

AHP FOR GROUP DECISION-MAKING WITH OPINION MODIFYING PROCESS

Daisuke Maeda¹, Takashi Namatame² and Toshikazu Yamaguchi³

¹Alpha Systems Inc.
2-17-5, Shibuya, Shibuya-ku,
Tokyo, 150-0002 – Japan

²Senshu University
2-1-1, Higashimita, Tama-ku,
Kawasaki, Kanagawa, 214-8580 –
Japan

³Tokyo University of Science
1-3, Kagurazaka, Shinjuku-
ku, Tokyo, 162-8601 – Japan

dmaeda@dragon.biglobe.ne.jp

takashi@isc.senshu-u.ac.jp

yama@ms.kagu.tus.ac.jp

p

Keywords: AHP, group decision-making, opinion modifying

Summary: *In this paper, we propose a method for group decision-making using the AHP concept. We focus on opinion modification in discussion processes and propose a method for obtaining agreement in a group using interactive discussion. Our method is divided into three processes: preparation, opinion declaration and opinion modification. Moreover, to modify opinions, we show quantitative information on the effect of change in term of pairwise value. By showing the information for modifying opinions and making the criterion for agreement explicit, the members who participated in our experimental example were able to reach a satisfying.*

1. Introduction

There are many cases where decisions are made in a group. In such a case, each member who belongs to the group often has a different opinion or criterion for achieving the goal. To integrate these opinions, we often discuss repeatedly or persuade the other members to make an integrated conclusion. AHP works as a powerful tool for decision-making by settling the problem and making the evaluation criteria clear. We also believe AHP is a useful method in the case of group decision-making, but it needs to integrate many different opinions, which can be very difficult.

Various methods have been proposed for group decision-making using AHP. Almost all of these methods are very useful when all members can accept the calculated conclusion. When a member disagrees with the final result, the value of pairwise comparison needs to be modified.

2. Proposed Method

In this paper, we propose a method for group decision-making using the AHP concept. We focus on the next three points in the proposed method. First, we consider the opinion modifying process in discussions. Second, we adopt a opinion modifying method where every member can be convinced. Third, we show the direction for modifying opinions using known methods.

Figure 1 shows the flowchart for the proposed method. The method is divided into three broad parts: preparation, opinion declaration and opinion modifying. In the preparation process, we first set the hierarchy for the goal. Next, since endless discussion is impossible, we set the end and agreement condition for decision-making, e.g., the first alternative of all members or all the alternatives rankings of all members is in agreement. Second, in the opinion declaration process, each member calculates the individual weight for each pairwise matrix and the synthetic weight for each alternative based on their own evaluation. Each member then declares the individual and synthetic weight to the other members.

In the opinion modifying process, we compare the weights of all members. If the agreement condition is satisfied, we end the discussion. If the agreement condition is not satisfied, but the end condition is satisfied, then the discussion ends without agreement. If both conditions are not satisfied, we continue the opinion modifying process.

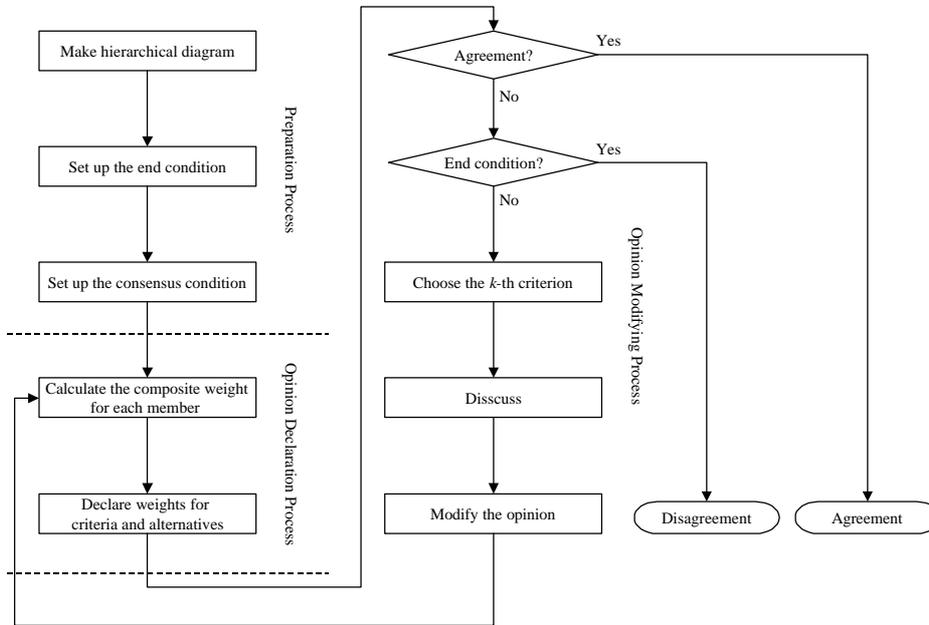


Figure 1. Flowchart for the proposed method

When the end condition is not satisfied, the members proceed to the discussion phase. First the members select the target evaluation criterion. Next, each member discuss freely comparing his/her opinion with the others opinions. Then, each member modifies his/her opinion based on the convinced opinion modifying method using the concepts of Masuda (1987) and Kato et al. (1997).

In the experimental example, most of the participating members indicated that the proposed facilitated opinion modification and some members felt that their opinions were reflected in the final conclusion through repeated discussion and opinion modification. However, the overall process was too time consuming.

3. Concluding Remarks

In this paper, we proposed a method for group decision-making using AHP. Our method focused on the discussion process and provided the information for modifying members' opinions. In an experiment of group decision-making, most members accepted our method, because it did not ignore all the opinions. Furthermore, it was possible to grasp the change in members' opinions and the degree of compromise by observing the moving weights in the opinion modifying process.

References

Kato, N, Chujo, M and Kunifuji, S. (1997) "A Development of a Group Decision Support System Facilitating the Consensus-making Process," *Journal of Information Processing Society of Japan*, 38, 2629-2639. (in Japanese)

Masuda, T. (1987) "Sensitivity Coefficients of Consistency Index and Priorities Used in the Analytic Hierarchy Process," *The Transactions of the Institute of Electronics, Information and Communication Engineers*, J70-A, 1562-1567. (in Japanese)

