Proposal of Tourism Support System for International Students in Japan

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Abstract: *Most international students come to Japan to study or do research. From an intercultural perspective, such students should be encouraged to visit tourist attractions in Japan. However, international students may have problems relative to tourism in Japan, but they cannot cope with these problems by using tourism support systems designed for Japanese or foreign tourists. Therefore, we analyze international students' needs relative to tourism in Japan and clarify mechanisms to support such students. First, we proposed a tourism support system based on a survey administered to international students about their tourism experiences. Next, we conduct experiments with groups of international students to evaluate the proposed system. The evaluation results confirm the effectiveness of the system. It is expected that the proposed system will promote cross-cultural communication. In future, we will address unsolved issues such as public operation of the system, and analysis of the tourism behavior of international students.*

Keywords: *Tourism support system, International students, Group tour, Tour planning*

1. Introduction

The number of international students in Japan reached 239,287 in 2016, an increase of 30,908 (14.8%) compared to the previous year [1]. International students come to Japan primarily to study or do research; however, to understand Japanese culture better and interact with local residents, they tend to visit places of interests in the region where they live [2]. Therefore, from the perspective of intercultural communication, not only tourism of famous tourist destinations, but also tourism in their local areas should be promoted. However, although many tourism support systems for Japanese or foreign tourists have been developed, no systems have been developed specially for international students. Relative to tourism, international students differ from foreign and Japanese tourists in some respects. For example, many international students are reluctant to participate in tours [3]. According to a study by Ryan et al. [4], international students want to participate in tourism; however, economic constraints and their academic requirements often interfere with their tour activities. In addition, although international students understand the Japanese language and lifestyle better than most foreign tourists, their understanding is less than that of Japanese people [5]. Accordingly, existing tourism support systems for Japanese or foreign tourists are functionally inadequate for international students from the perspective of engaging in tourism activities, and Japanese language support. Therefore, a tourism support system that considers the specific needs of international students in Japan is required.

The purpose of this research is to analyze the needs of international student tourists in Japan and to clarify mechanisms to support such students. First, we surveyed international students about their tourism intentions, and based on the survey results, we designed and developed tour support systems for such students. Then, based on evaluations by different international students, we confirmed the effectiveness of the system.

2. Basic Survey

2.1. Tourism Intention Survey

We conducted a survey about tourist intentions to clarify international students' tourism interests and issues. Interviews and Tourism behavior observations were used as the survey methods. Five international students enrolled at Iwate Prefectural University were surveyed. The target international students had been in Japan for three months and had no problems with the Japanese language or daily life in Japan. All surveyed students had achieved N2 level certification in the Japanese Language Proficiency Test.

2.1.1 Interviews

Interviews were conducted individually between the beginning of December, 2014 and the middle of January, 2015. The interview items included the current tourism situation, the current situation regarding the use of public transportation, and the degree of Japanese language comprehension. We used the KJ method [6] to analyze the interviewees' opinions and classified the results as three aspects, "Positive aspects", "Negative aspects", and "Demands and opinions". First, "Positive aspects" represent situations related to the promotion of international students' tourism. Opinions such as "I'd like to see the spots in Japan I have not seen before", and "Touring with friends is fun" were expressed. Next, "Negative aspects" refer to situations that hinder international students' tourism. We confirmed situations such as "I do not know tourist information", "It's inconvenient to use public transportation", and "I am short of money". In addition, there are opinions such as "There is not enough time to tour", "There is no one to tour with", and "It is difficult to form consensus with others to plan a tour". We considered that international students did not frequently participate in tourism activities in above situations. Final, "Demands and opinions" included the international students' demands such as they wanted "Group tourism", "Provision of tourist information", and "Support for Japanese understanding".

2.1.2 Tourism Behaviour Observations

On January 1, 2015, we observed and recorded the tourism behavior of the target international students in Morioka, Iwate. The observation records are shown as follows. First, "Records at the stage of deciding tourism theme" clarified that international students wanted to tour in groups. Second, "Records at the time of group tour planning" indicated the following problem: "I want to go to sightseeing together, but group opinions are not unified". Furthermore, from the "Records of actual tourism behaviour", we clarified that some students enjoyed the tour and other did not. People who did not enjoy the tour spent less time sightseeing; on the other hand, people who enjoyed the tour seemed to have interesting conversations about the tourist locations while walking. In addition, we determined that even though international students rely on public transportation in their daily life, they do not necessarily use public transportation effectively when participating in a tour.

