

Using Priority based Annotation Technique to Search Educational Video Resources

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Abstract—Multimedia educational resources play a vital role for distance e-learning experiences. It is necessary to explore, share, reuse and link these educational resources. With the help of linked data technology, video annotation and browser platform with two online tools namely Annomation and Sugar tube are used. These mentioned tools will generate further videos and educational resources from the Linked Open Data cloud and the web. The Annomation technique is limited to search of related videos which are listed based on a general or random keyword weightage. In order to enhance the methodology, the application is extended to provide a more accurate search results by listing the links based purely on the keyword value which is maintained in the database by an expert using the Prioritized Context Aware Technique. Thereby, when a search is made based on the keyword, the highest prioritized link as per the expert's knowledge will be provided. This approach improves the functionality of the e-learning since the search is more optimized and specific.

Key words: Annomation, Prioritized Context-Aware Technique.

I. INTRODUCTION

E-learning which uses electronic media and information and communication technologies (ICT) in education is broadly inclusive of all forms of educational technology in learning and teaching. E-learning includes numerous types of media that deliver text, audio, images, animation, and streaming video. E-learning is suited to distance learning and a flexible learning approach. As a result of this advancement in the technologies at the current scenario there are a numerous count of users using the various online resources. Accordingly many websites have introduced an enormous number of online learning methodologies that would be off help for the end user. Many features have been added to the various sources of e-learning system to attract the users who are in need of these online resources. But all the sources available online in the form of text, audio, images, animation, and streaming video will be displayed to the student based on their search and also based on certain criteria that has been set by the website administrator.

Every website or the source of online resource will have follow the same algorithm or work flow. They will individually follow certain filter criteria, where in the various data content, audio, images, animations, videos or the links will be searched and displayed according to the algorithm they follow. The search results can be displayed accordingly. An e-learning system has to be effective. Effectiveness according to this context means providing a more accurate and closely related search result. The e-

learning activities are essential for distance learning in higher education. The number of students using online courses is increasing every year. With the rapid growth of the multimedia web, a large number of free educational resources are available on the web. Therefore it is crucial to gain the capability to efficiently search for all related distributed educational resources together to allow them to be used to enhance the learning activities.

This paper adopts the following technology:

A. Prioritized Context Aware Technique

The database for the links can be created and maintained. Every link in the database will be given 3 keywords (a, b, c) and there exists a separate database or table with the related technical words (a, b, c, d, e..... t) along with its priority value. The highest priority value is said to be one and that will be the keyword entered in the search (i.e.) when "a" is the search keyword then it will have the highest priority value of 1. Then the other values such as b, c, and d... will have values less than 1. Consider the two scenarios given below.

- 1) If a, b, c are having the highest priority value among those 20 words with values (1, 0.9, 0.8), then this link will have the highest priority and it will be listed first since a, b, c (that is maintained with priority value) is equal to the a, b, c (keywords that are given for that link). The link weightage will be calculated as,

$$(1 * 1) + (0.9 * 1) + (0.8 * 1) = 2.7$$

(The value is 1 since all the keywords match)

- 2) If a,b,d are the 3 keywords given for another link and if "d" is having a priority value of (0.5) in the database then the weightage value for this link will be calculates as,

$$(1 * 1) + (0.9 * 1) + (0.5 * 1) = 2.4$$
- 3) When comparing the above two cases, the link with keywords (a, b, c) will be displayed first since it has the highest weightage value of 2.7. Then the link with keywords (a,b,d) will be displayed which has a weightage value of 2.4.
- 4) By this the links can be sorted and can be listed in a search based on the priority level allotted by the domain expert.
- 5) To make the search even more precise and more accurate, the context which is related to the users search can also be mentioned by selecting the options provided in the form of radio buttons. The required

domain or the subject can be chosen by the end user to make the search more specific and defined.

II. ARCHITECTURE

The overall architecture of the prioritized annotation process is:

- 1) Domain experts who are specialists in identifying items on the video for certain courses. They assign priorities to each video link based on their importance.
- 2) Annotation is the technique of adding keywords to each video link. A maximum of three keywords are given for each link.
- 3) End users are the learners who search for the video resources by entering the keywords.
- 4) Database MySQL database is used to store all the video links with the associated keywords and their priorities.

