Group Decision Support System based on Sharing Individual Viewpoint in Consensus Building Processes

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Abstract

Decision-making is a thinking activity which needs intellectual judgment. In particular, group decision-making is much more complicated compared with individual decision-making. For example, it is not easy to get common recognition and mutual understanding among decision makers because their value judgments which depend on differences such as knowledge and standpoint, are different from each other. Because of this reason, it is important to facilitate mutual adjustment of their opinions and support reaching a consensus cooperatively.

In this study, we define a subjective evaluation which is based on each decision maker's value judgment to a group decision-making problem as an individual viewpoint. We propose viewpoint sharing among all decision makers can be realized by constructing an individual evaluation structure and externalizing it as quantitative viewpoint information using AHP(Analytic Hierarchy Process).

A developed group decision support system is groupware which supports solving alternative choice-type decision-making problem. This system makes it possible to grasp self viewpoints objectively and differences between decision makers' viewpoints by sharing an individual viewpoint. Experimental results show that mutual understanding among decision makers can be facilitated.

Moreover, we propose a method for supporting the consensus building process by using tradeoff analysis based on sensitivity analysis. According to this method, by repeating the processes of persuasion or compromise on conflict parts extracted from differences in mutual viewpoints, we confirmed some usefulness of the system for supporting the consensus building process. We also analyzed the transition of decision makers' behavior in the consensus building process.

The above-mentioned system presupposes that each decision maker has a common evaluation structure. But it is generally hard to construct a common evaluation structure to which all decision makers agree. From this perspective, we propose a method for supporting consensus building among decision makers with each participant possessing a different evaluation structure. Regarding this method, the decision makers compose a relationship matrix cooperatively using their evaluation structure. This relationship matrix is adopted by a quality table in QDA(Quality Deployment Approach). With the relationship matrix, viewpoint sharing can be realized by bidirectional transformation of mutual requirements.

Evaluation experiments using the developed system show that viewpoint sharing can be realized in case of different evaluation structures as well as a common evaluation structure and the system can improve consensus building process based on mutual understanding among the decision makers.

Key Words: **group decision making, groupware, viewpoint, information sharing, analytic hierarchy process, tradeoff analysis, quality deployment approach**