

HealthDialogue: An XML-based Document System for Facilitating Patient – Physician Communication

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ABSTRACT

The current state of web-based information repositories in the medical field poses certain unanswered problems and challenges. There are often many different audiences for the same material, each desiring information appropriate in scope and detail. The needs of a layperson are often different from the medical student, or practicing clinician. The development of content for different audiences results in reduplication of efforts. Furthermore, the consumption of information by different audiences is insular, and does not encourage interaction among different audiences with similar interests. In this poster synopsis, we will present the work we have done in developing an XML-based system that addresses these concerns. The system, which is fully implemented and functional, offers the user the ability to see multiple views of a given document; it also allows the user to make and send comments for others to see. This system allows for multiple views of the same document, and has the potential to encourage an interaction, or a dialogue among those who view this content.

BACKGROUND AND MOTIVATION

The current state of web-based information repositories in the medical field poses certain unanswered problems and challenges. There are many different audiences for the same material, each desiring information appropriate in scope and detail. The needs of a layperson are often different from the medical student, or practicing clinician. The development of content for different audiences results in reduplication of efforts. Furthermore, synchronization of different "versions" of the same material becomes an issue: a recent advance may become publicized in the lay press before the clinician is aware of them, or vice versa.

The availability of information on the web ought to encourage communication. The retrieval of documents alone does not encourage such interaction (unlike newsgroups and discussion lists). While the idea of "integrated access" of information via "portals" has caught on, at the present time there really is not any substantial integration of static and interactive content. Physicians and patients alike could benefit greatly if it were possible to "annotate" static documents with comments and/or questions. While it is possible to "annotate" web documents (see the url: <http://www.thirdvoice.com>), such features have yet to be implemented in medically-oriented web sites. It is imaginable that people would like to direct and/or categorize their comments towards specific audiences; thus, a physician may want to annotate a document with a question geared not to the general public, but rather other physicians. A patient may not want to view such questions.

We present the results of our work: a system where different groups of people (e.g. patients and physicians) can access the same information, in a personalized way for their particular group. This system also enables users to be able to annotate "static" information, and allow for the entry and retrieval of such comments in an individualized way.

METHODS

To develop the database schema for this project, we first created functional descriptions of the application, and derived use cases and problem domain objects from these descriptions. From these use cases and problem domain objects, we subsequently derived an EER model and a relational schema. The modeling approach used borrows from the use case approach described by Jacobsen.

The system was developed using the three-tier application methodology, as discussed in "Distributed Application Development for Three-Tier Architectures" by Gary R. Voth, Charles Kindel, and Jon Fujioka in IEEE Internet Computing, Vol. 2, No. 2, March/April 1998. The application can be thought of as consisting of three independent layers: a data layer which stores and retrieves the data, a business logic layer which does most of the "work" of the application, and a presentation layer which handles the user interface (a client-side application). Separating out these three layers allowed us to pick the best technology for each layer and also simplified the development.

A main feature of this application is the use of XML to facilitate multiple views of a single document. To fully exploit this paradigm of "load once, view many," we implemented a client side viewer that loads the XML document once and then performs XSL transformations as needed to provide the multiple views. We took advantage of the XML features built into Internet Explorer Version 5. In addition, we also utilized the rich "Dynamic HTML" features that IE5 supports.

RESULTS

A demo site of the system can be found at the following url:

<http://gabriel.student.harvard.edu:8001/cs265/>

Documentation on the site and how to use it can be found at:

<http://hdbc-linux.deas.harvard.edu/hdialogue/index.html>

As the whole, the system allows user friendly communication among doctors and patients. There are ethical, legal, and logistical workflow issues that need to be considered before this system could be fully deployed.

This work was performed in part to fulfill a class project requirement for a database class (cs265) taught at Harvard University's Dept. of Engineering and Applied Sciences.