2020 Town—Web Design Converter for Providing Guidance Assistance to Individuals in Cities

Kiyoshi Nakahama, Yuji Morinishi, Masahiro Watanabe, Sayaka Teranaka, and Rika Mochizuki

Abstract

To prepare for the year 2020, NTT Service Evolution Laboratories is striving to develop a system to provide city guidance to individuals such as senior citizens and foreign visitors to Japan. The system takes the characteristics of individuals into account. In this article, we introduce our Web Design Converter system, which presents information tailored to individual user characteristics on signage screens and personal terminals.

Keywords: signage, web, conversion

1. Introduction

Digital signage systems that transmit information using display screens and other display processes are in wide use today. The efficient way in which they display information by effectively using moving images and space makes them a useful means of providing information about cities.

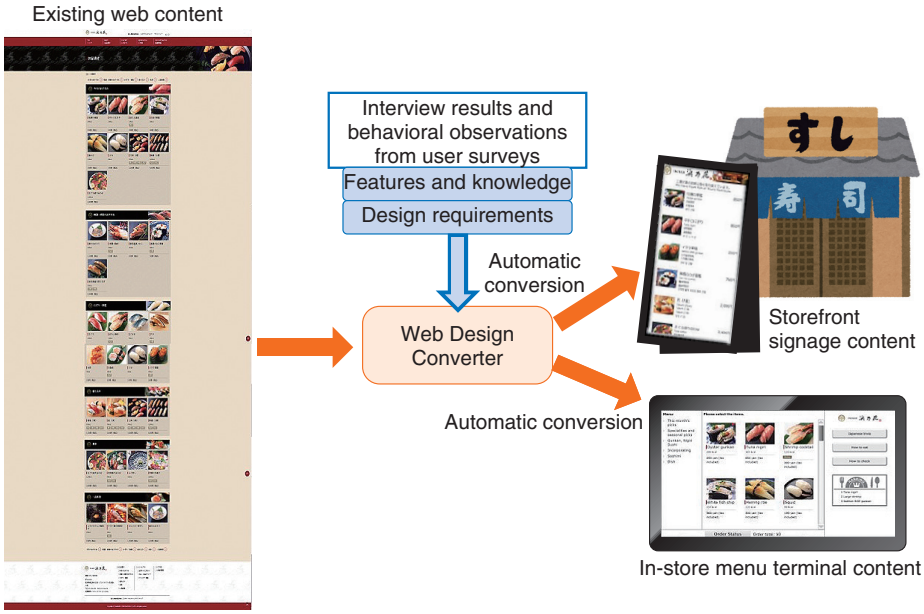
However, two important issues must be taken into account in developing such systems. First, with the international sporting events scheduled to be held in Tokyo in 2020, the number of foreign visitors to Japan is expected to increase greatly during the next few years. Second, Japan faces the problem of a rapidly aging population. To address these issues, it has become essential to develop systems that meet the needs of a greater variety of users. This, however, makes it necessary to create content on an individual basis, which brings added costs.

Accordingly, we at NTT Service Evolution Laboratories are working to develop web design/conversion technology with which content can be converted to make it easier to understand. This will enable us to provide content that will meet service aims and that will match the characteristics of individuals such as their age group and the language they speak. We call the product that utilizes this technology the Web Design Converter, and we have demonstrated a prototype of it at various exhibitions [1, 2].

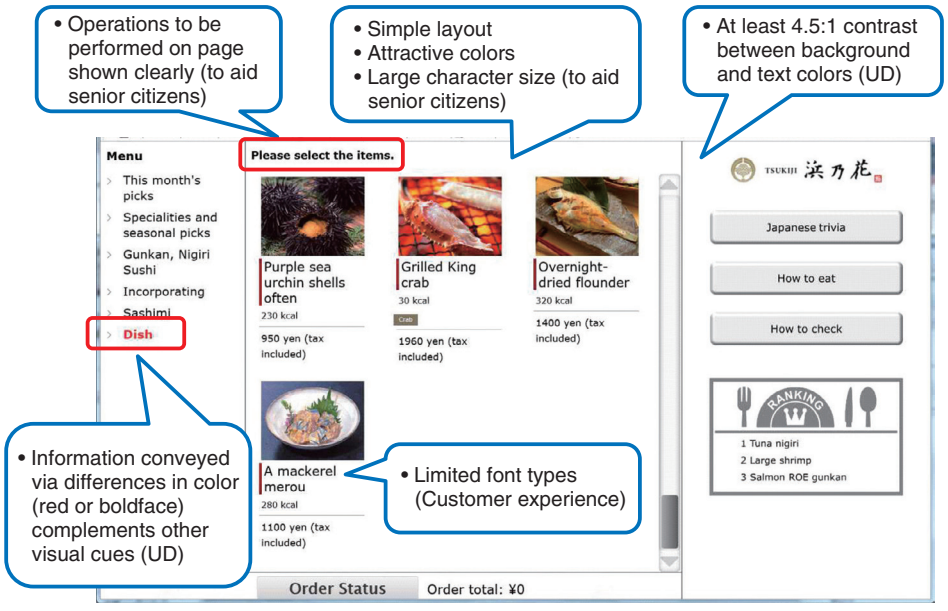
By using this technology to create digital signage content, we expect to be able to not only reduce content creation costs but also to provide content such as information about local events in a timely manner. We believe that the Web Design Converter digital signage system is a useful tool for providing city guidance to individuals according to their personal characteristics, and that by making it available to users worldwide we can achieve a world in which a *universal town* development approach is emphasized.

