Application of a Generic Voting Tool for Rating Purposes

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Abstract: A highly customizable voting subsystem has been implemented as part of the Web4Groups EU supported project (Telematics Application Development Projects, Fourth Framework Program). The target of the Web4Groups project is to develop a distributed non-simultaneous group communication system with multiple access possibilities (WWW, mail, fax, etc.) and incorporating advanced groupware functionalities such as voting, rating and annotation. This paper describes the voting facility of the Web4Groups system, and investigates the application of this voting tool for rating purposes.

Keywords: CSCW, groupware, group communication service, World Wide Web, voting, rating, PICS, Web4Groups

1. Introduction

Rating can help people in multiple ways to navigate on the Internet more effectively and safely. The need for practical rating facilities over the Internet is shown by the emerge of the Platform for Internet Content Selection (PICS, this effort is guided by the World Wide Web Consortium). PICS defines the content and the communication of ratings among Internet hosts. In PICS terms a label bureau serves the ratings provided by one or more rating services [5]. Rating services give their ratings according to rating systems. A rating system defines the syntax and semantics of the possible ratings [4]. A separate WWW page may define the meaning of the rating system for humans.

Presently the distribution and service of ratings seems to be solved, but there is a lack in tools and unified environments for the collection and calculation of ratings. The Web4Groups system with its wide group collaboration features could help in the operation of rating services. To achieve this, relatively small extensions are needed to the existing Web4Groups software. This paper briefly describes the Web4Groups system (Section 2), and its voting facility (Section 3), then investigates the possibility of extension for rating purposes (Section 4), and finally gives some scenarios for the use of the extended system (Section 5).

2. The Web4Groups conferencing system

Web4Groups is a distributed system that has a notion of users, documents or messages and activities. Documents can be stored under activities. Users can browse the mesh of activities, viewing and adding messages inside activities. Activities can be of different types with different behavior or additional functionalities. Currently the most important supported activity types are:

- forums for public discussions
- workspaces for limited access to a given set of users
- votes
- annotations for WWW pages

There is also an activity type for joint editing of compound documents under preparation. The basic group collaboration services of Web4Groups consist:

- group membership administration
- user authentication and authorization
- personal workspace management
- multimedia E-mail support
- support for multilinguality

Another strong side of the Web4Groups system is the multiple ways of accessing its information. Currently besides the WWW user interface there are also user interfaces under implementation for telnet, telephone and fax connections.

The architecture of the system is based on a special database called KOM that stores objects of the system (messages and activities) called "boards". Boards can be connected with typed links to each other enabling a highly flexible structure for the groupware functionality. The database has been implemented at SICS in Sweden in C++ language.

The different user interfaces (WWW, telnet, phone, etc.) are separate software entities communicating with the KOM database via a TCP/IP based protocol. As the system is distributed, the KOM databases have another protocol for their inter-database communication. The WWW user interface is implemented in Java by Kapsch. For more information about the Web4Groups features and functions please refer to the published information about the project and the system. [6,7]

3. The voting subsystem of Web4Groups

Voting is integrated into the general conferencing features of Web4Groups. A voting is presented as a set of Web4Groups forums and messages. Special actions in a voting are shown as buttons when a user browses the voting. This way, user registration, access permission, message threads, multilinguality and distributed behavior are inherited from the Web4Groups system. The voting subsystem is implemented as a plug-in module for the Web4Groups system. It has been developed in Java language by SZTAKI in Hungary.

In the design phase of this subsystem SOCOEC (Austria) prepared an in-depth study on the use, mechanics and social aspects of voting and rating processes in everyday life [8]. This implied the idea of a generally applicable voting tool [1,3,9]. This tool controls voting processes according its configuration given by the vote organizer. The configuration includes:

- definition of user groups
- definition of the questionnaire (vote form)
- definition of the voting process

Members of user groups are defined in such a way that every member can have a selected language for communication with the system. Questionnaires can also be given in multiple languages, thus continuing and improving the multilinguality aspects of the Web4Groups system. A large variety of question types are supported including single or multiple selection, evaluation with given labels and ranking.

