An Improved Publication Process for the UMVF

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Abstract

The “Université Médicale Virtuelle Francophone” (UMVF) is a federation of French medical schools. Its main goal is to share the production and use of pedagogic medical resources generated by academic medical teachers. We developed an Open-Source application based upon a workflow system which provides an improved publication process for the UMVF. For teachers, the tool permits easy and efficient upload of new educational resources. For web masters it provides a mechanism to easily locate and validate the resources. For both the teachers and the web masters, the utility provides the control and communication functions that define a workflow system.

For all users, students in particular, the application improves the value of the UMVF repository by providing an easy way to find a detailed description of a resource and to check any resource from the UMVF to ascertain its quality and integrity, even if the resource is an old deprecated version. The server tier of the application is used to implement the main workflow functionalities and is deployed on certified UMVF servers using the PHP language, an LDAP directory and an SQL database. The client tier of the application provides both the workflow and the search and check functionalities and is implemented using a Java applet through a W3C compliant web browser. A unique signature for each resource, was needed to provide security functionality and is implemented using the MD5 Digest algorithm. The testing performed by Rennes and Lille verified the functionality and conformity with our specifications.

Keywords:  
Web publishing; Indexation; UMVF; Workflow management; Medical pedagogy; Resource searching; Cryptographic digest.

1. Introduction

The “Université Médicale Virtuelle Francophone” (UMVF) is a federation of French medical schools. Its main goal is to share the production and use of pedagogic medical resources generated by academic medical teachers. The resources provided by each school are located on the web sites of the individual medical schools. In order to help the students to find the specific resources they were seeking, the UMVF decided to use a search engine developed in Rouen, “DocCisMef” [1].

This search engine depends on manual indexation performed by librarians, rendering it very difficult for the Rouen team to keep up with the increasing flow of information coming from the individual schools. The solution to this problem was to associate with each new document a standardised description. This “UMVF-notice”, SCORM compliant
provides all the information needed for an automatic and immediate pre-indexation by the Rouen team, the full indexation remaining manual. The group in Rennes then developed a specific application to fill in this “UMVF-notice”. However, the questions remained: who would fill in this notice and who would verify its quality?

The documents referenced on the UMVF website are widely circulated by a variety of means, such as downloading, and distribution on CDs and disks. The students experienced considerable difficulties determining the author, date of publication and origin of the information, its validity and its accuracy. Without this information, the students were unable to determine whether the document they had in hand was the most current version, nor were they able to assess the quality of information therein.

For the instructors the problem was how best to submit to the central office the details of their resources. In the absence of a formal submission mechanism these details might be sent in a variety of ways with no standardization of mechanism of submission, details, version numbers, dates or authors. At the same time, in the absence of standardization, the personnel in Rouen had great difficulties posting the information in a timely fashion.

We thus sought to create an application which would ensure standardized data entry, assist the webmaster in validating the data, and render the entry of the data into the database more efficient and thus faster. With such an application, the work would be easier for the teachers, the webmasters and the personnel in charge of the final manual indexation.

2. Specifications

To build our application we defined specifications which provided the functionality necessary to solve the identified problems. Some of these were related to the solutions we chose, others were related to UMVF organizational constraints.

2.1- The publication process

For teachers: The tool had to permit easy and efficient upload of new educational resources; these were designated as “primary resources” in this process. It had to be usable from behind hospital network firewalls. The required base functionalities were the ability to add, modify or delete the file of pedagogic medical resources on the UMVF web sites. The tool also had to assist the teacher in filling out the UMVF-notice of the resource, by pre-filling fields such as file name, medical school, and date.

For webmasters: the tool had to provide a mechanism to easily locate new uploaded files, to associate them with their author and to validate them, if necessary after having modified their style settings.

These (possibly modified and validated) files were designated “secondary resources” in this process. The webmaster must add the URL for the resource to the UMVF-notice, (which was pre-filled by the software and completed by the original author). He must then validate the notice and send it to the indexation centers in Rouen and Rennes.

For both the teachers and the web masters, the utility had to provide the control and communication functions that define a workflow system [3]. Each user had to have a simple view of the status of the data, resources and associated UMVF-notices for which he was responsible. The teachers needed to be able to see if their data were in stand-by mode, rejected, validated or published; the webmasters had to be able to determine if the author had made any changes to their submissions or corrections to rejected data. And if more information were needed, the workflow system had to allow the webmaster to easily communicate by e-mail with the author, including references to the data with problems.
2.2- Security of resources

A very important functionality for students was the ability to verify the validity and integrity of the resources they had downloaded or received from friends. It was thus necessary to provide a simple means for students to search for the original UMVF-notice from a resource they had in hand. We needed a unique signature for each resource, easy to rebuild from the resource itself, and incorporated into the description. The student's tool should compute the signature of the resource in hand, and use it to search for the corresponding UMVF notice [4, 5]. Armed with this description the student would then be able to access the information collected by the indexation team such as key words, topics, versions authors, dates of revision, etc. If the student’s copy of the resource was either corrupted or not a valid UMVF notice, the software should identify this fact.