2. Overview of Web Design Converter

Web Design Converter comprises an automatic design conversion function and a function for automatically generating supplementary information. The automatic design conversion function is used for providing translated information for foreign visitors. In addition, it presents information in an easy-to-understand way in accordance with user and service aims by converting the information structure, fonts, and



(a)



(b)

Fig. 1. Example features of automatic design conversion function.

colors. It does so by applying the information and communication technology service design principles NTT Service Evolution Laboratories has developed and fostered based on user characteristic surveys. This function makes it easy to provide UI (user interface) design applications that take usability into account (**Fig. 1**).

The function for automatically generating

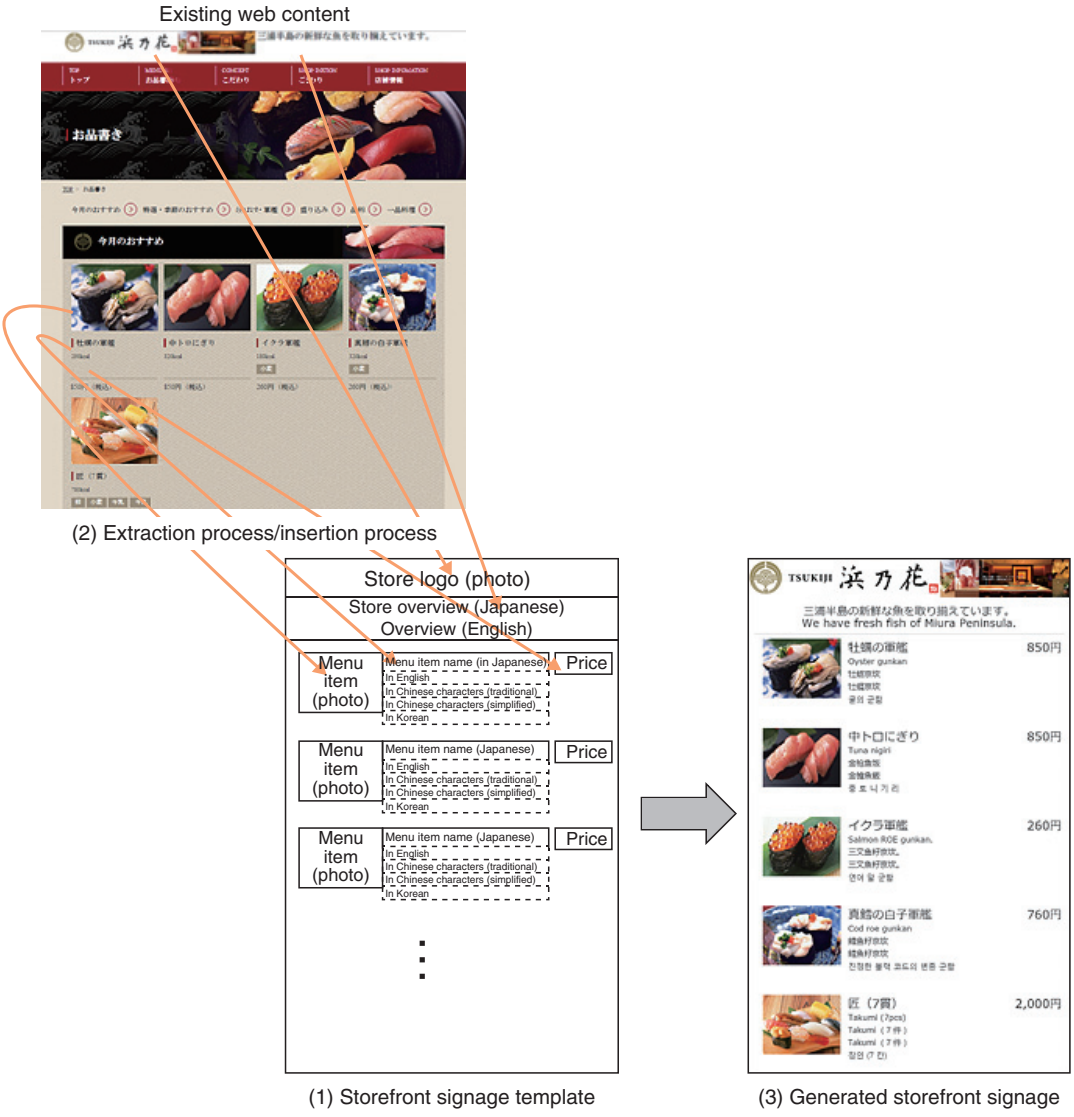


Fig. 2. Process for generating storefront signage content.