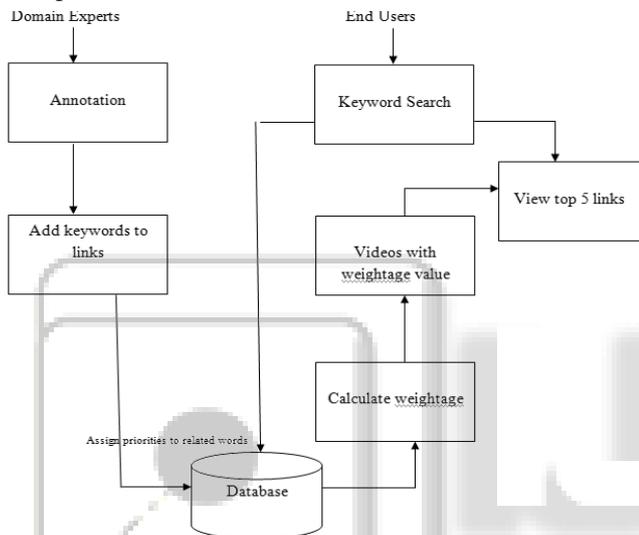


Fig. 1: Overall Architecture

The domain experts will add the course in the MySQL database by giving the video link and assigning three keywords to each video. A context button is provided to select a particular course. The domain expert will also assign priorities to each video based on their importance related to the subject. The video with the highest priority is given the value 1 and the related links are given priority values less than 1 (like 0.9, 0.8,). The annotation technique is the process of adding metadata to images, videos etc., and in this scenario the annotation technique is used for assigning keywords to each video link and a maximum of three keywords are assigned to each video link.

When the end user types in the keyword, the particular word is searched in the database with all the other keywords which are related to this word. Then a calculation is done by multiplying the priorities for each keyword that matches with the keyword typed in the search box and finally added together. In this way the top five links will be displayed to the user from the highest priority to the lowest priority. This method of assigning priorities to each video and calculating them according to their weightage gives a very accurate result in displaying the results to the end user. This priority method is effective and gives the output in a very short amount of time.

The Context-Aware Annotation process is used to add priorities to all the links. The highest priority link for a specific course will be displayed first. The various priorities will be calculated and the links will be displayed based on the assigned priority. The Annotation is a tedious and a time consuming process but with the help of the Context-Aware technique the process can be made simpler by identifying the user's preferences for educational resources and providing them with the accurate videos that suite the user's profile.

III. ANNOMATION

Annomation is a web application that allows users to view a video in a collaborative way, pause it, and add Linked Data Annotations to instances or durations on the video timeline.

A. Using Linked Data to Annotate Videos

Traditional video annotations using free-text keywords or predefined vocabularies are insufficient for a collaborative and multilingual environment. This paper uses Linked Data [2] to tackle the above issues in video annotations. It brings the following benefits:

- 1) Each vocabulary is controlled and accurately defined in the Linked Data Cloud. It owns a unique URI to distinguish it from other vocabularies.
- 2) Different vocabularies, which describe the same thing, are linked using the *cwl: same as* property as an equation definition.
- 3) The Linked Open Data cloud [3], which has the most complete data sets to describe the current world, helps to find a good number of related educational resources.

B. Priority Based Context Aware Implementation

The system is implemented by using certain tools. In the Annomation tool used, the data and the links are maintained in the RDF structure [4] and manipulated using the SPARQL. In the Priority Based Context Aware Technique, the following tools are used for the mentioned purposes.

1) J-developer tool

It is a software tool which is given free by the Oracle and used for visually designing the codes in Java, HTML, and SQL and has various enhanced features. The Java code for Context Aware technique and listing of the links based on the priorities are executed using this tool.

2) Oracle Web Logic

This tool developed by the Oracle contains a telecommunication platform, an http web server and a Web logic communication platform which is used for the connectivity purpose in this scenario by means of the driver class.

3) MYSQL GUI

The MYSQL workbench is used for creating and maintaining a database in an automated way. There also exists standard templates in the tool which can be used directly without creating a new database from the scratch and it is time efficient.

