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Procedia Computer Science 22 (2013) 846 – 854

Procedia Computer Science

17th International Conference in Knowledge Based and Intelligent Information and Engineering Systems - KES2013

Encouragement of Group Decisions Beyond the Sum of the Individuals Based on Possible Estimations

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Abstract

The decision problem in this paper is to induce the preference range of a group, for which Interval AHP is suitable because of an interval weight. Three crucial factors, namely, constructive conflict, consideration, and closure, are considered in decision making with respect to Interval AHP. Constructive conflict is encouraged by giving and modifying judgments independently. For fair consideration, the group decision is specified from the possible aggregation of all of the judgments, which could go beyond any of them individually. To support an appropriate closure, the judgment is scrutinized from several viewpoints in reconsideration and it avoids from inconsistent and opportunistic modification.

Keywords: Group decision making; Interval AHP; Interval weight; Comparison; Possible aggregation; Reconsideration

1. Introduction

From the viewpoint that decision making is not an event but a process, there are inquiry and advocacy approaches [1]. The former is open process and the group considers a variety options carefully. While, the latter is as a contest, although the participants do not necessarily compete openly or even consciously. It is noted that the former produces decisions of the higher quality than the latter.

Focusing on practicing the decision, the advantage of the inquiry approach can be explained from the concept of community of practice, whose origin and primary use is in learning theory, now is used for a variety of analytical purposes in social science [2]. Communities of practice are people who share concern or a passion for something they do and learn how to do it better as they interact regularly. It is constituted by three elements; the domain, a commitment to which is implied as membership, the community, where members engage in joint activities and discussions, help each other, and share information, and the practice which differs from merely an interest. This concept is applied to organizations in business to manage their knowledge formally and informally, to government and schools to coordinate and share open knowledge, and also to the web which is beyond the traditional community and calls for a new kind of shared practice. In this way, the practice of a community is dynamic and involves learning on the part of everyone. Assuming members of community are practitioners, the

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doi:10.1016/j.procs.2013.09.167

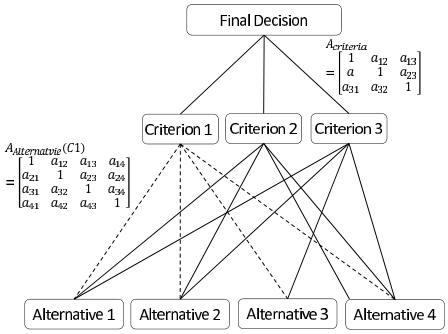

Fig. 1. Structure of AHP

excellence of the decision is not only the condition to the success but also the acceptability of members. Such a practicability is enhanced by the inquiry approach, where members influence each other.

In order for the advocacy approach to move to the inquiry approach, it is said that three factors, constructive conflict, consideration, and closure, are critical [1]. Constructive conflict can help participants to flag real weaknesses and introduces new ideas. Most decisions in our real life are the responsibility of groups rather than individuals and generally it is believed that groups make better decision. One of the reasons why group decision making outperforms individuals' decisions is that they facilitate creativity, in that people can often spark off each other and develop new ideas better in group abstracts [3]. The information given by the others encourage the decision maker to resolve the difference and add new values. It is necessary to improve the quality of the final decision. Consideration can give participants opportunities to influence to the final decision, even when the ultimate decision is made by the leader, and such a process leads them to commit to the resulting decision. In the process, the decision maker gives and modifies his/her opinion step by step and it should be fairly reflected to the group decision. It is not forced to him/her to modify so as to be close to the group. When s/he sticks to his/her own thoughts, s/he is free to intend to influence the group opinion. Closure cannot be too early nor too late. The minority views which may broaden and deepen decision should be well cultivated and the same arguments should not be constantly repeated. Thus, the modifications are repeated with avoiding their endless loop by explicit rule. Depending on the purpose of the group decisions, there are two approaches, value-oriented and goal-oriented systems [4]. The essence of the former is to determine the relative importance of criteria and the concept of the later is to seek solutions which are as near to the target as possible. In the value-oriented approach, where the answers are created in the process, these three factors are more important.

This paper considers three crucial factors to model inquiry approach into Interval AHP. AHP (Analytic hierarchy process) [5] is one of the well-known value-oriented system. Instead of a crisp weight in AHP, Interval AHP obtains an interval weight from the given pairwise comparison matrix. The interval weight reflects the uncertainty of the given comparisons and represents the possibility of an alternative. When it comes to practice the decision, a value in the interval can be chosen at a user's own discretion. The didactic example is a decision for designing something. The designer has to embody the preference of a client to the product, although it is often ambiguous and imperfect. Such uncertain preference can be denoted by its bounds as interval. For the designer, the preference range of his/her client is enough and useful, since s/he utilizes his/her skills and experience to make the product better within the range. The decision problem assumed in this paper is that the user tries to know the preference range of a group of decision makers. Since such a problem needs to leave some discretion to a user, it is discussed from the viewpoint of Interval AHP with interval weights.

2. Preliminary: Interval AHP

The problem in AHP (Analytic hierarchy process) is decomposed into hierarchy by criteria and alternatives as in Fig. 1 [5]. A decision maker compares the importance of criteria and the local weights of alternatives under