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Classification on News Web Pages by Link based Pattern Formation

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ABSTRACT: Now-a-days proper guidance in landing up to particular documents on the Internet is well supported by search engines, by giving appropriate keywords in form of queries, or either by catalogues generation, which organize documents into hierarchical file structure. But maintenance of such catalogues manually is more difficult, due to the huge data residing on the Web; hence it becomes necessary build some techniques for auto-categorization of documents. Auto-categorizations scale the retrieval of more relevant information by crawling through file structure along with its indexed documents in order to identify the category in which the news falls, which advent the reader to directly access / locate the titles.

The paper describes a model to perform categorization on news contents, which starts with catalog generation through identification & analysis of pattern obtained from file structure traversal, extracts useful information for classifying a document into category by referring to URL. On account of crawling experience, results a classifier that supports the technique of web page categorization.

KEYWORDS: Automatic Web Page Classification, News Content Categorization, Web Crawler, Web Scraper.

I. INTRODUCTION

The world of web is extremely huge in terms of web pages with large amount of informative contents available in different formats like text, graphical, audio-video, etc. which leads to inconsistency in retrieval of data due to its irrelevance for which the user looking for. As the result, the probability to find the exact information is very nominal. So, when we talk about news which means a lot for any reader to obtain information which may delivered from newspapers, magazines, television news channel or widely accessed internet provides news from portals, blogs and other social media's.

On other side the bigger challenge faced by a reader is that, they don't get the enough stuff on news related to own domain, from favourite zone or of local area. So the need arises to fetch information using search engine which leads to more inconvenience in exact findings from the different sources over web and the contents available on web pages speaks a lot on massive topics in general which may results useless in many cases where the reader's choice might be expecting the news which one want to read. Hence there is a solution in the term of classification of web pages which holds news into general categories like Business, Sports, Politics, etc., or it can be represented into customized ways which focuses on user's choice and domain.

II. RELATED WORK

In the domain of Web Page Classification the current scenario states two different methodology used for recommendation system. i.e. (1) Information filtering (2) Collaboration filtering where information filtering approach recommends the news contents on the basis of user's profile, these profile is formed by analyzing the user's traversal over the content & favored by the user to read the content of his/her choice. On the other hand, the collaborative filtering approach works on the opinion of the user's recommendation to read the news contents.

Tan and Teo [6] proposed a personalized news system, called PIN. PIN fetches and prioritizes ranks to news articles according to the user's profile, which is pre-defined by the user as a list of keywords and then on evaluation from user

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feedback using neural network technology the system can be trained accordingly to extract the relevant contents. When interacting with PIN, users provide explicit feedback by rating the articles. A similar system, News Dude [7], provides news to users, on the support of a series of feedback options such as “interesting”, “not interesting”, “I already know this”, etc. Another personal news agent, PVA [8], records and analyzes user’s referred page clicks and the access time, in order to build a “customized profile” that states the user interests. PVA is used to provide personalized news access.

In many other cases, some researches have implemented the combination of both methods and have recorded impressive results. Encouraging advantages are obtained by providing notifications that cover all domains and user’s interests that improve the recommendations as the healthy growth in number of users and ratings is been observed.

III. PROPOSED ALGORITHM

The main objective of this research is to categorize the news highly focused on web pages of blogs; news channel portals, etc into relevant category. This helps the reader to get the news catalogs directly accessed for the updates from various headlines, which makes WPC more efficient from search engine. But the complexity in obtaining exact match for the news on the basis of URL’s, Meta tags, Html structure traversal is observed very expensive and so there is a need to traverse the entire file path and its structure where the page resides. The URL file structure extracted by web crawler from any source is further considered as data set (path) to retrieve the news contents which are needed to be evaluated on its exactness before getting indexed into catalog. So to resolve the problem, the proposed model is designed with its architectural structure.