These are the several tools that are used for this purpose and these are incorporated on the web. It is feasible only when installed and run in a Windows 7 or Windows XP

operating system platform. J-developer tool is a software tool which is given free by the Oracle and used for visually designing the codes in Java, HTML, and SQL and has various enhanced features. The Java code for Context Aware technique and listing of the links based on the priorities are executed using this tool. It is here the java code for calculating the weightage for individual links is done. Connecting this application with the database is also done here in the form of java code. Oracle Web Logic is a tool developed by the Oracle contains a telecommunication platform, an http web server and a Web logic communication platform which is used for the connectivity purpose in this scenario by means of the driver class. MYSQL GUI must also be installed. The MYSQL workbench is used for creating and maintaining a database in an automated way. There also exists standard templates in the tool which can be used directly without creating a new database from the scratch and it is time efficient. There is two database or table maintained here for this project. One of the tables contains all the links that are added along with the three keyword values for each of the link. These links can be filtered based on the context or the domain when there are many domains added in the future development. For now there is only one domain maintained to start off in a small scale. In the other database, a list of keywords along with their related words and the corresponding priority values are maintained. This is given by the expert of the domain. This contributes to the major effectiveness of the search.

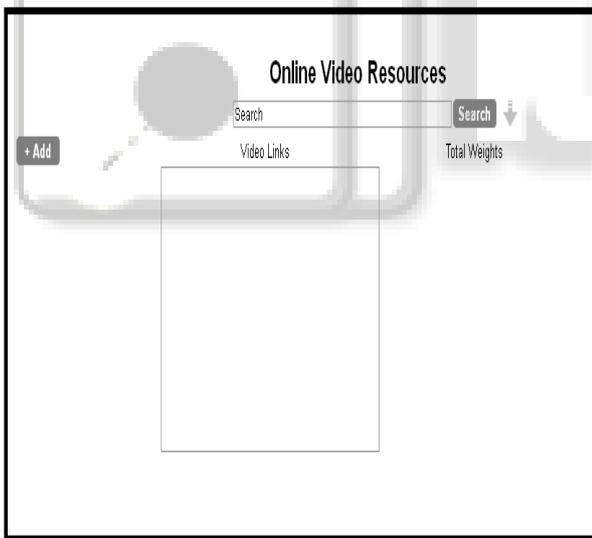


Fig. 2: Browser page

This is the browser page where the end user will type in the search keyword. When the search is carried out the MySQL dataset is scanned to find the keywords that match with the searched keyword and the weightage is calculated according to the assigned priorities and the top five links are displayed to the user.

By the use of the priority technique there is effectiveness in the search results produced. The links are valued by the domain expert and based on the priority value assigned by the expert himself, the links individual weight age value can be calculated and based on this weightage value the results will be displayed. The top five links with

the highest weightage value will be listed in the search result. Since this is all individually done by the expert itself, a more appropriate content with respect to the search keyword will be produced. In comparison with the other e-learning search engines, this is said to be more time effective.

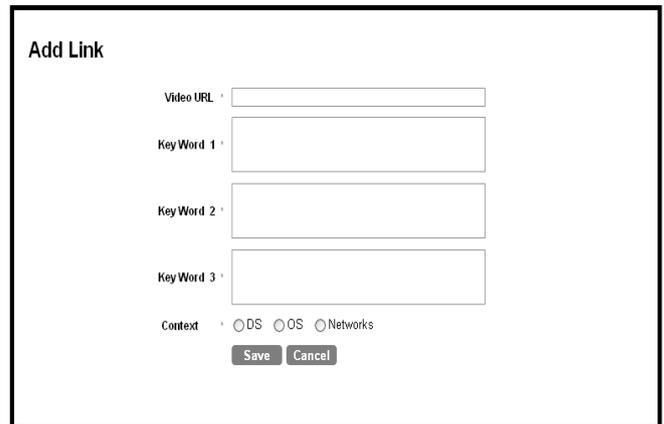


Fig. 3: A snapshot of the interface to add keywords and links

The user interface to add the keywords for the specific video link contains the following:

- 1) A title box which is used to provide the name for the video link used.
- 2) The video name is the link of the specific topic which can be browsed from the World Wide Web.
- 3) The keywords are used to specify the common words that are related to this video. It is mandatory to specify all three keywords for a particular video link.
- 4) The context button indicates the name of the course being created.