The control flow of the voting process is defined by a state-machine (called script). This state-machine can act on conditions such as a new vote's arrival or the value of a system maintained variable (e.g. 90% of the participants has voted). It can also perform actions at a given time (e.g. to stop the voting at midnight). Conditions fire the execution of command blocks. Commands cover all generic actions during the voting process in a simple manner which does not require programming skills, neither allows the abuse or corruption of the vote. There are commands for sending messages to groups of people, publishing the results, changing vote switches, etc. Switches provide general configuration of the vote, defining user authentication, anonymity, or a statement whether one may change his/her vote during the voting process or not. For the configuration and management of voting processes a WWW form-based interface is provided.

3.1 The course of a voting from the users viewpoint

At the time of creation, a new workspace is generated for the vote with special messages (e.g. description, log) and a separate subforum for discussion. The organizers of the vote are appointed, and they perform the configuration of the vote considering the remarks and discussion of participants. The configuration of the vote and the vote form is shown in the workspace.

When everything has been settled, the voting process may be started. Participants may vote either by filling the questionnaire via the WWW interface, or by sending their ballots in e-mail. In this phase normally no interaction is needed by the organizers, but in case of disorders they have a possibility to interrupt and fix the voting process. According to the script invitations, reminders, results are generated automatically. Finally the voting process is terminated and the vote is closed. This process can be followed in the log (which is a message readable to all participants). After closing the vote, the workspace turns into an archive, storing all important documents of the vote.

4. Extending the voting subsystem for rating purposes

In the first subsection the possibility of such extension is studied. Then further subsections describe one way of performing the extension.

4.1. Comparison of voting and rating

A rating process can be seen as the same voting process cloned for each object to be rated. For each rated object a separate voting is performed, but these votings share the configuration, i.e. the questionnaire, the group of allowed voters, etc. In this view a voting process can be extended into a rating process by adding a new dimension to it namely the group definition of rateable objects. To refine this view the significant differences between a rating process and a voting process are summarized here.

Differences in the definition of voting and rating processes

Rating introduces the task of associating an object with a rating. The first aspect of this is the definition of rateable objects. The group of rateable objects can be limited according various attributes, for example format, location, or topic.

On the other hand definition tasks inherited from voting are richer than it is expected for rating. Complex time schedule is rarely used in case of rating. The only essential control flow is that after the arrival of a new rating certain commands are executed. Among question types found in votings mostly single and multiple selections are used.

Differences in the result calculation

In case of rating the rated objects are ranked with respect to their rates. In case of voting the choices of a question are ranked according the votes. This calculation can be used to produce the rating of one object. A second level of computation has to be added to compare the ratings of objects and to get different rank orders of the object. Like there are several methods to calculate the result on the first level (the rating of one object), there are also several methods to calculate the rank orders of rated objects on the second level.

Distribution of the result has different methods

In a voting process the result is treated as a whole, while in a rating process the rates are queried either individually for each object, or in complex database-like queries. Rated objects are retrievable in various sorted orders or by query formulae. Rating results are usually distributed through a query interface and not as huge rank lists of objects. For such interfaces different query types, query engines and distribution formats (for example PICS) can be used.

User interface

Rated objects and rating processes are interconnected with several relationships. These relationships has to be visualized for the user in an easily comprehensible way. For an object the available ratings and rating services has to be shown. If the user is allowed to contribute his/her own rating to a rating system, this has to be offered in the user interface while viewing the object. On the other hand a rating service may provide various rank lists of rated objects in which case the rated objects are to be uniquely identified and easily retrievable from the user interface.

Common features

In spite of these differences the definition of user groups, questionnaires and control flows can be used in both rating and voting processes. Similarly the methods used in connection with questions (presentation, filling in, result calculation, etc.) are common. Going through the list of features implemented in our voting tool none of those - though rarely used - proves to be useless. As a conclusion it can be stated that a general rating facility can be specialized from a general voting facility by inheriting all features in the voting tool and providing additional mechanisms for ranking the rated objects and for the association of rated objects to rating services. On the user interface side this may include a rating viewer/composer for objects and a query interface for rating services.

4.2 Accessing and submitting ratings

After the above examination the additional features and user interface elements are elaborated in the context of the Web4Groups system.

