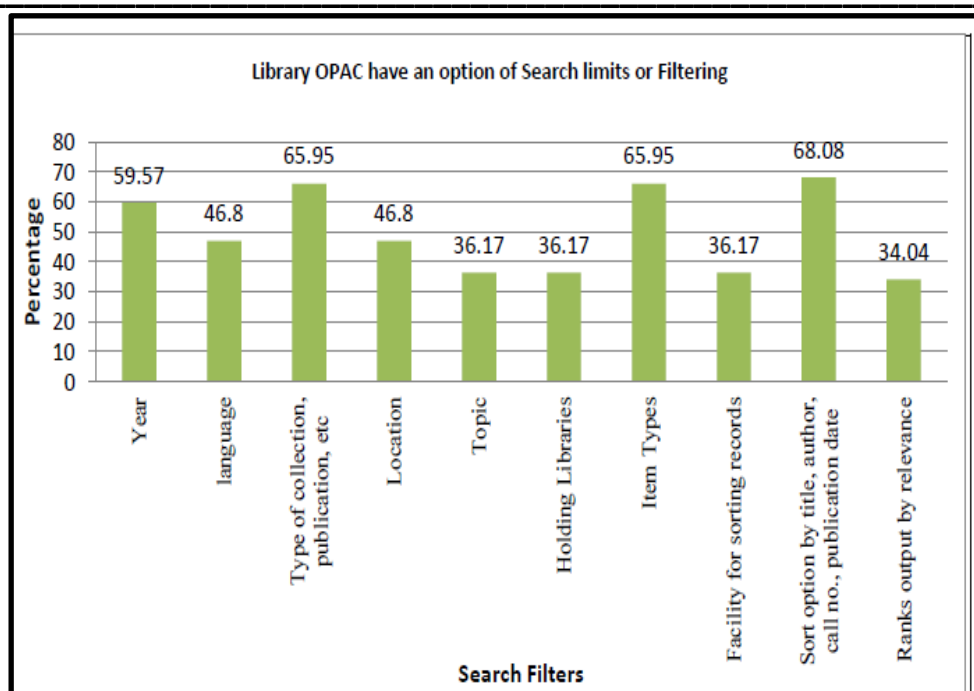


Figure 1 : Search Limits and Search Filters

From Figure 1, it is observed that Sort by Title, Author, Call No, Publication Date, Type of Collection, Publication, etc, Item Types and Year are the top four most provided filters in all the online library search methods and in that ranking order.

Further, it is observed that 52.08% libraries do not have the provision of —Virtual Book Shelf Browsing‖ in their online catalogue search. While 47.91% libraries have the provision of —Virtual Book Shelf Browsing‖ in their online catalogue.

Sorting Methods	Rank
Subjectwise	1
Yearwise	2
Author	3
Call Number	4
Title	5
Publication Year	6
Keyword	7
Relevance	8
Popularity	9

Figure 2 :Sorting methods used in Online Library searching

From Figure 2, it is observed that there are several sorting methods. Subject wise method is highest preferred sorting method while year wise is second highest preferred method. Popularity Method is least preferred method used in the libraries.