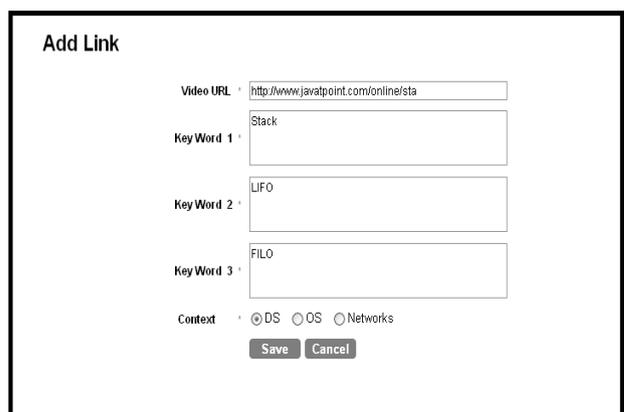


Fig. 4: Adding the keywords to the video link

The 3 context will have several keywords maintained in a database. These keywords will have related words along with their priority value (which is entered by the expert of that particular domain). When the keywords of a link, match with the highest priority related words in the database, then according to the calculations, that link will have the highest weightage value. Accordingly, that

particular link (URL) will be fetched and displayed on top of the search results window.

After adding the keywords to the database along with the priorities the final output will be displayed as follows:

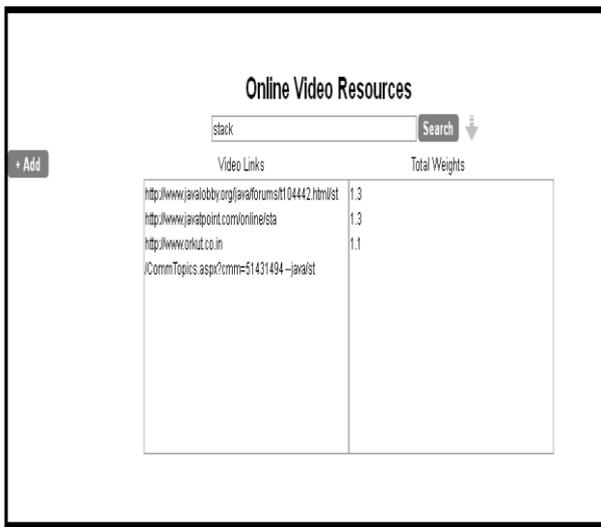


Fig. 5: Final Output.

When a keyword is typed in the search box the list of other keywords which are associated with it in the database will be located along with their priorities. The weightage is calculated based on the values given the domain expert and the links will be displayed in the order of highest priority to the lowest priority. In this way only the relevant details will be displayed to the end user. This provides effective results in a short amount of time.

The priority based context-aware process allows the domain experts or the course creators to assign the important topics with highest priority. This method will display the results more accurately than in any random order. The use of keywords for each link makes it easier to view the related videos and the search time is also increased whereby the videos links are displayed according to their priority values.

IV. CONCLUSION AND FUTURE WORKS

By using this Priority based technique to optimize the search results that are available online for the e-learning purpose, the video streams that are finally listed in the search result page are said to be more accurate than the results that are obtained from the normal search in other web pages. The search time is also comparatively less and it filters and lists out only the top five accurate links that are required for the user. More specific information is obtained by this technique since the priorities are given by the domain expert and the application calculates weightage accordingly. All these factors contribute to the effectiveness of the search and contribute to a reliable search.

Further research work can optimize the search using the Search Engine Optimization technique to provide only the necessary links to the user. To enhance the functionality and the features of this application in future, a metadata data repository can be maintained which contains

the recent search items. The frequently searched content and the views can also be maintained. In this project only one context or a domain is available. To build the application to further levels, this can be extended and made available for various other domains. The context or the domain can be chosen and then the search can be entered in the text box. By all these measures the e-learning experience can be made even more effective.

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