QCT and SF services in Torii:
Human Evaluations of Documents
Benefit to the Community

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Abstract. This paper describes two services of the Torii portal dedicated to the High Energy Physics research community, and developed within the context of the TIPS European project. These services both relate to the reuse of evaluations performed by humans on scientific publications. The first one, called QCT (Quality Control Tools) aims at collecting human detailed evaluations of documents in order to enrich the traditional topical indexing of documents with quality-related information. The second one, called SF (Social Filtering) integrates a push functionality as a alternate and complementary tool to traditional pull services such as Information Retrieval; documents are pushed to users with respect to the evaluations they have made in the past, and as compared to other users' evaluations.

1 Quality Control Tools and Social Filtering

This paper describes two services developed for a community portal, in the context of TIPS european project. After setting the context, we describe each of these services.

1.1 TIPS Project

1.1.1 Purpose of the Project

TIPS (Tools for Innovative Publication in Science) is a european project funded by the European Community (IST-1999-10419) for the period February 2000 to July 2002. It involves the High Energy Physics research commmunity (HEP), that is in need of tools to access the great quantity of available information, especially the scientific articles that are published everyday in this domain.

The aim of the TIPS project is to develop tools that help researchers in their daily activities: search, and read articles, write and disseminate papers, communicate with other researchers.

1.1.2 Services in Torii Portal

The TIPS project has developed a Web portal in order to offer services to the HEP research community. The portal, called Torii, has two aims:

- centralize and facilitate the access to various third part resources, such as open archives of scientific publications, and
- serve as a personal desktop where a given researcher can find the most relevant information for him.

The Grenoble partner in TIPS project (CLIPS-IMAG research laboratory) is in charge of two services: Quality Control Tools, and Social Filtering. Both of these services are related to the evaluation of scientific publications.

1.2 Evaluation of Scientific Publications

The two services are related to the general idea of the evaluation of scientific publications. In their everyday activity, researchers need to evaluate articles that they read. Such evaluations occur in two different contexts: peer review, and evaluation for personal use.

1.2.1 Peer Review

The peer review activity is a widespread process for evaluating the quality of research articles. For instance, when a journal calls for papers to be published in a new issue, the editorial board mandates researchers to review the submitted papers in order to decide whether an article reaches the quality standards required to be published in the journal. The reviewers are selected with respect to their personal research skills, that determine their ability to evaluate the article.

Reviewers are generally asked to fill an evaluation form that reflects the quality standards of the journal or conference. These quality standards can vary depending on the aim of the journal or conference.

1.2.2 Evaluation for Personal Use and Social Reuse

Another context where evaluation occurs is the evaluation that a researcher does when he reads an article that he retrieved from some archive. When a researcher searches for information, he retrieves a number of articles selected on the basis of the topic that the articles deal with. Among the retrieved documents, some will be more relevant than others, because of quality-related features of the document.

To select the most relevant ones, the user needs to read the documents in order to elaborate his own opinion on the document. This opinion generally encompasses several criteria, that are likely to be shared by other users with the same information needs.

This evaluation process is generally not formalized, as the user does it for his own use. In some cases, it can be made partly explicit by the user when he tries to organize the set of interesting documents, not only by topic, but also by the extent to which it can be useful in some situation: for instance as a reference to quote in an article, or as a reference to recommend to students, or to research colleagues.

1.3 Overview of QCT and SF Services

1.3.1 QCT

The Quality Control Tools (QCT) aim at collecting the evaluations that researchers have done, in order to enrich the traditional indexing information that is associated with documents for retrieval. Documents are generally indexed by information relating to topics. With human participation, quality-related information can be added, that is highly valuable to help subsequent users in their selection of the most relevant documents.

In Torii, a user can evaluate any document retrieved via the portal, by using an evaluation form. The portal keeps track of the evaluations made by any user, and combines them into statistical indicators that are displayed together with the document.

In order to easily produce ad-hoc evaluation forms, a tool to produce new forms has also been developed. This tool is dedicated to the editorial boards who would like to formalize the quality standards of their publications.

1.3.2 SF

Social Filtering (SF), also known as Collaborative Filtering, automatizes the process of people recommending documents to other people that have similar interests. A typical social filtering system pushes documents to a given user on the basis of the evaluations that he has made in the past, as compared to the evaluations other people have also made.

In Torii, a user can evaluate any document that he encounters in the portal with a single click, and the system pushes relevant documents into a dedicated subfolder of his personal folder.

In the remainder of this paper, we describe the QCT and SF services that are available in Torii.