2.2. Related Work

The Bon voyage [7] and Trippiece [8] systems are intended to create tourism plans for groups. Bon Voyage attempts to streamline planning by sharing a plan created by a single user with other users when planning a business trip. Trippiece is a social tourism planning service for groups, planners and participants. With Trippiece, planners publish new tour themes on bulletin boards, participants who are interested in the trip offer advice, and planners then develop a detailed plan based on the participants' advice. Although these systems are helpful to prepare tourism plans for a group, this research forced on the collaborative work process; thus, it is unsuitable for the target international students. In addition, a system that automatically generates a plan for a group tour has been proposed [9]. That system extracts each group member's preferences and recommends places to visit, however, detailed plans are not generated.

Systems for foreign tourists in Japan are being actively investigated, and many studies support language understanding. For example, relative to foreign language communication using machine translation, Kobuki et al.[10] developed a "phrase book service" that allows foreign tourists to ask locals for assistance. In addition, VoiceTra [11], a multilingual speech translation application for smartphones developed as an industry,

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government, and academia project, provides multiple functions, such as speech recognition, translation, and multilingual speech synthesis. Both studies involved full text translation of Japanese information into foreign languages. However, international students who can understand Japanese to some extent may have difficulty understanding the information due to low accuracy and mistakes in the full text machine translation.

3. Design and Development of the Proposed System

3.1. System Design Concepts

Based on the issues clarified from the tourism intention survey and a review of related work, we established the following system design concepts.

(1) **Group tour planning support**: The target international students desire a group tour. However, since it is difficult to undertake tour activities without a trigger, we asked the international students' supporter to act as the facilitator to support the creation of a tour plan by a group. The primary system usage forms will be face-to-face and synchronous because these forms were determined to be the most efficient to achieve consensus when creating a tourism plan.

(2) **Providing tourism information that incorporates daily life information**: Considering that the targets international students identified economic, regional, and time constraints, we assumed a one-day tour in the local region. In addition, in consideration of the needs of international students, we incorporated daily life information, such as commercial facilities and restaurants in addition to conventional tourism information.

(3) **Japanese language comprehension support**: Since the target international students actively study Japanese language, the system will be based on Japanese as a Japanese language learning support system. Considering the low accuracy of full text machine translation, the system will provide a function that allows users to obtain a translation of vocabulary or sentences. Note that the system will also include automatic vocabulary collection to make it easy for users to refer to difficult-to-understand tourism vocabulary.

3.2. System Details

A system based on the design concepts was developed. The system configuration is shown in Fig. 1. The target users are groups of four to five international students. The group users can be divided to two types of role, i.e., the facilitator and the group members. The facilitator is a role to carry out instructions in the stage of planning or during the tour, and the group members were the roles to act according to the facilitator's instructions. Two types of usage scenarios, i.e., before and during the tour, were assumed. In the before tour usage scenario, the group worked in face-to-face synchronization to create a tour plan. The system provides user information management, and three functions corresponding to the three design concepts, i.e., group tour planning support function, tourism information provision function, and Japanese language comprehension support function. We will describe the three functions from next paragraph. During the tour, group members can
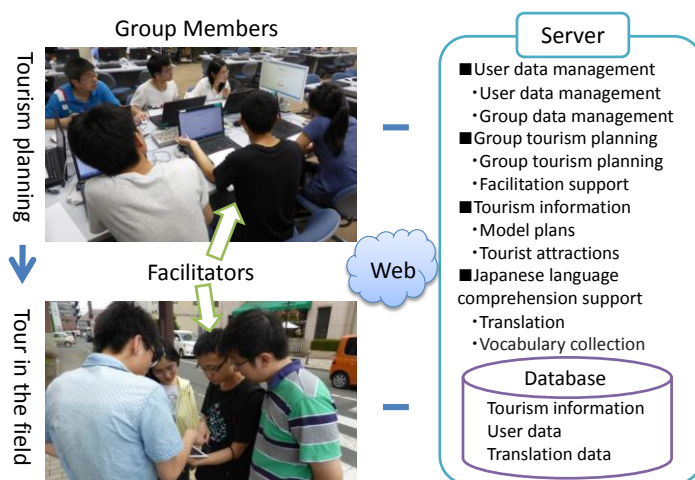

Fig. 1: System configuration

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use the system with tablets or smartphones to check the information about the tour route and tourist attractions.

