Research and Development into a Safe and Secure Integrated Shopping

Support System to Reduce the Physical Burden on the Elderly and Disabled

Lifestyle Research Field

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1. Research Background and Aims

In Japan, the populations of elderly and disabled persons are growing. Additionally, owing to globalization, the number of foreign residents is also increasing as is the number of Working women with children and dual-income couples. It is very difficult for the elderly, the disabled, foreign residents, and mothers to shop routinely. There is increasing concern in society regarding food, which is a necessity of life, and the desire to buy high-quality foodstuffs is growing. Considering the societal background described above, and assuming the existence of "shopping refugees", a term for the elderly, disabled, foreign residents, and mothers without easy retail access, there is considerable societal significance in constructing a support system to enable effective, routine shopping without any physical burden. Consequently, we developed an integrated shopping support system for obtaining goods smoothly, which implements safe and secure payments by simply photographing product codes with a smartphone. This system uses Logo Q, a high-security, high-visibility, full-colour, next-generation QR code that has been under development by our team for a long time. We aim to distribute Logo Q to society following field trials and evaluation. Additionally, we aim to create a societal system that allows everyone to consider food safety, while generating a form of communication that uses Logo O to smoothly link producers and consumers in a safe, secure manner.

2. Research Methods and Details

In 2016, we created a system that enables the selection of products by simply reading a Logo Q code from previously-distributed flyers, as shown in the figure below, using a smartphone. The system enables easy payments from a pre-registered credit card by directly connecting to the payment site. Logo Q has a unique code added to a general QR code, enabling the encoding of characters (including symbols, numbers, and Chinese characters) into the code. Consequently, it is highly secure and allows for the construction of product selection and payment systems that constitute a low burden for the customer, as well as being safe and reassuring. Additionally, we have developed a system that allows for easy communication with vegetable producers, simply by reading the Logo Q code affixed to vegetables. In 2017, we used the system from Figure 1, developed in 2016, to prepare for a trial of the system's operations in the metropolitan areas of Kanagawa Prefecture, using fresh fruit and vegetables as an example, due to their high demand among urban consumers. Through this trial, we clarified the usability of the system from surveys of trial participants living in cities and reconstructed it to attain an even more complete system. The system includes a rural-city synergistic system that enables safe and reassuring communication with producers by photographing the Logo Q of purchased fruit and vegetables. It will become the foundation for allowing society to consider the safety of food.

3. Research Results and Discussion

Our research group constructed a shopping support system for delivering products at a specified time. The system enabled simulated shoppers to simply order and pay for products by using a smartphone to read Logo Q colour codes for products they wished to buy, which were recorded on flyers. Because consumers have commonly held the opinion that they want the purchase of fresh vegetables to be made easily, in cooperation with farms that could provide vegetables that were freshly picked in the morning, we implemented a demonstration trial of the system for 1 week from October 10, 2017, with a further retrospective evaluation survey for 1 week following the trial (Figure 2).



Figure 1. (Left) Conceptual overview of simple product selection and payment using Logo Q. (Right) Conceptual overview of the "rural-city synergistic system", a communications support system using Logo Q to connect consumers and vegetable producers in a safe and reassuring manner.

The simulated shoppers were sampled from 3 homes in Fujisawa and Ayase, where the shopping refugee problem is becoming severe. We asked 3 farms that sold vegetables in an agricultural cooperative in Fujisawa for cooperation. The overall evaluation of the cooperation between simulated shoppers and farms is recorded below. Based on this overall evaluation, we will improve the current system in 2018 and perform trials and evaluation using the new system.

(Simulated Shopper A)

- Thinking about this from my standpoint as a district welfare officer, in recent years, supermarkets and arcades have been closing one after another, even in sub-metropolitan cities in Kanagawa Prefecture, such as Fujisawa and Ayase. I would be very happy to see systems such as this, where you can easily buy something from a smartphone —whenever, wherever—, shift from a test product to the implementation stage. In Kanagawa Prefecture, the elderly comprise almost half of the total population in many areas, and I have heard that areas outside of the Tokyo area are the same. Thinking 10 years into the future, I would certainly like to see this implemented. However, since people of a certain age are not able to become accustomed to smartphones, I think it is likely necessary to have telephone ordering as an alternative, until those in their fifties, to whom smartphones are ordinary, have become elderly.



