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INTERACTIVE INFORMATION RETRIEVAL: AN OVERVIEW

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Abstract

Introduction: Information Retrieval (IR) is deal as the interface between the information handler and the framework and the query thus formulated is matched against a keyword indexed in the system whereas in Interactive Information Retrieval (IIR) Human Computer Interaction (HCI) is involved. Although, Interactive Information Retrieval (IIR) is a multidisciplinary field its broad subject is Computer science. Algorithmic kind of IR is still prevalent in Interactive Information Retrieval (IIR), information seeking and information behaviour.

Method: This paper will review the literature available on the Interactive Information Retrieval and will present its overview. Various models of IIR will be reviewed. The IIRin regards to library and information science will be reviewed.

Results: Interactive Information Retrieval is a broad subject area and involved various disciplines of knowledge. Interactive Information Retrievals (IIR's) scope is wide and is not limited to any particular domain of knowledge.

Conclusion: Interactive Information Retrieval (IIR) is an evolving discipline and continuous research needs to be done in understanding human behaviours and for developing IR system which will resemble human cognition. Coordination between different disciplinary groups is essential for developing a rich algorithm which will understand human information need in natural languages.

Keywords: Interactive Information Retrieval, Cognition, IR Models, Algorithm.

Introduction

From the ancient times to the modern times human endeavour has been to find accurate and relevant information to enrich one's knowledge. In modern era with the onset of Computers by the late 1950s Information Retrieval (IR) term was started to be used in the process of retrieval of document from document collections and this was done by indexing the documents and to retrieve document query formulation should be done in natural language.

In 1950 C.N.Mooers has coined the term Information Retrieval (IR). Information Retrieval (IR) is a trait of human behaviour. What distinguishes Information Retrieval (IR) from Interactive Information Retrieval (IIR) is a human and socio-technical approach.

Information Retrieval (IR) deals with interaction between the systems and it adopts system approach signified with Cranfield model this approach is also known as TREC (Text Retrieval Conference) style evaluation whereas Interactive Information Retrieval (IIR) or Human Computer Information Retrieval (HCIR) deals with interaction between systems along with human approach. Interactive Information Retrieval (IIR) is a relatively new field of study and is evolving.(Borlund, 2013)

There are different search systems and hence the decision regarding choosing the type of search system is equally important. The decisions are complicated as because the relevancy of one kind of system can't be equally applicable to the others. Search expertness of any one particular topic can't help exactly the retrieval of any other topic relevantly. As in the case of personal desktop computer it comes equipped with different types of search tools (file search,

email search, internet searching through browser, search tools in PDF and Word documents and help feature). The different forms of the data available and its implicit and explicit nature also put a burden on system designer and the searcher. Previous research shows that users usually operate IR system with premeditated approach to information seeking along with processing strategy of using any particular systems. For this situation neither the search result achievement nor the searcher fulfilment with the framework it relies exclusively upon the intelligent interactive characteristics of the search framework or the suggestion given by the search system to incorporate such features the searches depends on both factors working in conjunction with each other i.e. searcher and system.(Ruthven, 2008).

The subject of Interactive Information Retrieval (IIR) epitomizes research that is connected with contemplating and helping these different end users of information access and retrieval system. IIR includes investigation of (a) research on information seeking and search operation (b) research on the advancement of new strategies for interfacing with electronic resources. Analysis on both of the previously mentioned factors is significant as in light of the fact that the exploration on information finding for gives the impulse on choices associated with discovering information that contextualize a significant part of the work in IIR.

Historical Evaluation of Interactive Information Retrieval (IIR)

For following the historical background of Interactive Information Retrieval (IIR) we have to initially investigate the historical background of Information retrieval. The historical background of IR assessment can be followed back into 1953 and establish the starting point of IR research as an observational order with the arrangement of test that prompted the Cranfield model. C.N.Mooers has coined the term Information Retrieval (IR). Early advancement in IR date backs to explore endeavours directed in 1950's by pioneer, for example, Eugene Garfield, Philip Bagley, Hans Peter Luhn and Calvin Mooers. In 1955 Allen Kent and co-workers in their paper coined terms precision and review measurements which was later followed in distribution in 1962 by Cyril Cleverdon in Cranfield theory. First book in information retrieval was published by Robert Hayes with Joseph Becker. In the 1960's Gerald Salton and Karen Sparck Jones built up the field by propounding the basic ideas that prompted the advanced innovations of positioning in IR. Salton had published first book on information retrieval. One more book was published by Salton and McGill which is based on vector models in 1983. After this domain of information retrieval had developed by

different experts across various fields. Though the development of the field started after the 1990s serious attention was given to the interactive properties of information retrieval and especially the interface in information retrieval system design came in 1971 from John Bennett who was a researcher at IBM he recommended altering the design of search interface to the information retrieval community in a workshop called The User Interface of Bibliographic Databases.(Cool and Belkin, 2011)

