Knowledge Discovery of Interview Survey on Fresh Food Management

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ABSTRACT

In this paper, the analysis of the questionnaire survey to managers on food processing is introduced. Management of losses due to out of stock and surplus stock in a retail food store are well known as an important element in fresh food management. The manager who has a responsibility in side dishes area faces difficult decisions on food processing such as quantitative and qualitative arrangement. So, interview investigation is carried out to the manager of the side dishes section. The purpose is to explore elements which the managers usually focus on decide kinds of side dishes and amount of processing foods, and pay attention to avoid opportunity of loss and spoiling loss. According to the analysis, their knowledge is extracted by a technique of text mining.

Keywords: Text mining, knowledge extraction, interview survey, knowledge management on fresh foods

1. INTRODUCTION

The loss management of the fresh foods is an important subject at the retail store. Loss management is to reduce opportunity loss and a scrapping loss. Because it is out of the stock, a retail store sells articles, and opportunity loss is to miss an opportunity to earn a profit. A scrapping loss is that a profit can't be earned to scrap the articles for which to remain unsold. The relations of the opportunity loss and the scrapping loss are intimate to each other. The risk of the scrapping loss rises when many articles are prepared to avoid opportunity loss. Moreover, a scrapping loss is watched, and the risk of the opportunity loss rises when the number of articles is reduced. It shows a tendency to stop going to that retail store for a client when generally to have much sold-out. Then, a retail store gets great damage because the number of clients of that retail store decreases. The articles which could cut used-by date are scrapped. Still a retail store gets great damage. Control of loss becomes more difficult because the used-by date of the fresh foods is short. In this paper, loss management about the daily dishes which are one of the fresh foods is made the target.

It is difficult to do loss management automatically. Because, as for the opportunity loss, it is difficult to describe it by using the mathematical model. Furthermore, because it is difficult, it is understood when opportunity loss happened. Generally the manager of the section takes charge of loss management. Then, it is very important so that decision making by that manager may be control of loss.

Manager's decision making items are the decision of the list of articles of the articles and an order and the control of the counter mainly. There is the number of people arrangement and so on to manufacture articles additionally. A skillful manager can do loss management well. Then, the sales of the daily dishes section can be extended. So far, only a limited number of managers of the fresh foods section seem to be able to be benefited.

It seems to be difficult for them to explain their own behaviours and knowledge about the management. As a result, knowledge transition among managers cannot be performed and a situation in which the sales volume is down when the skilled managers go to other branches. Therefore, it is necessary to analyze their behavior and knowledge. In this paper, analysis of the managers who decide the kinds of side dishes and the amount of each side dish in the fresh foods section is focused on.

2. APPROACH

Nowadays, the retail trade stores develop the efficient sales strategy that a spoiling loss is prevented by the effective sales promotion to introduce an information system such as POS (Point Of Sales) and FSP (Frequent

Shoppers Program) , and to reduce the opportunity loss of sold-out by analysing sales and client data.

However, the same information doesn't provide the same sales. For instance, many branches of a big grocery company have different sales even if the managers of the branches use the same system. And the skilled manager tends to have good sales volume in a different branch after he moves there. This phenomenon clearly means that the sense or knowledge of the skilled managers has influenced the sales.

The manager who has a responsibility in side dishes area have to decide several matters on food processing such as quantitative and qualitative arrangement. For instance, order of kinds and amount of materials, inventory management, scheduling of the processing side dishes, and so on. In order to extract the knowledge of managers on decision making in food processing such as quantitative and qualitative arrangement, an approach of interview investigation is taken in this paper. This approach is expected to extract the managers behavior based on their speech. Because of the limitation of interview time and concentration on listening to their requirements for decision making, a semi-structured interview format is taken.

2.1. Interview Survey

The semi-structured interview format includes four parts. There are kinds and amount of processing side dishes, preparation of processing, which matters you (respondent) make a decision about the side dishes and which matters you (respondent) focus on to decide them.

Those who make decisions with fruitful experiments on management of processing fresh foods in a kitchen of the retail store are hunted as respondents. After asking the general profile of the manager (respondent), interviewers ask more details related to the above parts. List of questions are here.