Figure 2. Scene of Experiment from Oct 10

(Simulated Shopper B)- I think it is wonderful to have fresh vegetables that were picked in the morning and are usually found in agricultural cooperatives' direct sales outlets, delivered at a specified time the very same morning, by just reading the "Logo Q" colour code with a smartphone and pressing the purchase confirmation button. The vegetables delivered were also of the fine quality expected of food produced for local consumption. I think many people would be happy to receive fresh vegetables by around 10 a.m., and because of the advances in refrigeration technology, I think it is possible to preserve that freshness by making good use of cooler boxes in dual-income homes and apartments. I'd be happy to see this implemented.

(Simulated Shopper C)

- From the standpoint of user-friendliness and usability, I regard the ability to order things by reading a "Logo Q" colour code and pressing the confirmation button to complete the order as excellent. It is great that the order history is sent by e-mail and that the payment is completed using a pre-registered credit card upon reading the code. Also, it uses payment technology which relies on the smartphone's telecom carrier. From a technological perspective, I would like to see this popularized. At the same time, from a shopping standpoint, I also feel that I would like it to be developed into a way of shopping for goods from farmers that produce vegetables, rather than for products. For example, it would be good to have a "Logo Q" modelled after a farmer's face, which shows their recommended vegetables for today on the screen, which you could then select and buy. There are some famous farmers in the region, and the branding of vegetables has also advanced, so I think it would also be good to have codes for the farmers, and I hope that this suggestion will be considered.

(Farmer A, Provider of Vegetables)

- Being able to control purchaser, producer, order, and payment-related information with just a "Logo Q" colour code, and being able to share this with the end customer, purchaser, and transport company are some of the good points of this system, and I think this code controlling feature is also convenient. However, because personal data, such as the purchaser's information, is transferred in the current test system, this is a concern from the standpoint of personal data protection and security. It's a system that I would certainly like to see implemented, and I'm happy, as a producer, to be able to sell things both to a direct sales outlet and by telemarketing. I'd like to use it in the future, but I'd like the experiments to continue to make it more stable from a security and personal information perspective.

(Farmer B, Provider of Vegetables)

- This experiment concerned the collection of vegetables from farms by a transport company and the delivery to simulated shoppers. However, given that farms suffer labour shortages, I expect there will be problems whereby farmers cannot regain the time lost waiting for a transport company. This is why it is good to have a system whereby the agricultural cooperatives gather all the farmers' produce at direct sale outlets and provide them to the customer. In such a case, the farmers can use their time effectively, and reduce transport costs. Moreover, the biggest theme, as a producer of vegetables, is stabilizing income. To have a quick, stable profit from what was bought, I think it is best to have the agricultural cooperatives, which also function as financial institutions, shoulder the integrated role of this system. Farmers are union members of the agricultural cooperatives, and so most of them have bank accounts with the cooperatives. I would be happy for this system to be adopted by the agricultural cooperatives that act as financial institutions. As a farmer, I think it is a good idea to have a method of charging, for example, the credit card companies, after the farmers have been paid the profits in advance from their sales history. I think that, as a rule, transport costs are currently borne by the shopper, who receives the benefits. However, I think it would be possible to reduce the cost using methods, such as having the produce collected at the direct sales outlet of the agricultural cooperatives, as described above.

4. Conclusions and Future Development

As shown above, the shopping support system was generally well received by both the simulated shoppers and the farmers. Consequently, we will improve the system to reflect the views that appeared in the evaluations, building on the current system as a foundation. Additionally, as well as agricultural cooperatives, this system has received interest from multiple vendors that transport rental CDs and DVDs. We will pursue further investigation into the possibility of collaborating on multiple business fronts and continue to examine the implementation of the system in society.

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