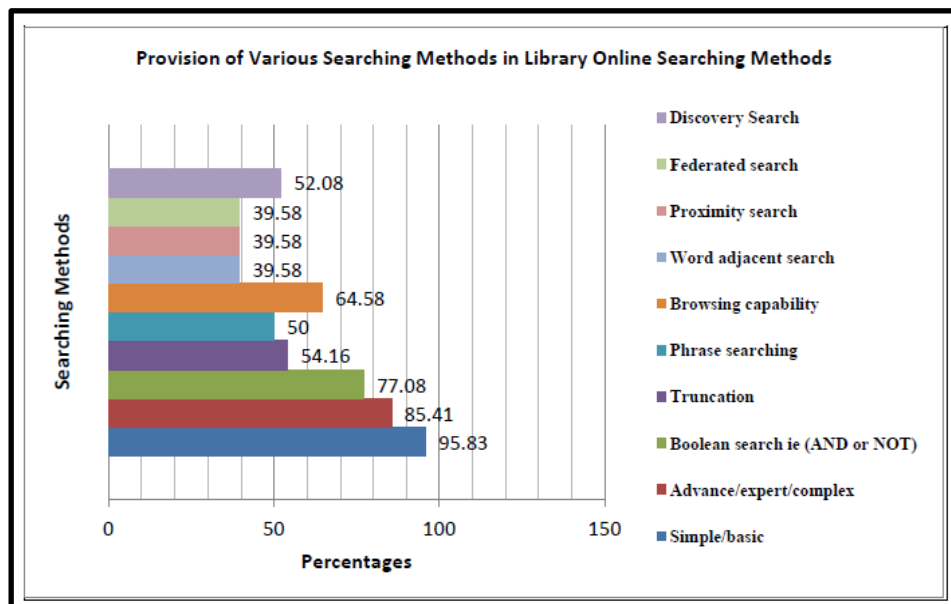


Figure 3 : Search mechanisms used in online library searching systems

From Figure 3, it is observed that 95.83% libraries are usually applying Simple/basic Searching Mechanisms in their library catalogue, while 85.41% are usually applying Advance/Expert Complex Search. It is further observed that word adjacent search, proximity search and federated search are least applied search mechanisms.

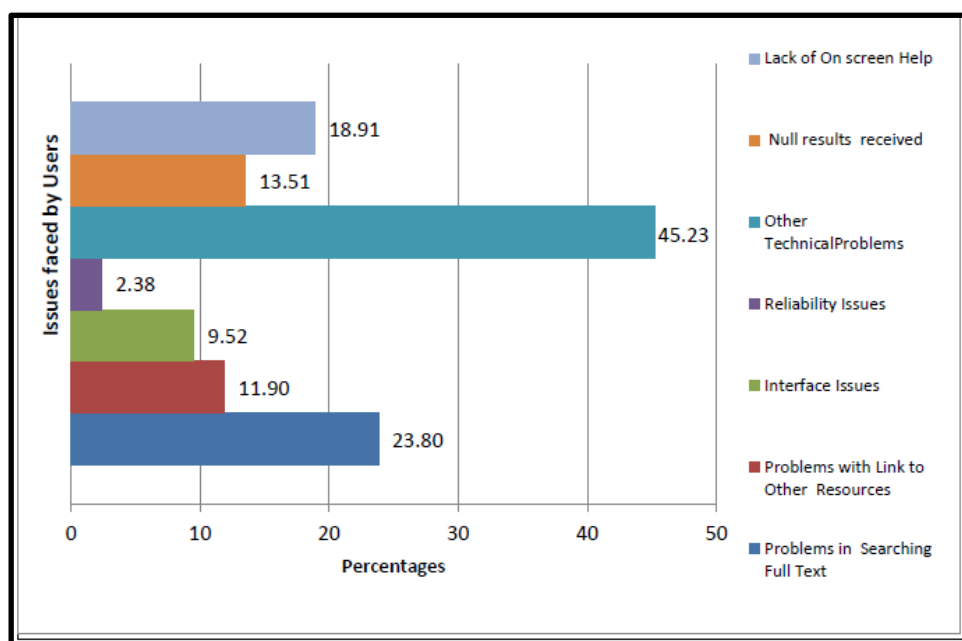


Figure 4 : Issues faced by users in online library searching methods

From Figure 4, it is observed that maximum problems are faced (45.23%) related with technical issues. In searching full text, 23.8% libraries are facing problems whereas only 2.38% libraries do not rely on the search results completely.