3.2.1 Group Tour Planning Support Function

The process flow to create a tour plan by a group is shown in Fig. 2. STEP 1. First, the facilitator invites students to participate in a tour (STEP 1 ①). Next, participants join as group members (STEP 1 ②). When the group members have set a date to plan a tour, they proceed to STEP 2 to determine tourist attractions they want to visit. Following the facilitator's instructions, group members browse tourist attraction information and select spots of interest (STEP 2 ③). While watching a list of all members' desired spots collected by the system, group members discuss the reasons those spots were chosen, and determine spots for the group tour (STEP 2 ④). The tour route is determined in STEP 3. After confirming the location of selected spots on an electronic map, the facilitator determines the visiting order and distributes tasks regarding moving between spots using public transportation (STEP 3 ⑤). Group members search the Internet to determine ways to move between spots and report the results to the system. After completing all tasks (STEP 3 ⑥), the system presents a summary of tour plan.

The system also provides the facilitation function that support for the facilitator's instruction during the planning process. There is a navigation set for the facilitator that he/she can understand the group planning process easily. And the system presents the points of how to instruct in each process to guide the facilitator's instruction.
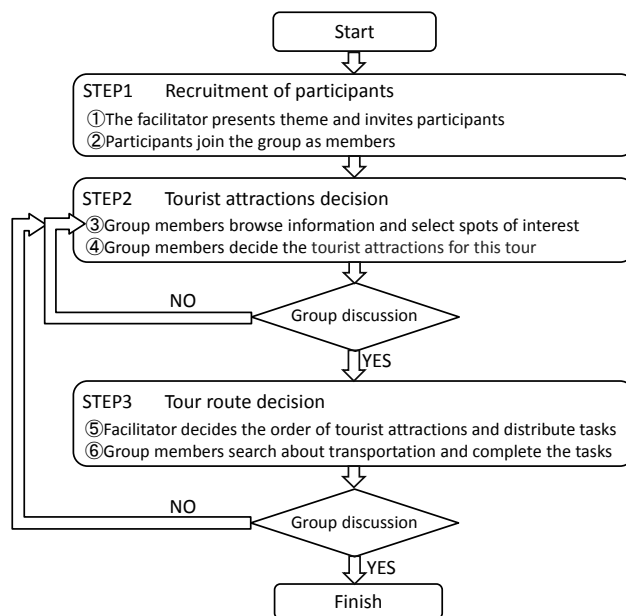

Fig. 2: Process of tour planning by group

3.2.2 Tourism Information Provision Function

As the target region in this research, i.e., Morioka, Iwate, has many townscapes, historic buildings old modern Western buildings have been built in the old city area at the Meiji Period. Public transportation in Morioka relies more on buses than trains. The system mainly provides tourism information based on the above points. As tourist attraction information, 83 spots in three categories, i.e., "History/Culture", "Tourist Facility" and "Daily Life Information" are provided. Daily Life Information includes information about supermarkets, commercial facilities, and popular restaurants. In addition, the system posts links to regularly updated websites that contain information about daily life. Regarding the model plan, a plan is proposed in consideration of the transportation infrastructure in Morioka, which includes information about sightseeing spots around the city circulation bus route. The system also provides plans in consideration of the needs of international students, such as plans containing experiential tourism, and shopping information.