—— Semi-structured Interview Format ——

0. Respondent profile
   (a) Your professional experiment
   (b) Your decision making matters
   (c) The term that you have spent for current job
1. Questions on the kinds and amount of processing side dishes as follows:
   (a) How many kinds of fresh side dishes are prepared at the moment.
   (b) Who has the responsibility for the kinds of processing side dishes? And when is the decision making done? (Or How many days before the selling day in advance?)
   (c) What factors are important for making a decision on the kinds of the processing side dishes?
   (d) Do you have your recommendations in the selling day? (Non-permanent side dishes like seasonable dishes can be included.)
   (e) Do you consider that elaborate meals which require to spend time and effort provides more sales? And do you intend to prepare such dishes in your department?
   (f) Who has the responsibility for the amount of processing side dishes? And when does he/she decide the amount of processing side dishes? (Or How many days before the selling day in advance?)
2. Questions on procedure to prepare the fresh side dishes as follows:
   (a) Who goes for the order of the raw material, stocking, and so on? When is the order of the raw material and stocking done? (how many days ago of the sales day)?
   (b) Are daily dishes to sell on the handbill?
   (c) How many persons are assigned in charge of processing side dishes in one day?
   (d) When is the decision making done about person scheduling (Or How many days before the selling day in advance?)
   (e) What are the other factors being taken into consideration except the order, handbill, scheduling of persons in charge of processing when the decision making that you are related to the daily dishes is done?
   (f) When do you begin to process the planed side dishes before opening hours?
   (g) How many times do you check the number of the side dishes in the showcase in one day? And what time do you check it?
3. Questions on decision making to prevent the chance loss and the opportunity loss on the fresh side dishes as follows:
   (a) What kind of countermeasure are you taking about so that you may reduce opportunity loss and a scrapping loss?

(b) What kind of factor are you taking into consideration so that you may do the demand forecast of the daily dishes?

(c) What are the other factors being taken into consideration except the demand prediction when the decision making that you are related to the daily dishes is done?

4. Please give degree of importance in 5 level scores to the following items, when you decide the kinds and amount of the processing side dishes.

(a) POS database analysis

(b) Weather condition

(c) the day of the week

(d) traditional events or social events

(e) the number and types of customers depending on hours

(f) discount hours

(g) ad and promotion in the store

(h) purchasing and inventory of the materials

- What factors do you consider in order to make more effective decision else?

2.2. Analysis of Interview Survey

To visualize obtained results from using data mining techniques [1] has recognized as an informative element. In the field of Chance Discovery [2], information visualization is positively utilized as a tool in order to find various views or scenarios towards issues, trying to find new ideas with discussion in front of visualized results. KeyGraph [2][3] is well known as a tool of text mining and it provides graph which expresses relationships among words. In this paper, KeyGraph is applied in order to analysis interview survey trying to find requirements of the respondents on loss management.

3. ILLUSTRATION

The answer of every question is analyzed as the unit (one sentence) of the association, and a Jaccard coefficient is set up as a measure of co-occurrence information of words, and KeyGraph is carried out. In Figure 1, the result of analysis by using KeyGraph is illustrated.

There are six islands which are surrounded by broken lines as shown in the figure 1. They were composed by the result that the map of the word which shows the way of making decisions about the daily dishes. It would be summarized taking into account the included words that they are ”A: Basic behavior”, ”B: Behavior to reduce a loss opportunity, spoiling loss”, ”C: Behavior to order the raw material”, ”D: Side dishes sales method 1”, ”E: Understanding of the consumer behavior” and ”F: Side dishes sales method 2”. There are only Japanese words in the illustrated figure, this is because the respondents answer in only Japanese.

The elements in Island B and Island E are specifically concerned with the reduction of the opportunity loss and the spoiling loss, and it was able to get the scenario related to the reduction of the opportunity, spoiling loss from each island. Based on the Island B, the scenario of ”The time zone of noon and the evening and so on and a tendency such as sale, customers on weekend and an actual sale are seen, and a decision whether to add it is made.” could be read around ”the sale” and ”the customers”. Based on the elements of Island E, the scenario of ”As for the weather condition such as raining and/or windy influences with the kind of the side dishes, and temperature such as heat, coldness influences with the number of consumers.” could be read around ”temperature” and ”the weather, weather”.

