GDM-R A new framework in R to suppot Fuzzy Group Decision Making processes

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Abstract. This is a summary of our article published in Information
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1. Summary

Group decsion making processes, GDM, have attracted research attention in the
last ten years and therefore a wide range of different methodologies have been
proposed [7]. However, new paradigms and ways of making decisions, such as
web 2.0 frameworks, social networks and e-democracy, have made the complexity
of decision making processes to increase, involving a huge number of decision
makers [5]. These new scenarios require automatic tools not only to combine the
information in the best possible way but also to better analyze the whole context,
providing a rapid and complete insight about the current state of the process. In
this direction, some efforts have already been made [4,8,9,10].

In this contribution, we have presented a new framework to carry out GDM
processes, both in classical and current scenarios, whose main features are:

- The proposed system provides support for both real GDM situations and
simulation environments. Being useful not only to assist decision making
processes, but also to compare and validate already existing approaches and
to develop new ones.
- The system provides powerful visualizations tools to quickly verify the state
of the decision process. Among its various representations it depicts experts'
preferences 3D maps to quickly detect those experts who are far from the

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consensus solution and are more reluctant to change their mind and also to detect those ones who provide more contradictory or inconsistent opinions. The system also allows the user to visually check the evolution of the global consensus and consistency among the various round of consensus.

- In many GDM situations, especially those involving a large number of alternatives to choose from conflicting and dynamic sources of information, some of the decision makers could not efficiently express their opinions over all the available options, and sometimes it is necessary to deal with incomplete information [11], being necessary to try to estimate the missing information since it could be very valuable for the decision making process. In such a way, the system is able to deal with this uncertainty.

- It carries out a number of consensus round to obtain a solution accepted by all the decision makers and provides the best alternative using well known decision making algorithms [6].

- It is an open source framework implemented in R [1], following a modular architecture which easily enables the extension of the tool by other researchers.

The framework's architecture is depicted in Fig. 1 which shows the interaction among all the modules.
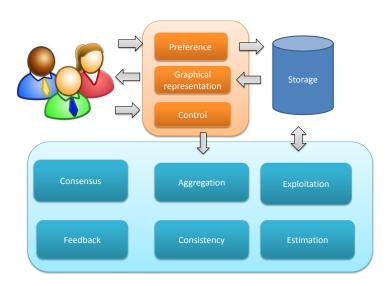

Figure 1. Architecture of the developed framework and the main interactions between modules.

This system is available for the interested reader in a Github repository in [3] and the documentation with a detailed description of all the available functions can be downloaded in [2]

Acknowledgments

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