IIR is of interest of academician as well as practical implementers of IIR as well. Some Scholarly journals whose theme is IR are as: Journal of the American Society for Information Science & Technology, Information Processing & Management, Journal of Documentation, and ACM Transaction on Information System are some journals which publishes research oriented journals on Interactive Information Retrieval (IIR) along with this other journals like Human Computer Interaction (HCI), ACM Transaction on Computer-Human Interaction, Interacting with Computers and to a lesser extent Human-Computer Interaction. (Ruthven, 2008)

IIR Models

The System or algorithmic viewpoint is the one most familiar to IR researcher and this viewpoint is embodied by the Cranfield and TREC evaluation models. The view point expressed in this is system centred and it describes simplifying assumption about user and their need and behaviours.(Kelly, 2009). An ideal IR evaluation model should satisfy the following mentioned three conditions – The evaluation of information seeking episode as a whole with respect to the accomplishment of the user's task/goal. Second it should test each evaluation with respect to its interaction and its significance in accomplishing the overall goal/task. Third it should assess each interaction and each information seeking strategy with respect to its particular goal. In this framework an ideal system will support the task accomplishment by presenting resources and user support in an optimally ordered minimum number of interaction step.(Belkin, Cole and Liu, 2009)The idea of information retrieval ought to be collaboration yet a large portion of the models depend on coordinating the question inputted into the framework into output. It doesn't show the alterable interactive method. Adjustment in question gives diverse yield each time and there isn't a consistency in the yield the yield may contrast on various web crawler in regards to web search. The human mediation has made the entire procedure more convoluted and dynamic. Some interactive IIR models are (1) Ingwersen cognitive model of 1992, 1996 (2) Belkin episodic model of

interaction involving test, 1996 and (3) Saracevic stratified model of 1996a, 1997 are given below:

Ingwersen Cognitive model and application

The Basic of the Integrated Information Seeking and Retrieval (IS and R) Framework

The Information Seeking and Retrieval research system has been created by longer than 10 years in 1992, 1996, and 1999 by Ingwersen and again in 2005 by Ingwersen with Järvelin. Ingwersen upgraded and built up an intellectual model dependent on IS and R of IR collaboration which thus has helped in setting up the hypothesis of IS and R. Five modules that comprise the intellectual model of connection are (a personal user cognizance space, a users societal and organizational environment, the interface/mediator, information object, and the IR system setup) in this the intellectual change and impact starting with one segment then onto the next, and the intuitive correspondence of intellectual structure by means of an interface or middle person are the key aspects.

Integrated Information Seeking and Retrieval Research Framework

As an essential segment of the model intellectual actor(s) or groups can be symbolised by the accompanying human communities in the information creation, association, scattering and use process:

- Information creator object;
- Indexer investigating and creating portrayal of information to encourage information retrieval
- Designer of interface and software to facilitate user's interaction with systems;
- Designer of retrieval engines, structures, and algorithms to facilitate user's effective retrieval of relevant information;
- Gatekeepers determining the availability of information object into a collection or carrier;
- Information-seeker or searcher looking for information to solve their problems;
- Communities representing different groups from different organisational and social context.

Belkin Episode model of interaction with text and application

The Basis and Evolution of the Episode model of Interaction with Text

The model of association has taken 10 years to develop. Belkin and his partner start with the general model of Information retrieval system that incorporates both the user along with the

IR system. Three significant parts are established in the IR system: the user, the knowledge resource that user interacts with, and the intermediaries (person or devices) that mediate user's interaction with texts. The IR system consist of five processes: (1) representation of user's information problem and text in the system (2) comparison of the information problem and texts (3) interaction between user and intermediaries (4) judgement of relevance of retrieved text to the information problem and (5) modification of representation of the information problem. Belkin suggested that IR should be form of interaction with texts.

The Evolution and Theoretical basis of the Stratified Interaction Model

Saracevic projected the delineated connection in 1996 and further improved model in 1997. In the paper of 1996 he has given an outline of a portion of the past work he and others have done on nature of collaboration in IR, IR cooperation from a correspondence point of view and a portion of the doctoral dissertation. In the year 1997 he published a paper on in which he synthesised five of his own articles and the articles he has written in collaboration with others.

These papers remembered his unique work for audit of his interaction model and a proposition for his stratified interaction model, importance, clients and their connection with go-betweens, search term viability during intervened looking and the type of response.

The Stratified Interaction Model

This model involves two theories: (a) Users need to communicate with IR system to locate information; and (b) the information recovery process is connected with cognitive and situational application. The defined association model considers the communication among clients and framework through an interface at a surface level. Communication is the interchange between or among various types of clients and systems.

Users are included in the following levels of discussion:

- On the cognizance level users need to make significance decisions about the recovered content and their condition of information may change in light of their collaboration with text and their portrayals. The cooperation is between the psychological structure of clients and text.