2 QCT in Torii

The Quality Control Tools collect user evaluations of documents and combines them into statistical indicators, that are in turn made available to all users.

2.1 Evaluation Criteria

A study has been conducted in order to identify important quality criteria for the evaluation of scientific publications.

Quality criteria are criteria that allow selecting a subset of documents out of a set of topically relevant documents. They allow users to specify quality standards when they search documents. Quality features are the properties of documents that are associated to quality criteria. For a given document, a quality feature must be assessed to allow for later searching along the corresponding quality criterion.

We have identified the following 9 top-level quality features (for more details, see document UR-R1-QCT1 from the TIPS project Web site http:// tips.sissa.it). The full set of candidate quality features is given in figure 1.
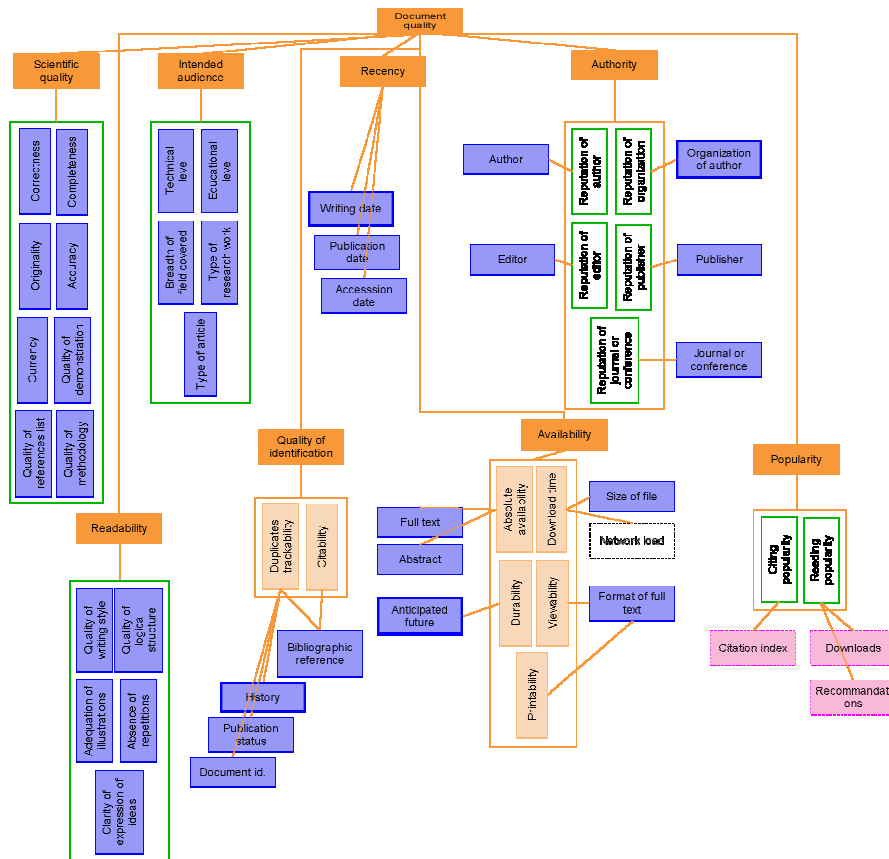

Fig. 1. Hierarchy of the full set of quality features. There is a wide variety of quality features. For instance, "correctness" is a quality feature that reflects a strict meaning of the word "quality", as it vehicles a clear-cut judgment: it is always bad for a document not to be error-free. On the opposite, "recency" is reflects a less clear-cut meaning for the word "quality", as a document may be a good one, although it is not a recent one.

2.2 Evaluation Forms

Evaluation forms reflect the quality standards that depend on the intended use of the evaluation. In Torii, the emphasis was made on the evaluations as made by a simple

reader, for his own use. A standard default evaluation form was defined with the help of experts in the domain, for it to be easily understood and filled up by users. An additional functionality was also provided to account for the fact that users are not always willing to formalize their evaluations. This is the "free comment" functionality, that allows a user to comment freely on a document.

Besides this, the peer review context was also accounted for, with a tool that allows to create ad-hoc forms for more specific intended uses.

We present here the general structure of an evaluation form via the presentation of the user interface to create forms, the standard default evaluation form, and the "free comment" functionality.

2.2.1 Creating Forms

In Torii, the definitions of evaluation forms are stored into a database, in order to automatically generate the corresponding forms.

We first describe the general structure of a form.

- A form is a set of "scaled criteria".
- A scaled criterion is a criterion associated with a "scale" which can be a set of predefined values, or a free text field.
- Each criterion can have a set of subcriteria, which are also associated with a scale.
- The predefined values of a scale can be associated with numbers when it is relevant to order these values.