The above scenarios can provide the following behavior of the managers. Roughly speaking, the managers usually check the weather condition in order to estimate the number of consumers and try to tune the kind of side dishes and the amount of food processing of each side dish. The managers try to be careful about the number of lunch boxes and salad in the showcase, in particular, peak time. They frequently check the number of exposures in the showcase and add them. The recognized peak time for the managers in the retail grocer stores are noon (from 11 o’clock, 1 o’clock) and early evening (from 4 o’clock, 6 o’clock). They try to keep the abundantly number of kinds and amount of side dishes corresponding to lunch or dinner. Aside from these sensitive time zones, the managers try to check the showcases and to avoid stock out.

In Table 1, the averaged degrees of the priority in 4th field of semi-structured interview format are shown. We can see that the managers do not have higher priority of (a),(f) and (h). Generally speaking, it is said that the customers consider discount hours. However, the managers do not think same thing. because the value of (f) is small comparing with other items.

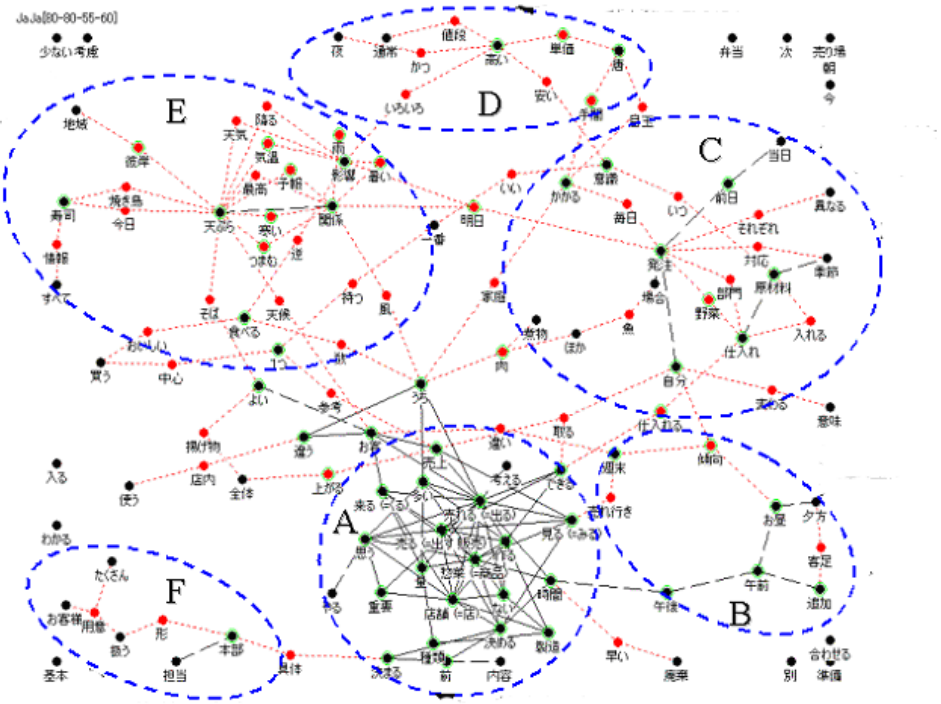

Figure 1: Illustrated Result

Table 1: ave. of degree of the priority in 4th field

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
3.6	4.8	4.9	4.9	4.6	2.1	4.4	3.5

4. CONCLUDING REMARKS

The aim of this paper is to investigate the managers' knowledge in the fresh side dishes section on loss management which includes the loss opportunity and the spoiling loss. The interview survey is carried out. KeyGraph, which is one of the text mining techniques and is included in Polaris [3] with Japanese Morpheme Analysis System CHASEN [4], is applied in order to analyze the questionnaire data and the result is illustrated. Based on the result, typical behavior of the managers is extracted. The scenario related to loss management by illustrating interview survey data from using KeyGraph could be provided. Based on the described scenarios, the managers take care of the regional events and the national traditional events such as seeing cherry blossoms, Hinamatsuri and so on. One of the informative factors in this paper is the peak hour in the grocery stores. It is easily recognized that this time would be considerably changed depending on the national holiday, the day of the week, and store inside or outside promotion which is set by the individual grocery store. Therefore, there is an expectation to obtain more detail scenarios or rules in order to support the decision making of the managers when additional numerical or symbolic attributes related to the peak time zone with other observed database such as POS are used to extract knowledge from the managers. This task is included in future work in order to build the knowledge management model of the managers.

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