DEMOS Tools for Online Discussion and Decision Making

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DEMOS provides an environment that assists the management of discussions and decision making through the web, especially when involving a large population (e.g., a community using the web to debate about city issues). It is based on the integration of three well-proven methods of social research: the Delphi method, Survey techniques, and Mediation method. These are supported by a set of tools (user interfacing, forum management, survey organization, text mining, and clustering), integrated in a layered architecture and adapted to multiple languages (the current version works on English, German and Italian web sites).

1   Introduction

DEMOS stands for Delphi Mediation On-line System∗. The main objective of the project is to develop and evaluate new ways to support large-scale discussion and decision-making on-line. This is achieved by developing a novel participation methodology for on-line debate, combining three well-proven methods of social research: the Delphi method [1], Survey techniques [2], and Mediation method [3]. The result is an open web-based system with user-friendly and attractive interface, built on a modular software architecture, which allows DEMOS-based systems to be adjusted to the full range of processes for on-line debate. The approach and the system have been validated at two trial sites: the cities of Hamburg and Bologna.

The project is planned to make a substantial breakthrough in on-line consultation where currently no acceptable means exist to handle large-scale discussion processes and deliberative opinion formation. The DEMOS software architecture wraps, in a unified user interface, access to different tools such as survey organization, text mining, and group formation.

2   The DEMOS Process

A DEMOS process is always concerned with one main topic of discussion in a community of users on a limited timeline under the guidance of on-line moderators. To limit the debate to just one main topic is a conceptual decision derived from the general objective of the project to concentrate on deliberative discourses with potential impact on public decision-making process. It also serves to discourage debates from losing any sense of direction. However, in a DEMOS system several processes can be conducted in parallel and each of them split up into different subtopics during the course of the debate.

The basic process model comprises three different phases each with specific goals (see Figure 1): broadening, deepening, and consolidating the discussion.

The *first phase* has above all to initiate, facilitate and broaden the debate and subsequently to identify the most important aspects or subtopics of the chosen subject matter. Therefore the moderators have to analyze and cluster the (free text) contributions in order to find out the issues most participants seem to be interested in. The moderators are backed up by qualitative methods of content analysis. For instance, a text-mining tool can automatically group the text contributions once a set of categories (subtopics) are defined and illustrated by examples.
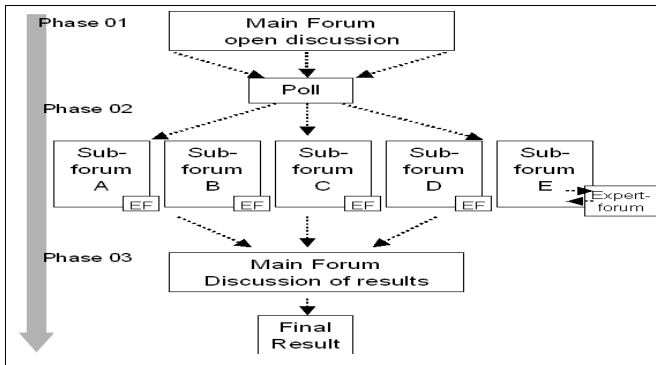

Fig. 1. The DEMOS process.

Additionally, the moderators have to summarize the discussion during the course of the first phase. These summaries consist of content and progress related parts and highlight and profile emerging lines of conflict according to the Mediation method. The first phase finally results in a set of proposed subtopics that can be more intensively discussed in separate discussion forums in the next phase. Since this procedure is relying on interpretations of the individual postings as well as of the entire discussion, the result may not exactly meet the preferences of the participants. At this point the Survey method comes into play in order to evaluate whether or not the proposed sub-forums meet the demands of the community and if necessary, to generate ideas on how to revise the list of subtopics.