3.2.3 Japanese Language Comprehension Support Function

The system provides translation and vocabulary collection functions. In the translation function, two contents of Japanese information are provided: The English, Chinese translation. These components are provided for the following reasons. First, international students who have limited Japanese language ability typically understand English effectively [5]. On the other hand, there are many international students from Chinese-speaking countries (China and Taiwan) in the target region of the research. Besides the translation contents above, the explanation of some nouns relative to culture or history of Japan, is also provided with Wikipedia as a part of the translation function. If unknown Japanese language is encountered by international students when they browse tourism information, the above contents will be displayed (Fig. 3) by selecting a word or sentence using mouse. At the same time, as the vocabulary collection function, automatic vocabulary collection is performed for the selected words.
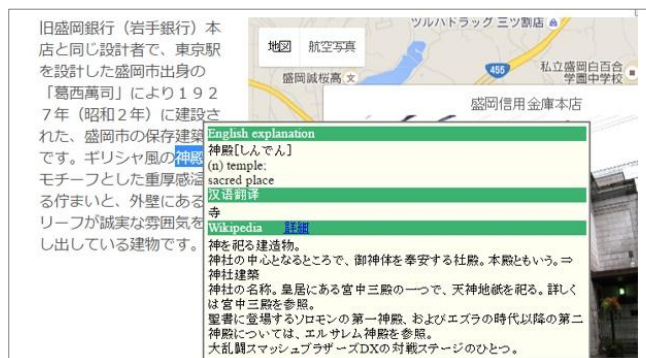

Fig. 3: Translation function

4. Evaluation and Consideration

4.1. Evaluation

To confirm the effectiveness of the system, two evaluations were conducted with international students from Iwate Prefectural University (first evaluation: four students, April 28-30, 2016, second evaluation: five students, October 15-16, 2016). Note that the evaluators were living the region of Morioka.

The evaluation included three stages, i.e., experiments of using the system to plan a tour by the group, observation of evaluators' behavior during the tour, and interviews with the evaluators after the tour. In the experiments of using the system to plan by the group, two types of tour planning modes were used, i.e., planning using the model plans (first evaluation), and planning by group members select attractions using the tourist attraction selection function (second evaluation). Next, from observation, we found that group members visited all of spots in the created tour plan, and the facilitator reviewed the created tour plan with a smartphone to confirm information about the location of the next spot. However, the group members also visited some places that were not included in the created tour plan. The reason was that the group members cannot confirm information about the location by using the system; therefore, the facilitator searched for the information using search engines and found some other places of interests. Finally, as a result of the interview with the evaluators after the tour, although there was a problem regarding the usability of the system, all of functions were considered useful.

4.2. Consideration of System Design Concepts

We considered the effectiveness of the system relative to the three design concepts. Information about the evaluators is shown in Table 1.

Relative to the **group tour planning support** concept, as can be seen in Table 1, the countries of origin and duration in Japan differed among the evaluators. However, functions of the system were affirmed to be functional by both evaluation interviews on the direction of support for group tour planning. In the second evaluation, it was proved that it is possible to create a plan through group work and communicate in English.

Thus, we consider that the system can sufficiently support the group tour planning, even in a group where the group members speak different languages, because it is possible to select a common language such as Japanese, English or Chinese. However, there is room for improvement about the group tour planning support. For example, generally, international students have many international student friends living in various areas. Thus, additional functionality to support remote use of group tour planning could make it is easier for international students living in different areas to tour together.

On the other hand, there is a certain effect of the facilitation function that makes it easy to create a group tour plan for the group members. Firstly, in the sightseeing spot selection process, both evaluations showed no stagnation which occurred during experiments when the function was not been used. In addition, the opinions that "group planning became easier as a facilitator makes decisions", "instruction guidance for facilitation support made the operation of group work smoother" was obtained. From the above, it can be said that group tour planning support concept was effective for the target international student groups.

TABLE I: Evaluator Information.

Evaluation	Evaluators		Time in Japan
First evaluation	Group1	Taiwan (1 - A)	Half a year
		China (1 - B)	Half a year
		Taiwan (1 - C)	A short period of time
		Taiwan (1 - D)	A short period of time
Second evaluation	Group2	Austria (2 - A)	A short period of time
		China (2 - B)	A short period of time
		China (2 - C)	A short period of time
		China (2 - D)	Short time
		Taiwan (2 - E)	half a year

※ 1 - D and 2 - E are the same person.

Regarding the concept of **providing tourism information that incorporates daily life information**, as shown in Table 1, there were group members who had only been in Japan for a short period of time and those who had stayed for six months. However, the evaluation results confirmed that system satisfies the needs of international students regardless of their duration in Japan. We discuss the following evidence to support this claim. First, according to the system records, users frequently browsed spots associated with daily life information such as "Matsukiyo" (cosmetics store), "Yo Ichi" (daily life market), etc. Second, "I did not know so much tourism information before I use the system", and "The model plans that consisted of tourist attractions and shopping were very good" were mentioned in positive reviews of the tourism information. Furthermore, in the first evaluation, the group members selected a model plan that included daily life information (e.g., commercial facilities) in the planning stage and spent time shopping during tour. From the above, we suggest that tourism information that incorporates daily life information is useful for international student tours. However, considering interview results, international students pay particularly attention to economic considerations; thus, in future, the cost associated with such tours, e.g., food and transportation expenses, can be used to incorporate budget information in the model in order to create cost-aware plans.