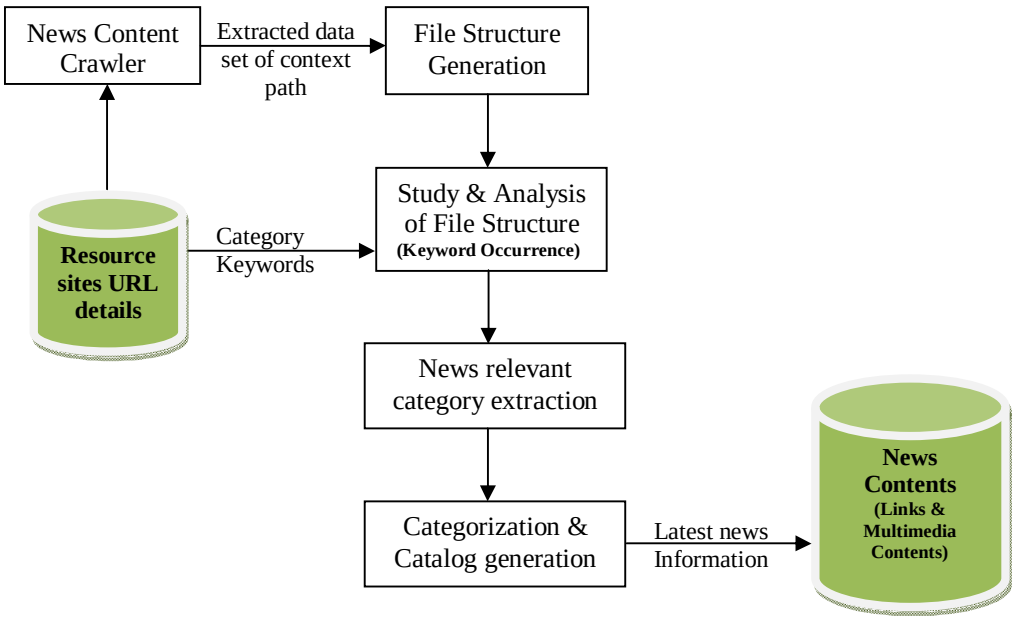

Fig.: 1. Architectural model for Web Page Categorization

The model execution starts with the crawling of links recorded in the data set available. So here the URL links will be traversed one at a time to obtain the file structure (root to leaf level) of each resource portal. Once the file structure is extracted, each links from the structure is under analysis to understand the URL elements bifurcation in order to trace the keywords of latest news updates. The process of categorization starts with comparison of URL with the representing category words for the findings of estimated category set in which the URL may fall, and from that pool of category the objective of categorization is fulfilled by identifying the exact category of current URL by calculating the relevance weight by evaluating the frequency of the category key words supported by the URL.

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IV. SIMULATION RESULTS

To conduct the research, I have build a Web Crawler with the aim to obtain the file structure of the web pages placed in the portal of Aaj Tak News & The Times of India which provides essential elements by scraping news headline, contents and its URL (Links) which provides the exact path to classify contents into relevant category. Here are some of the below specified results obtained by executing the web crawler.

Recorded URL

http://aajtak.intoday.in/story/iphone-6-the-most-popular-gadget-of-2014-1-793823.html
http://aajtak.intoday.in/story/you-can-watch-tv-on-this-mobile-phone-1-793802.html
http://aajtak.intoday.in/story/lenovo-to-launch-low-price-4g-phone-1-793556.html
http://aajtak.intoday.in/education/category/private-govt-psu-jobs.html
http://aajtak.intoday.in/sports/story/india-vs-australia-fourth-test-match-day-one-live-update-1-794235.html

Some Categories

http://aajtak.intoday.in/world-news.html
http://aajtak.intoday.in/national.html
http://aajtak.intoday.in/states-news.html
http://aajtak.intoday.in/metro-cities.html
http://aajtak.intoday.in/sports/
http://aajtak.intoday.in/business.html

Sample Data Set # 1 – States the file structure of AAJ Tak News portal (http://www. aajtak.intoday.in)

Recorded URL

http://timesofindia.indiatimes.com/entertainment/music/articlelistls/27976150.cms
/home/science/articlelist/-2128672765.cms
/home/education/news/articlelist/913168846.cms
/home/environment/articlelist/2647163.cms
/top-stories/No-comeback-for-Yuvraj-Singh-in-World-Cup-squad/articleshow/45776844.cms
/city/delhi/Sunanda-Pushkar-was-murdered-Delhi-Police/articleshow/45775554.cms

Some Categories

/entertainment/music/
/sports/badminton
/sports/boxing/
/city/navi-Mumbai/
/city/noida

} Categories to trace local news

Sample Data Set # 2 – States the file structure of TOI (http://timesofindia.indiatimes.com)

From the observation of above crawling extraction, it is found that URL links obtained from two different sources itself speaks a lot about the content for which they are representing and for better understanding let's consider some sample URL from the sample data set # 1.

http://aajtak.intoday.in/education/category/private-govt-psu-jobs.html
http://aajtak.intoday.in/sports/story/india-vs-australia-fourth-test-match-day-one-live-update-1-794235.html

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Now when we go through each URL at a time, first elements states name of source portal site then the category in which the news falls which is followed by the sub category and later on concatenation of news title or headline e.g. "india-vs-australia-fourth-test-match-day-one-live-update" provides us with the abstract about the news of live updates regarding the 4th cricket match between India & Australia. Thus the usage of such essential keywords found in the URL must be considered during the process of categorization and to fetch the similar types of contents from other resources.

This is all about the news extraction & categorization in general or specific domain, but it is also observed that reader are more fond of reading news from their own local area or nation, like e.g. the above news on cricket match which is but obvious highly referred by the inhabitants of India & Australia in comparison of people from other nation. Let's take one more sample result from source # 2 in order to identify the category of local news.

```
/city/navi-Mumbai/articlelist/22126655.cms
/city/rajkot/articlelist/3942663.cms
/city/goa/articlelist/3012535.cms
```

This file structure is extracted from the Times of India web portal which clearly defines some Indian cities like "navi mumbai" or "rajkot" as categorical boundaries where the local news resides where people are more prone to read news from their own local area or national regional, then of their favorite domains and later of worldwide news. So it becomes essential to provide reader with the local news makes him / her to less effort in news findings. Hence from all above result set it was found that on evaluation of each element of file structure supports and provides sufficient information about elements for categorization at each level.

V. CONCLUSION AND FUTURE WORK

The technique described here is to perform automatic categorization of documents, which consider huge information extracted from an analysis of the pattern generated from file structure of different resource like news portals, blogs, etc. The results of crawling experiments is found highly encouraging enhancement. By considering information from several sources, the algorithm achieves an efficient categorization of Web pages with good productivity. The developed tool with revised algorithm in future may involve in development of multi-linguistic knowledge and techniques for advanced categorization.

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