- On the full of feeling level goal and related emotional components are what clients connect with for the most part client's aim conviction and inspiration.
- On the situational level the circumstance and issue that lead the client to search for data are what client collaborates with. Task along with issues are the foci of the examination.

Three stages of framework contributions are proposed:

- On the building part the equipment and its operational and configuration characteristic are the focal point of the examination.
- On the handling level the product particularly the calculation lies in the middle of the fundamental procedures that are related with the transaction among client and framework levels.
- On the substance level data assets the content and their portrayal are the centralization of the examination. The examination centres around the precision believability legitimacy dependability and nature of the content

Limitation of the Three Models

Of the Three models referenced over each model is having a limitation as there is certifiably not a solitary report which has tried or approved these models. A related issue is the means by which these IR intuitive models can sift through the key explicit issues in intelligent IR. Though this model focuses on factors which impacts interactive information finding and retrieval process they can't relate these variables with information finding for methodologies or conduct. As indicated by Foster and Ford the significant downside of these models are that the current models of information finding and conduct including Ingwersen's and Saracevic's model have unsuccessful to sum up away from of good in information searching. Spink, Griesdorf, Bateman gives comments that these models are not tried and they've not given fruitful query items. The office of programmed help by IR framework can help in connection between the client and framework Jansen commented that programmed looking through help as an idea isn't obviously communicated in intelligent IR model and other data looking

through models. Another restriction related with this model is client attributes. The overall sort of Interactive IR models should be improved to incorporate various kinds of client gatherings, various kinds of assignment measurement, diverse information finding as well as retrieval processes, distinctive intuitive exercises, distinctive IR framework or situations, etc. In spite of the fact that these models depend on hypothetical ramifications for research on IS and R their effect on handy ramifications particularly the plan of intuitive IR framework isn't noteworthy as their hypothetical ramifications. These models neglect to manage toward planning intelligent IR frameworks to speak to and bolster cooperation referenced in these models.

Micro level Interactive IR Models

Notwithstanding the previously mentioned three significant Interactive IR models scientists have likewise built up another distinctive intuitive IR models or ways to deal with show or feature one part of information finding and retrieval interface. While Ellis model of information seeking behaviour (as cited in Ellis, 1989 and Ellis and Haugan, 1997) and (as cited in Bates, 1989) berry picking approach highlights the dynamic interactive IR processes (as cited in Vakkari, 2001) focuses on the theory of the task based IR process and (as cited in Spink, 1997) extended the interactive model by incorporating five types of interactive feedback. Xie (2008) further differentiated and associated the micro level of IR interaction (as cited in Hert, 1997) with the macro level of the information seeking process.

Interactive IR in OPAC environment

Online catalogues are different kinds of interactive information system they can likewise be called intelligent interactive catalogues which are interacting with the users for finding significant information. In the start of 1980s libraries all over the world began the shift from printed and card catalogue of their assortments to purported online public access catalogue (OPACs). This was an endeavour for making more effective and to utilize the current modernized regulatory databases in supplanting the costly printed card catalogue. This was accomplished basically by giving an essential search interface to some of the current electronic records which would be approached by terminals in the library.

The innovation of OPACs had a significant impact. As the information finding for communication could be logged by the OPACs it made feasible just because to attempt un-interruptive, wide scale contemplates dependent on catalogue use. This primary appeared as

not all that conspicuous capacity later turned into the reason for an enormous number of investigations of OPAC use and searcher activities. These previous investigations of OPAC were critical because of other significant reasons. They demonstrate the primary instance of huge examinations dependent on individual's cooperation with huge scope bibliographic frameworks interactive information retrieval framework. The logs of these associations gave significant perspective into examples of collaboration with these frameworks some of which were amazing at any rate to information professionals. After effects of early examinations demonstrated that all things considered individuals led subject finding through more than referred to them looking as contradict to the overall view in librarianship that index scans were intended for known resources. Detail investigation of logs uncovered the motivation somewhat for the accomplishment of certain searches and disappointments of others. These and related outcome had novel and significant ramifications for the kinds of intelligent looking through that would most viably bolster searchers in OPAC. This online information retrieval system established the start of genuine exploration in retrieval of interactive information.

Conclusion

There exist two sorts of approaches in IR which are system design and research which are system and user oriented. The approach based on system orientation plays a major role until now but there is a need now to take a look at human oriented approach as well. The several models described above are theoretical as well as practical model they have limitation in terms of its application. Interactive Information Retrieval (IIR) can be characterized as a communication system between the clients and the IR system however the elements of intuitive IR is yet to be completely investigated. This paper has attempted to review large scale (macro) and smaller (micro) scale level models of interactive information retrieval. There is a need for coordination between different subject experts for building a well-balanced interactive IR model which can process the queries in natural language and will give output which will have human cognition.

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