On the other hand, evaluation results that international students spent a short time at souvenir shops where foreign tourists are visiting frequently showed that international students were not particularly interested in such shops. We believe this is because the international students are currently living in the region; thus, they can buy such tourist products at their leisure. In future, to clarify the tourism interests of international students, it will be necessary to collect and analyze more system usage data.

We evaluate the effectiveness of the **Japanese language comprehension support** concept from the perspectives of translation function and vocabulary collection function. First, the system translation function received positive evaluations. Table 2 summarizes the duration in Japan and Japanese language ability of the

evaluators. As shown in Table 2, although the evaluators' Japanese language proficiency differed, international students with Japanese language qualifications (2 - B, 2 - C, 2 - D, 1 - B), and those without Japanese qualifications (1 - A) who had been in Japan for six months, rated the translation function positively. And an evaluator (1 - C), who does not have Japanese language qualifications and had been in Japan just for short time, stated, "I understood somehow by using it, even though I can hardly understand Japanese." Thus, the system's translation function, which can be freely get translation result of a word or sentence, rather than full text translation, was considered functional. Next, the phrases collected by the vocabulary collection function were investigated. A total of 46 words were collected in evaluation experiments. Among them, the nouns were 33 words. The above result indicates that explanation of the noun is useful to support international students' comprehension of tourist information.

Meanwhile, the international student from Europe (2 - A) who did not understand any Japanese and was not familiar with kanji (Chinese characters), required other's translate assistance when using the system. Therefore, if English language information of the system's user interface such as page title, tourist attractions genre, etc., are provided with the Japanese language information, international students who have limited Japanese language ability can use the system without others' translate assistance, and learn the system's basic terms at the same time.

TABLE II: Time in Japan and Japanese Language Proficiency

Duration in Japan	Japanese Language Proficiency Certification	
	Have	Do not Have
Short time	2 - B, 2 - C, 2 - D	1 - C, 1 - D, 2 - A
More than half a year	1 - B	1 - A, 2 - E

※ Symbols for international students are derived from Table 1

4.3. Consideration of System Operations

In future, we will focus on public operation to allow more international students to use the system. Fig. 4 shows an overview of the system operations, including the roles of service providers, cooperators and users. The service provider is assumed to be the international communication circle at the university. The international communication circle regularly plans tour activities for international students. Cooperators are assumed to be individuals or entities who support international students at the university and the city's Tourism Association / International communication Association, who typically post system links, informs international students about tourism activities, etc. to promote the use of the system. The users are assumed to be groups of international students.
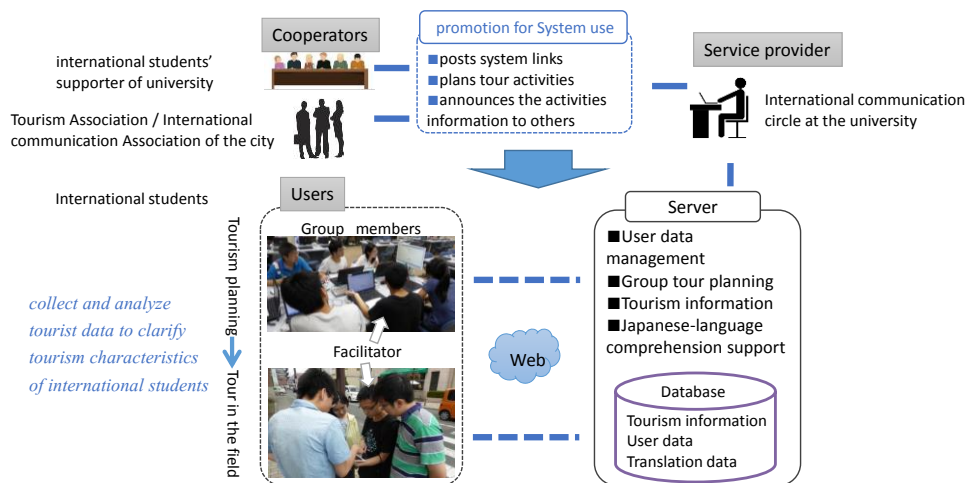

Fig. 4: System operation

By making the system publicly available, it will become possible to collect tourist data from international

students that were previously difficult to obtain. Moreover, by analyzing the collected data, it is expected that the tourism behavior of international students could be clarified where the ICT are used commonly.