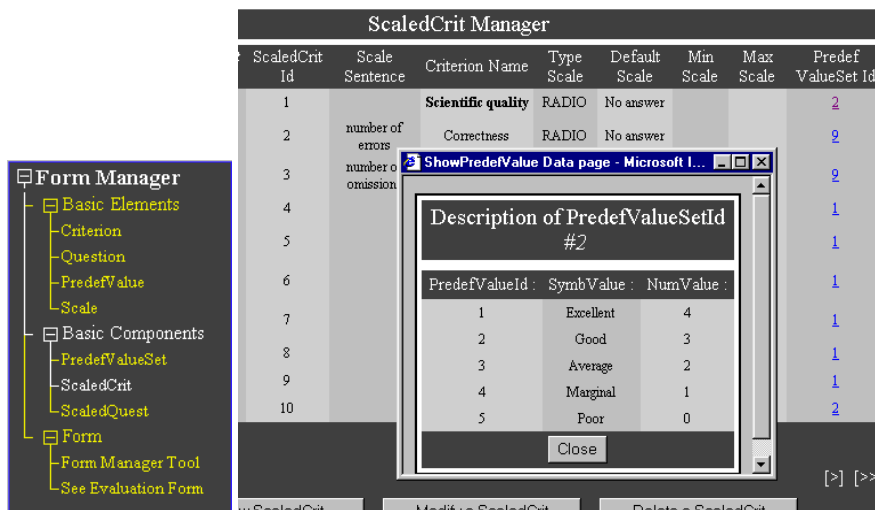Figure 2 shows a sample of user interfaces for creating forms.

Fig. 2. Sample of interfaces for the creation of a form.

The administration tool allows to:

− Create new predefined values and associate numerical values to them,
− Group predefined values to build a scale,
− Create a new criterion, and optionally specify whether it is a subcriterion of another criterion,
− Associate a criterion to a scale (to produce a scaled criterion),
− Group criteria to build a form.

2.2.3   Standard Default Form

Figure 3 shows the default evaluation form that is prompted when a user wants to evaluate a document in details.

Fig. 3. Default evaluation form for the simple reader. The forms interface allow users to expand and collapse the scale for each criterion. The right-hand column recalls to the user whether he has already evaluated a criterion or not.

For the standard default form, to be used by simple readers as opposed to mandated reviewers, a selection of the most important quality features has been made, with the help of researchers in the HEP domain.

Three criteria remain: "Research quality", "Presentation" and "Intended audience". Research quality can be detailed along two subcriteria: "Validity" and "Importance".

2.3 Free Comments

Users can attach free comments to the documents they access via the portal. A given user can edit a private comment, only visible by himself, and a public comment, accessible to any other user.
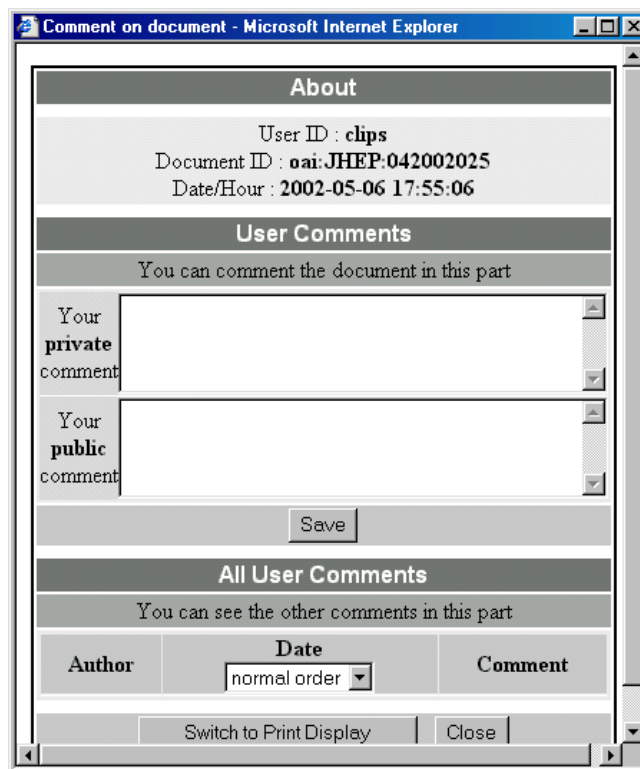

Fig. 4. Free comments functionality. A user can both edit his own comments and view other users comments in this window.