supplementary information uses information on the Internet to automatically generate supplementary information about commercial products and the like [3]. For example, if the signage for foreign visitors in a restaurant simply translates a dish as "A mackerel merou" [namerou], they will likely not be able to clearly understand what sort of dish it is. This function can help them by adding further information such as, "A traditional food of Chiba Prefecture." It may also further their understanding by making comparisons to things they are familiar with, such as, "It's like 'tartar for appetizers.'" The translations are provided by machine learning, and as research in this field advances, the resulting translations are expected to improve in accuracy.

3. Example implementation of restaurant service

Applying the Web Design Converter technology to websites that introduce the type of food a restaurant serves enables users to automatically generate content such as that in the storefront signage and the in-store menu terminal.

3.1 Storefront signage

Users first select the display for the storefront signage template (**Fig. 2(1)**). This template includes an

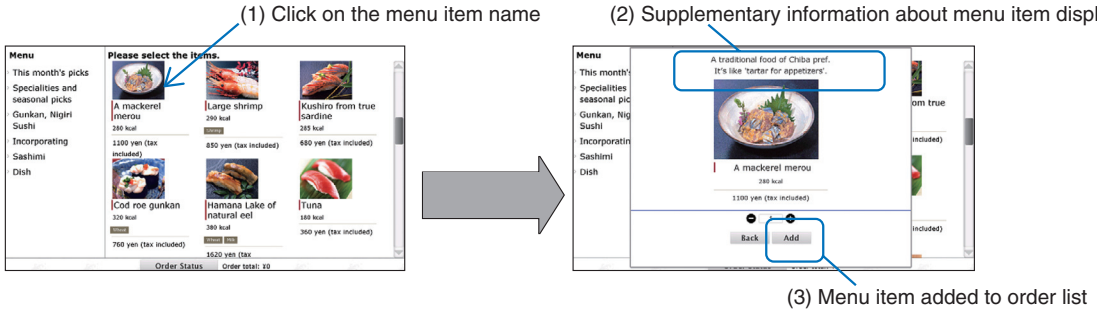


Fig. 3. Interactive menu terminal generating supplemental information.

overview of the store (restaurant), its logo, and a view of the menu items (with photos, names, and prices of dishes). Users then extract the information they want from the existing web content of the store and insert it into the template (**Fig. 2(2)**). If they need to have characters translated during the insertion process, they can use a machine translation function to convert the information into the desired language (**Fig. 2(3)**).

Currently, it is necessary to specify the location of the content to be extracted through the service provider operation when constructing the initial template. However, we are doing further studies with the aim of fully automating the extraction process in the future.

3.2 In-store menu terminal

In the same way as the storefront signage, the in-store menu terminal generates content by extracting a view of the menu items on the menu terminal template. In addition, there is a function (**Fig. 3(2)**) for displaying supplementary information about menu items when they are clicked (**Fig. 3(1)**). It is also possible to use an interaction function (**Fig. 3(3)**) to select or deselect additional items to be ordered.

4. Future development

In the future, we plan to expand the template so that it will be able to handle a wide variety of signage display devices, including smartphones and tablets. We also plan to carry out field trials on how to use the technology, for example, how to use it to provide details on store information or events being held within the city. We aim to use the feedback results to achieve early practical applications of the system. We anticipate that appropriate information will be provided by various contributors such as citizens and local governments, so we will strive to develop a universal town that can be understood by all.

We encourage anyone who is interested in this technology to contact us.

References

[1] Website of NTT R&D Forum, https://labevent.ecl.ntt.co.jp/forum2016/e/index.html
[2] Website of Digital Signage Japan 2016, http://www.f2ff.jp/dsj/2016/en/
[3] R. Mochizuki and T. Watanabe, "Emotion Sharing Model Based on Life-log Comparison—Matching Comparable Experiences—," Trans. Human Interface Soc., Vol. 17, No. 4, pp. 327–340, 2015.

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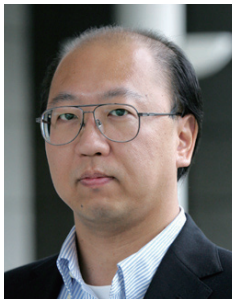

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