5. Conclusion

We have designed and developed a tourism support system for international students in Japan. The effectiveness of the system has been confirmed through the evaluations. First, the group tourism planning, which is typically difficult for international students, is effectively facilitated by system's support. Second, we confirmed that the system makes it easier for international students to obtain various tourism information by providing such information. In addition, the translation function for Japanese vocabulary and sentences was found to be functional.

Meanwhile, we found that the system helps international students learn Japanese language when creating tourism plans. In addition, the system appears to be able to motivate international students to engage in tourism activities. What's more, the international students also gained broader understanding of the local region by using the system. The translation of tourism information also provides opportunities for international students to study Japanese culture and history, which is typically not a focus at university courses. Thus, it is expected that the proposed system promote cross-cultural communication.

In future, we plan to address several remaining issues, such as remote use of the system and English language information in the system's user interface. To support international student tourism better, we also intend to implement public operation of the system, which will incorporate service providers, cooperators, and users to conduct additional analysis of the tourism behavior of international students.

6. References

[1] *Result of an Annual survey of International Students in Japan 2016*, Japan Student Services Organization, 2017.

[2] H. Varasteh, A. Marzuki, and S.M. Rasoolimanesh, "Factors affecting international students' travel behavior", *Journal of Vacation Marketing*, Vol. 21, No. 2, pp. 131-149, 2015.
https://doi.org/10.1177/1356766714562823

[3] Y. Wasa, "Analysis of Foreign Students' and their Relatives' Travel Behaviors in Japan: Focusing on their Countries of Origin and Motivations for Studying in Japan", M.S. thesis, Japanese, Tokyo Metropolitan University, Japan, 2014.

[4] C. Ryan, and Z. Zhang: Chinese students, "Holiday behaviours in New Zealand", *Journal of Vacation Marketing*, Vol.13, No. 2, pp. 91-105, 2007.
https://doi.org/10.1177/1356766707074734

[5] Y. Shi, T. Sajiki, D. Sawauchi, T. Nakatani, Y. Yamamoto, "An Analysis of Domestic Travel Behaviors of International Students in Japan: The Case of Hokkaido University", *The Nōkei Ronsō (The Review of Agricultural Economics, Hokkaido University)*, Japanese, Vol. 64, pp. 97-104, 2009.

[6] J. Kawakida, *Hasso ho (Conception method)*, JP: Chuokoronsha, Japanese, 1992.

[7] N.A. Reshef, A. Barger, Y. Dubinsky, I. Guy, and S.K. Davidson, "Bon voyage: social travel planning in the enterprise", *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work*, pp.819-828, 2012.

[8] Trippiece, https://www.trippiece.com/, Accessed 2017-7-10.

[9] I. Garcia, L. Sebastia, and E. Onaindia, "On the design of individual and group recommender systems for tourism", *Expert Systems with Applications*, vol. 38, No. 6, pp. 7683-7692, 2010.
https://doi.org/10.1016/j.eswa.2010.12.143

[10] R. Kobuki, M. Takahashi, T. Naitō, H. Furuyashiki, M. Yoshida, A. Fujita, K. Matsubara and Y. Katagiri, "Multilingual Service of Sightseeing Information for Foreign Tourists in Hakodate", *IEICE technical report*, Japanese, Vol. 110, No. 428, pp. 25-30, 2011.

[11] S. Matsuda, T. Hayashi, Y. Ashikari, Y. Shiga, H. Kashioka, K. Yasuda, H. Okuma, M. Uchiyama, E. Sumita, H. Kawai and S. Nakamura: "Development of "VoiceTra" Multi-Lingual Speech Translation System for Practical Use", *IEICE Transactions*, Japanese, Vol. J96-D, No. 10, pp. 2549-2561, 2013.