

## EDITORIAL MESSAGE

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Our Associate Editor, Professor Enrique Herrera-Viedma, together with Professor Francisco Chiclana of the De Montfort University (UK), Professor Yucheng Dong of the Sichuan University (China), and Professor Francisco Javier Cabrerizo of the University of Granada (Spain) have organized and specially edited the first five articles of this issue to address a new research trend on intelligent decision making and consensus. Following are the messages that they would like to share with FODM readers.

Nowadays we find many real world problems in which intelligent decision making processes are developed by automatic decision making systems that support individual or organizational decision making processes through different information technologies such as the Web, Social Networks, Internet of the Things, Big Data, and Artificial/Computational Intelligence tools. In many cases, we find that the intelligent decision making processes involve the use of both preference modelling and consensus process. Preference modelling deals with the representation and models of the preferences provided by the experts in the problems. Fuzzy logic is a computational intelligence tool that provides an adequate framework to deal with the uncertainty presented in the user opinions, while fuzzy preference modelling has been satisfactorily applied in intelligent decision making. Consensus process is an important area of research in intelligent decision making. Consensus is commonly defined as a state of mutual agreement among members of a group where all opinions have been heard and addressed to the satisfaction of the group. A consensus reaching process is a dynamic and iterative process composed by several rounds where the experts express, discuss and modify their preferences.

The common objective of the five papers we selected is to highlight the ongoing research on intelligent decision making, fuzzy preference modelling and consensus process under uncertainty. They are devoted to the recent research developments on such topics. One of the five presents a novel framework for eliciting and aggregating pairwise preference relations in fuzzy decision making, another one shows a novel approach for group decision making under heterogeneous preference relations, and the rest three propose new consensus models in group decision making.

To be more specific, the first paper, "Aggregation and Consensus for Preference Relations based on Fuzzy Partial Orders" (authored by Gleb Beliakov, Simon James and Tim Wilkin), provides a new framework for eliciting and aggregating pairwise preference relations in decision making based on the assumption of an underlying fuzzy partial order and on the Kemeny distance. This work also proposes some linear programming optimization methods for ensuring consistency either as part of the aggregation phase or as a pre- or post-processing task. This new framework can be less sensitive to the extreme or biased opinions and is also less complex to elicit from experts.

The second paper, "Group Decision-Making based on Heterogeneous Preference Relations with Self-Confidence" (authored by Yucheng Dong, Wenqi Liu, Francisco Chiclana, Francisco Javier Cabrerizo and Enrique Herrera-Viedma), introduces both the concept of preference relation with self-confidence and a new two-stage linear programming model to deal with group decision making problems. This work is based on heterogeneous preference relations with self-confidence which utilizes a distance-based framework that minimizes the information deviation between decision makers' preference relations and collective preference vector.

The third paper, "A Consensus Reaching Process in the Context of Non-Uniform Ordered Qualitative Scales" (authored by José Luis García-Lapresta and David Pérez Román), presents a new consensus reaching model in a linguistic setting where agents assess the alternatives through a non-necessarily uniform qualitative scale from a purely ordinal perspective. This approach is based on ordinal proximity measures that assign an abstract degree of psychological proximity to each pair of terms belonging to the qualitative scale, avoiding the widely criticized cardinal representations of linguistic terms in qualitative scales. This consensus model is quite flexible and can be applied to numerous real decision problems.

The fourth paper, "Linguistic Fuzzy Consensus Model for Collaborative Development of Fuzzy Cognitive Maps—A Case Study in Software Development Risks" (authored by Carmen De Maio, Giuseppe Fenza, Vincenzo Loia and Francesco Orciuoli), introduces a new methodology for collaborative development of fuzzy cognitive maps based on consensus. Collaborative activities are carried out, in parallel, by experts who build their own versions of the fuzzy cognitive maps when exploiting their own competencies and knowledge about the specific domain. This methodology establishes the application of a fuzzy consensus model to exploit the different proposals of maps and, in such a way, to harmonize the different fuzzy cognitive maps provided by the experts. Thus, the harmonization is modelled as a group decision making process, which is needed to achieve a consensus each time when a conflict emerges from the different maps.

The fifth paper, "Consensus Building with A Group of Decision Makers under the Hesitant Probabilistic Fuzzy Environment" (authored by Zeshui Xu and Wei Zhou), describes the concept of hesitant fuzzy number with probabilities, called the hesitant probabilistic fuzzy number, by showing its score function, deviation function, comparison laws, and basic operations. It also presents a consensus model for group decision making under a hesitant probabilistic fuzzy environment and defines several ordered weighted operators to aggregate information in such decision context.

We think the collection of these five research papers show new research trends related to intelligent decision making systems and we hope that they will stimulate new advances in this research field. Finally, we would like to thank all the authors for their contributions and the referees for their outstanding cooperation and constructive inputs.