Chapter 79
Document Retrieval Using Efficient Indexing Techniques: A Review

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ABSTRACT

Document retrieval plays a crucial role in retrieving relevant documents. Relevancy depends upon the occurrences of query keywords in a document. Several documents include a similar key terms and hence they need to be indexed. Most of the indexing techniques are either based on inverted index or full-text index. Inverted index create lists and support word-based pattern queries. While full-text index handle queries comprise of any sequence of characters rather than just words. Problems arise when text cannot be separated as words in some western languages. Also, there are difficulties in space used by compressed versions of full-text indexes. Recently, one of the unique data structure called wavelet tree has been popular in the text compression and indexing. It indexes words or characters of the text documents and help in retrieving top ranked documents more efficiently. This paper presents a review on most recent efficient indexing techniques used in document retrieval.

1. INTRODUCTION

With the day-to-day advancement in every domain, the volume of textual information is expanding rapidly. Internet has become an important source of information. User perform web search to obtain solution for their queries. Web searching is becoming more complex day-by-day because of availability of billions of web pages. This is the reason that why finding relevant information for a user query is still

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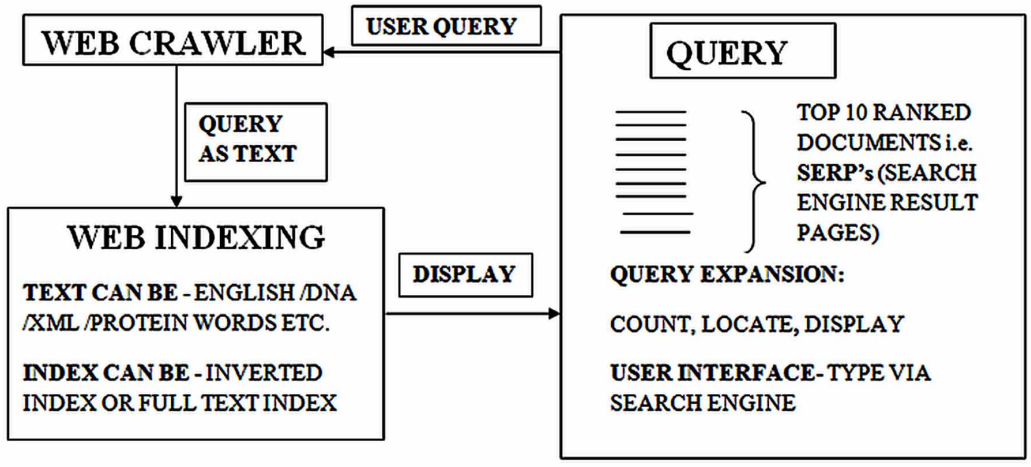
a big problem (Croft et al., 2010). Since search engine first extract relevant web pages and then return the Search Engine Result Pages (SERP's), therefore it plays an important role between User and World Wide Web (WWW). Initially, Crawler browses and stores the relevant web pages for the corresponding query. It further performs specific tasks such as indexing on the web. Also, a collection of seed URL's is the basis for the searching (Olston & Najork, 2010). Therefore, pages are fetched and accessed from the seed URL's and become SERP's. Here crawling, indexing, query and ranking are the web entities as shown in Figure 1. These web entities act as key components for text retrieval. It is difficult to analyze whether user is satisfied by the top result or not? Due to excess amount of data availability, it is really tough for a search engine to retrieve relevant information via web entities that satisfy user and also loyal to a relevant top result (Gurumurthy et al., 2010).

Initially a query pattern is given by user for which results are retrieved and ranked (Jansen et al., 2010). Query text can be in the terms of English words or some biological sequences like DNA sequence or a protein code words etc. It is assumed that retrieved web pages contain content of similar keywords of user query. Here, the relevancy is achieved on the basis of most occurrences of query terms (Jansen et al., 2011). Crawling plays a decisive role in the web indexing as it view websites and download web pages. Then, these web pages are indexed further based on their relevancy. After indexing, resultant web pages are displayed to the user via SERP's on web browser. For word-based query, inverted index has been most popular indexing technique while for alphabet-based queries; full text indexing (or self indexing) is efficient for web pages. Inverted index creates lists and support word-based pattern queries effectively. In order to reduce space requirement of lists, word-based compression techniques have been applied further on natural language texts. Text results may include web pages, articles of journals or newspapers clippings, advertisements, images, videos, Wikipedia's, ancient historical data, and biological data (Berry & Browne, 2005). Further, search engine perform ranking for their SERP's.

Therefore, if user finds a result relevant, user click on the corresponding link and retrieve the required information (Shin et al., 2012). Here, search engine acts as an intermediate system that satisfies user requirement using information system. It requires at least two or three words to understand the subject of query which is used to find accurate and valid information quickly. Although information can be available through an audio/video file/animated images but the major part of searching is still through

Figure 1. Text retrieval via search engine



A Roadmap to Integrate Document Clustering in Information Retrieval
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