2.3   Statistics

Statistics can be drawn from users evaluations of documents (Number of Evaluations, Research Quality, Presentation, Intended Audience). These statistics are then displayed when a user accesses a document via the portal.

Fig. 5. Display of the QCT statistics in the document view.

3 SF in Torii

The Social Filtering service in Torii pushes documents into the personal folder of an authenticated user.

3.1 General Principle of Social Filtering

The profile of a given user is the set of document identifiers associated with the evaluation that the user has given in the past for these documents.

For a given user U, the filtering engine computes a score for each document that is new to U, but has already been evaluated by one or several other users. This score is the prediction that the system makes of how much user U will like the document. It accounts for the evaluation of the other users, weighted by the similarity between the profile of these users and the profile of user U. The engine only pushes the documents for which the prediction is over a given threshold.

In Torii, the engine follows the Pearson-R correlation method for the computation of profile similarity, and the standard memory-based algorithm for the computation of the ranking (see for instance [1]).

3.2 Torii Interfaces for Social Filtering

The Social Filtering service allows users to indirectly define their profile, via a rating of documents on a single scale with the meaning "I like it".
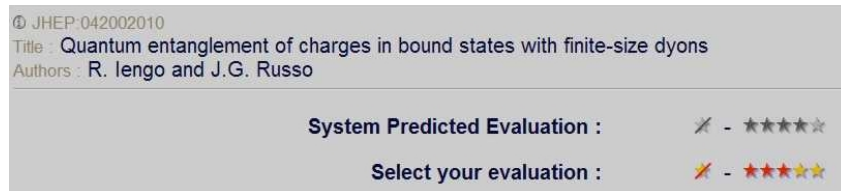
Fig. 6. User interface for the rating of a document to be used for social filtering. The number of red stars indicate how much user U likes the document, and the grey stars indicate the system prediction of this value, when available.

Users can check the documents that have been pushed by the system into a specific subfolder of their personal folder.
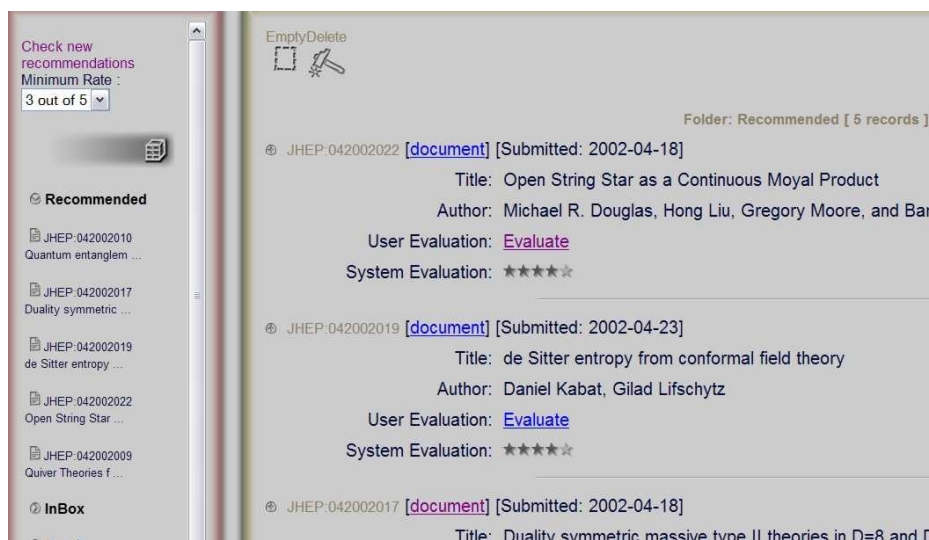

Fig. 7. The "Recommended" subfolder, that contains the documents pushed by the system.

4 Conclusion and perspectives

The two services presented in this paper increase the possibility of reusing individual evaluation efforts for the benefit of a community. They tackle the information

overload problem that researchers encounter, by encouraging and amplifying some of the naturally arising social phenomena.

For the time being, Torii integrates several services dedicated to the personalized and assisted access to information. QCT and SF are two of them, but cognitive filtering and assisted information retrieval are also available. Cognitive filtering, based on the topical content of documents, also requires evaluation feedback from the users, as well as information retrieval (the well-known "relevance feedback"). A stronger integration of these related services will be studied for the future, in order to allow users to better benefit from the feedback that they provide in these various contexts.

References

1. Resnick P.,Iacovou P., Suchak M., Bergstrom P., Riedl J.: GroupLens: An Open Architecture for Collaborative Filtering of Netnews, Proceedings of ACM Conference on Computer Supported Cooperative Work, pp. 175-186, 1994.