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Building a Decision Support System based on Subjective Judgements combined with Objective Information

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This thesis proposes a new decision-making support system that recommends the best goods, and indicates the validity of the system by experiments.

When people purchase goods, they collect the information about goods, and investigate whether the goods are what they ask for. Then, they decide which goods should be purchased.

In present network society, we can collect information easily using the Internet and so on. However, there is an enormous quantity of information on the Internet. People's judgement is also diversified. Therefore, we need the new decision-making support system that reflects the knowledge of the specialist who has objective information.

In order to express an individual judgement quantitatively, LP (Linear programming) is generally used. LP handles a problem which constraint and objective function are constituted of linear functions.

But, since LP can't grasp qualitative information, it isn't so suitable as a technique expressing actual evaluation-structure.

On the other hand, there is a technique of AHP (Analytic Hierarchy Process). AHP divides a decision-problem into some partial problems, and can express human's evaluation-structure by the repetition of the pairwise comparison between the evaluation items. Moreover, comparison between the evaluation items from which a measure is different can also be performed. From the above thing, we use AHP, in order to quantify a subjective demand of a user in this research.

Generally, there is much quantitative information about goods. Therefore, we will express a qualitative demand of a user with quantitative information so that the preference of alternatives may become easy. In order to perform this, we referred to the method studied in the past. This method supports the consensus making among decision-makers with each participant possessing a different evaluation structure. Regarding this method, each decision-maker composes a relationship matrix cooperatively using their evaluation structure. This relationship matrix is adopted from a quality table in QDA (Quality Deployment Approach).

Then, we have grasped the problem in the case of using this method as a system that supports the purchase of goods.

This method is calculated using a matrix showing both related strength, in order to change a qualitative judgment into a product function. However, with the actual product, the function that the direct requirement from a user is low may have affected the function that the demand from a user is high, strongly.

In this study, we proposed the new decision making model which solves the above-mentioned problem by using the method of Dematel which is the technique of solving a composite-problem.

Next, the practical problem was set up based on this model, we conducted the experiment which determines the goods to purchase. We also calculate by the conventional method of the AHP+QDA simultaneously, and examine the validity of the proposal model by comparison with the result.

Consequently, the model proposed in this thesis shows the validation more than the conventional model. Future subjects are a creation of the integration-tool based on the model proposed in this thesis, the correspondence to group decision-making by two or more persons, etc.