2.3- UMVF organisational constraints

We inherited some constraints directly from the UMVF organisation [6]. One was related to the heterogeneity of UMVF users’ computers (PC-Windows, PC-Linux, Mac-Macintosh); the application had to run on disparate architectures and operating systems. Another constraint stemmed from national Education Ministry specifications: we were required to use an external directory for authentication and access control, conformant with the university directory specification (SUPAN). A third constraint was a result of the nature of the information system, which is a distributed system in which the resources are distributed across multiple different medical school web sites. A further constraint was the use of the extant on-line description editor provided by the medical school of Rennes. This is the means by which a uniform description of the resources is obtained from each medical school. Changes made in these descriptions should affect the application only if the fields used specifically by the workflow application are changed. A final constraint was the need to send the description both to Rennes and Rouen where the two search engines of the UMVF are located.

3. Results

We developed two applications. The first is the workflow application and the second is the security application

3.1- The workflow application:

The language used was PHP and the development was done by our private partner, Archimed, Lille, France.

The authentication and the profiles are managed in an external LDAP directory which is SUPAN compliant.

We implemented the application on Microsoft-Windows and GNU-Linux servers with IIS or Apache web server running PHP v5, OpenLDAP Directory and MySQL Database engine. In the validation sub-process, a signature is computed as an MD5 sum digest and is inserted into the resource description. Our application is conformant with Open-Source GNU licencing.

3.2- The security application

The application was built as a Java applet downloadable from the main UMVF web site (http://www.umvf.org/). The user selects the resource he wishes to check. The applet then computes the MD5 digest of the resource and submits it to the description search engine hosted by Rennes. If a description related to the resource is found, the content of the
description is displayed, in particular the version of the resource. If no description corresponding to the digest is found, it indicates that the resource is either corrupted or is not referenced by the UMVF.

3.3- Tests

Testing was performed by Archimed on the Windows platform and by Lille and Rennes on GNU-Linux.

6. Discussion

This application improves the value of the UMVF repository by providing an easy way for all users, teachers and students to find a detailed description of a resource such as the dates of publication or revision, the authors, the content of the resource and the course to which it refers. Of more importance, it provides an easy way to check any resource from the UMVF to ascertain its quality and integrity, even if the resource is an old deprecated version. In such a case, the description provides a link to the accurate version. This functionality is very important because students use these resources in preparing for their exams and certifications. The wide distribution of the resources across multiple medical schools renders it very difficult for the students to be certain of the validity of the information [7]. The ability to verify the content distinguishes the UMVF search engine from the usual search engines such as Google, constituting a critical improvement in this context.

Our application depends on only a small specific subset of the fields from the UMVF notice. As long as these fields are not changed, no modifications to the record in our application are needed. Changes to those fields which are outside our application continue to be solely the responsibility of the teams in Rouen and Rennes, and are reflected in our application with no further intervention. By contrast, changes to any of the specific fields which are used directly by our application require specific modification in our application also.

- For the teachers, this application is of considerable help by providing management reports giving a quick and easy view of the status of all submissions they have made. They can readily distinguish the old from the new submissions, and the validated from the rejected ones.
- For the web master, the application provides a display of the status of all active files, permitting rapid and easy task management, as well as a search function for retrieving any resource according to its parameters, names, dates, or keywords.
- For both teachers and web masters, the application provides some communication facilities for informing the other of the status of the resources for which they are responsible. If more information must be sent between users, the application provides a link with a conventional e-mail system.
- For the indexation centres of Rouen and Rennes, this application is designed to help cope with the increasing flow of new resources created by all the medical school teachers of the French-speaking medical universities by providing validated base descriptions for their indexation work. At the same time, the application is designed to be as independent as possible from the description editor used for indexing. In general, changes and additions made to the UMVF notices by the indexers have no impact on our application; only if they involve the few specific fields used for reference between the two applications is it necessary to modify our application also.

With respect to security, a limitation to the use of the MD5 digest keys is the fact that they are not encrypted. Consequently, the digest search engine must be implemented only on a
certified server. An improvement would be to encrypt the digest incorporated in the notice by certificate assigned to the web masters. Such an improvement would require the building of a public key infrastructure (PKI) for the UMVF [8].

7. Conclusion

The testing performed by Archimed, Rennes and Lille verified the functionality and conformity with our specifications. We now have to deploy the application to all the UMVF members.

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13. References


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