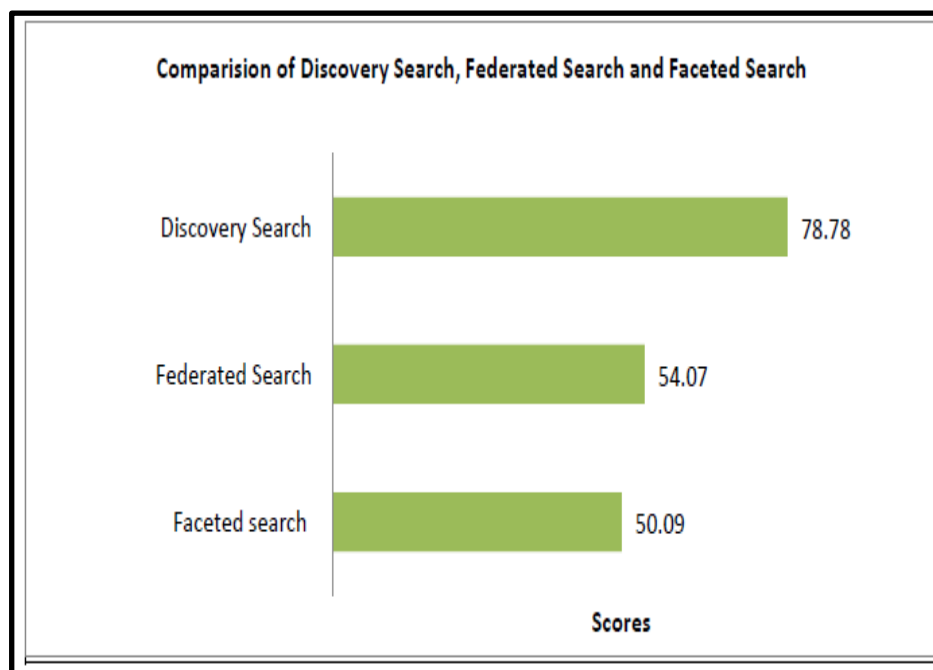


Figure 5 : Satisfaction levels of search methods

From Figure 5, it is evident that Discovery Search gives the best results according to the experiences of respondent libraries. Federated Search and Faceted Search gives almost similar satisfaction to the users with regard to desired search results which is quite less (50% to 55%) as compared to Discovery Search.

Major Findings

After detailed study of websites and portals of IITs, IIMs, and NITs libraries, following advances in online library searching methods have been found:

- (1) Use of Discovery search/tools
- (2) Multilingual features
- (3) Voice Assistance
- (4) Web OPAC on www
- (5) Mobile apps for catalogue searching
- (6) Interconnectivity with social media(Facebook, twitter, YouTube, blogs)
- (7) Searching Google Maps, Google Images, News. Etc.

(8) Presence of Widgets : i) Keyword search widget ii) Link with embedded search terms(results for 1 or more Subject, Author, Title Keyword) iii) World cat search widget

(9) Presence of user reviews

(10) Use of hyperlinks :i) Hyperlinks for bibliography ii) Build a Citation style iii) Apps and browser plug-in

(11) Editors/Translators wise search

(12) Research areas wise search

(13) Search by Abstract

(14) Sort by options : i) Relevance ii) Popularity iii) Recently added items added first vice versa iv) Shuffle items v) URL (A to Z , Z to A)

(15) Search with domain/website

(16) Browse by full text online

(17) Search articles by peer reviewed

(18) Content type

(19) Results display options

i. Virtual browsing with book jackets: link to table of content with abstract

ii. display in full text

iii. show links to cite items

iv. link to save items

v. Print to pdf, excel, html, doc, jpeg, etc.

vi. view related records (see also/cross references)

vii. Directly create alert list with citation style (APA/MLA etc.)

viii. Directly create alert list with bibliography

ix. Directly give citation report to user email id or mobile in excel and pdf formats

x. Save to existing list

xi. Save to things/recommended list

(20) Search results exported to Mendeley, Zotero, etc.

(21) Presence of Virtual Browsing with Book Jackets

(22) Various types of search limits or Filters are provided by online library searching mechanisms such as 'Sort by Title', 'Author', 'Year', 'Language', 'Location', 'Relevance' etc. It is found that the 'Sort' option by Title, Author etc. are the filters which are provided by most of the online library searching mechanisms. 'Item type' and 'year' are also not far behind.

(23) Amongst various sorting methods that are featured in an online library catalogue, 'Subject wise' sorting method is the most preferred method.

(24) 'Word adjacent Search' and 'Proximity Search' mechanisms have few takers while searching online catalogue. 'Phrase Searching' mechanism is also not used popularly by the users on online catalogue.

(25) Very limited On-Screen help is provided by the online catalogues. Many online library searching methods do not give details of search strategies.