While viewing Web4Groups boards (internal objects) the user may ask for a separate rating window, where all information concerning rating is shown. For each available rating service inside Web4Groups the window shows:

- general information about the rating service (full description is available following a link)
- the actual rating of the viewed document (if it is available)
- the user's own rating for the viewed document (if it is available)
- a link to the page where he/she can submit/change his/her own ratings (if the user has proper rights)

Furthermore if the viewed object is a forum or workspace, then the above information is presented for the contained messages as well. For each rating service in concern the list of rated messages together with their ratings are provided.

4.3 Presentation of ratings

Presentation has two main tasks: to show the rating of one object in a very informative way, and to produce different rank orders of the objects. Presentation of the rating of one object raises the question how to show the most information in the less space. The rating of an object has to be quickly recognizable, though it must not take much of the space available for showing the whole object. In a listing of objects it is even more critical to compress the rating information. The best solution can be to assign icons to rating labels (for example 3 stars means very good, a trashcan means very bad). This shorthand notation can be a single word as well. However these shorthands hide many available information: how many people have rated the object, what is the distribution of the rates. A miniature histogram or bar chart of ratings may provide more complete information.

Rank orders are objects listed according to some of the rating categories. Each rating category can define a separate rank order (for example quality or genuineness). The basic operation behind ranking is the comparison of two rates. Rating services with a given goal may evolve their special ranking algorithms to provide the best rank lists for their users. In a general rating tool it is desired to find a generally applicable ranking algorithm, or to offer various algorithms for ranking which needs further investigation.

A tabular format can be devised for the visualization of ratings for a group of objects. Each category has a column, and cells contain an appropriate chart or icon for the rating. Clicking on the header of the column ranks the objects according to that label or category.

4.4 Query interface

Another way of discovering the ratings is through a query interface. Each rating service is accessible for the users via this interface. Here the users can read the detailed description of the rating service, and search the ratings of that service. For example the top ten objects according to the first category can be retrieved. The interface gives back the title and the URL of objects as a link, so the user can download a selected object into the WWW browser.

4.5 PICS interface

This interface is designed for machine-machine communication, ensuring that any external software may access and use the rating information stored in the Web4Groups system. The PICS recommendation provides a common language for the communication of rating information. The most important supported methods are:

- get the definition of the rating system in PICS format
- get the rating for a URL in PICS format
- get the list of rated URLs

4.6 Setting up a new rating process

Setting up a new rating process will be supported with a wizard, which guides the user through the following steps:

Give a description about the rating service
> A textual description about the purpose of the service, how it works and who operates it.

Define rateable objects
> This is done by setting allowed and disallowed object types or URL prefixes.

Define raters
> The user group definition methods of the voting subsystem are applied here.

Define questions
> Questions and their evaluation are composed with the form editor of the voting subsystem.

In case of non-public rating services the access to the service can be restricted by allowing or disclosing Web4Groups users and external connections from given IP domains.

5. Possible usage scenarios of the new rating tool

5.1 Rating of documents inside the Web4groups system

Scenario 1: Papers submitted to a workshop are rated for acceptance.

All papers are uploaded into a Web4Groups workspace, where only the authors and reviewers can access them. A new rating is configured exclusively for the objects in the workspace, with the reviewers as allowed raters. The review form is defined for the rating. Every reviewer can read the papers, and fill in the review form for the paper. The summary of the reviews containing the average points gained and the list of the reviewers' comments are automatically generated and can be seen by both the reviewers and the authors. After the review the rating process is stopped, and the rates are frozen in the workspace.

Scenario 2: The most excellent contributions are searched on a Web4Groups server

Many times it is a relevant need to find the best quality pieces in a large pile of information. In this case a new rating can be set up for a whole server. The rating questionnaire can be very simple and pinpointed at measuring the quality of the object. Any user of the server can fill in the questionnaire and affect the overall rating of the object. In this scenario it is not enough to present the rating for each object, but it is also important that object can be sorted or searched according to their quality rating.

5.2 Rating of WWW pages

Scenario: Implementing a PICS-based label bureau

A Web4Groups server extended with voting/rating can host several rating services for the Internet. Each rating service creates a working area containing public and private documents about its operation, and a separate rating process providing the operational functionality. The rating system can be defined as the fill-in form of the rating process. The definition of the rating system is automatically generated in PICS format. The raters get an account on the Web4Groups server. While they are connected to the server, they can enter their ratings for any WWW page. The results of their ratings can be asked from the server by anybody. The results are sent in PICS format to the user of the rating service.

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