The purpose of the *second phase* (deepening the discussion) is to intensively discuss specific issues in smaller groups of interested participants, while the main forum still catches those participants who want to discuss the topic on a more general

level. Again the moderators have to summarize the developing debate on a regular basis and at the same time try to tease out and manage emerging conflicts. This is where the Mediation method comes in, as part of the moderator's task is to clarify how and to what extent people are agreeing or disagreeing and at the same time to reduce the distance between diverging positions by deliberative, moderated discourses. The result of the second phase should either be agreement (consent) or a rational dissent in the sense explained above. If required and appropriate, this opinion shaping process can be enriched and supplemented with expert knowledge by conducting Delphi surveys among a predefined set of domain experts. Delphi type studies can either be applied in the original fashion, e.g., to reduce the uncertainty with respect to future developments or in order to evaluate certain positions of the community from an expert point of view. Finally, the moderators close this phase with a summary of what was discussed so far, and once again ask the participants for their approval (survey).

The *third phase* (consolidating the discussion) reintegrates the sub-forums into the main forum by transferring the summaries and related survey results. Participants have the opportunity to see the particular subtopic as part of the general subject matter and a *big picture* will emerge. Participants have the last chance to comment on the main topic and the assembled results of the sub-forums and the community will be asked to rate the subtopics in terms of importance for the main topic that the DEMOS process was intentionally set up for. The final result will be a condensed document depicting both the results of a dynamic and deliberative discussion and the importance accorded to its different aspects in the view of its participants.

3   DEMOS Architecture

The main purpose of the DEMOS architecture is to implement efficiently the DEMOS social model and process. Note that there are strong requirements on the architecture concerning flexibility (therefore the modular approach, in order to be able to incorporate new functionality with minimum impact to existing modules), scalability (the system should work for a hundred of users, but grow to manage thousands; initially it is conceived to work at city level), and robustness (the system must be able to work without disruptions, and must be usable by a wide range of experienced and non-experienced users).

DEMOS system architecture is organized in several modules (see Figure 2), which provide the basic services that support the DEMOS process. All modules rely on the Argumentation and Mediation module (A&M) [4], which controls access to the repository of all the contributions that users may insert (i.e., it is a kind of forum manager). Users may participate in several forums, where they can read or put contributions about a certain discussion topic. Each forum has a moderator who has the responsibility for getting the discussion to some conclusion. In order to achieve this, the moderator can use DEMOS methodology with the tools that support it: Survey Module (SUR, supports the generation and distribution of questionnaires) and Subgroup Formation and Matchmaking (SFM, mechanisms for creating subgroups of users in a forum, which is essential for moving from phase 1 to phase 2 in the DEMOS process). These tools make use of Text Mining (TM) agents and User

Profiling (UP) agents. Finally, Graphical User Interface (GUI) provides a uniform access to users integrating the dialogue with the different modules (Figure 3).
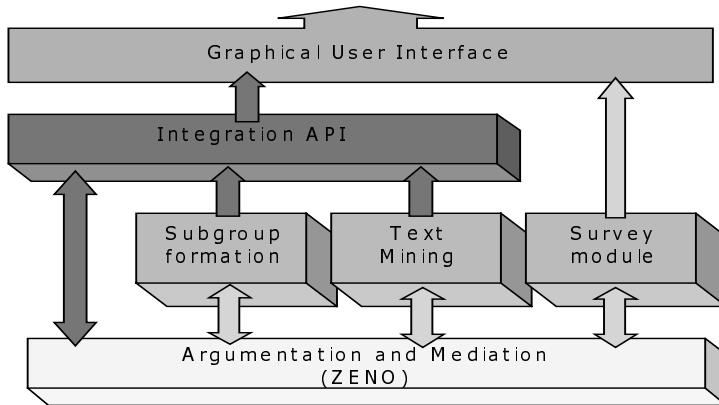

Fig. 2. DEMOS system modules

4   Conclusions

The innovative aspect of the DEMOS process is that a model of organizational workflow is applied to the broad public. The idea is to get together citizens interested in the same subject matter and to enable an organization-like interaction for the duration of the debate. This has been tested in the cities of Hamburg and Bologna in several debates during the period 2001-2003.

From the engineering point of view, DEMOS has shown the feasibility of integration of several tools for text mining, clustering, survey generation and management, on a common and customizable user interface. This way, DEMOS architecture shows its ability to evolve as it allows the addition of new tools supporting the participants in on-line debate and decision-making.

References

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