Suggestions

To overcome all the problems reported so far in the use of all above discussed online library search methods and other information retrieval systems of databases used in libraries, a conceptual model of future online library search and retrieval system is proposed which will incorporate latest internet technologies in the online catalogue searching methods and will avoid unnecessary use of sophisticated, complex and expensive technologies like Internet of Things(IoT) and Artificial Intelligence (AI). Efforts have been made to keep library searching systems and their Graphic User Interface (GUI) simple, less crowded and less confusing. The search methods used in this model are Faceted search and Discovery search.

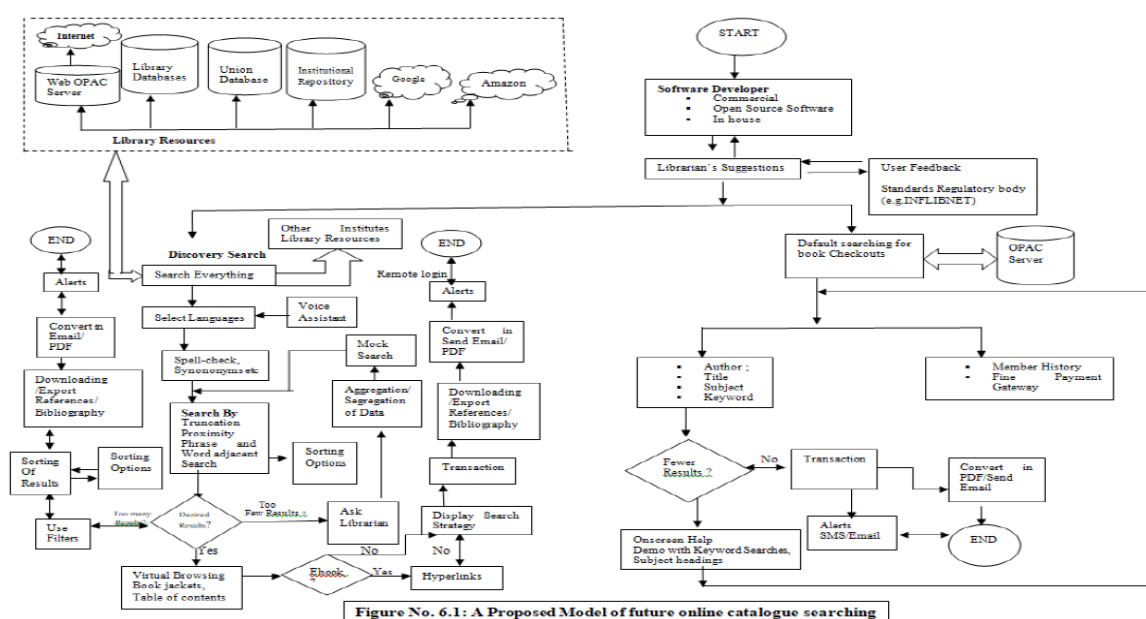


Figure No. 6.1: A Proposed Model of future online catalogue searching

This model has been fragmented into two components of OPAC interfaces viz. the first one provides a very simple, less crowded and easy to use version which users can directly use to only checkout books. The other interface provides advance features of online catalogue searching which users can opt for full text searching and to find all types of information (full text, abstract, catalogue, metadata) sources available related to his query.

The information centers should make sure that the copyrights /digital rights are not violated regarding their licensed e-Resources. The information scientist/information professionals should don the role of Information Aggregators and Information Segregators. While using the other online search engines like Amazon and Google etc. where search results are huge in number, the users should be able to take the guidance of expert library staff in accessing the relevant data out of the huge pile that he got from internet based search engines. The developers of library technologies should in collaboration with library experts develop uniform standard tools and methods for design and access of web based, gated databases, etc. so that different trainings and set of skills may not be necessary for the users for accessing different library online databases. The information retrieval systems of academic libraries should look and feel same and uniform to the users across institutions.

Conclusions

he outcome of this research will hopefully help the software developers in designing and reengineering of library online catalogue searching system, information retrieval systems and GUIs. It will also help the users in acquainting themselves with the advance features of these search methods. User studies or study of user satisfaction with federated search and Discovery search should be conducted to closely examine the efficacy of these searching algorithms. The informational professionals should carry out researches to find out how present smart technologies can improve the search and retrieval experience of these systems. Study of how to increase overall library effectiveness and efficiency with the use of Artificial Technology will definitely turn out to be a milestone in the growth of online library information retrieval systems.

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