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A Multiple Language Voice Search System for Japanese VOD Lecture using Mobile Tablet PC

Hiromitsu SHIINA[a*], Nobuki KOBAYASHI[b], Yusuke KIMURA[a] & Fumio KITAGAWA[a]
[a]*Faculty of Informatics, Okayama University of Science, Japan*
[b]*Faculty of Human Sciences, Sanyo Gakuen University, Japan*
shiinahiromitsu@gmail.com

Abstract: A mobile tablet PC has had an impact on e-learning system of Internet environment. In this paper, we developed learning system for Japanese VOD lecture using mobile tablet PC. This system has videos, slides and subtitles, and it is able to search by voice to subtitles. Though the voice search system based on Japanese subtitles. By this system has subtitles which were translated into Chinese, we developed voice search system to be available by Chinese.

Keywords: VOD Lecture, Voice Search, Multiple language search, Mobile tablet, e-learning

Introduction

Development of mobile tablet PCs as iPad and Android tablet PC has had an impact on the environment for the usage of computer and Internet. A mobile tourist information system[4] is a kind of Applications using mobile PCs. In many university, improvements on VOD lecture using Internet are studied[2][3]. It was practiced for example in Okayama University of Science[3]. Meanwhile, many changes of environment of VOD lectures are coming. In this study, we are developing e-learning system on mobile tablet PC, particularly on Android tablet PC. This system has videos, slides and subtitles, in addition it is able to search by voice to subtitles. Though the construction of voice search system based on text search to Japanese subtitles. By having translated Japanese subtitles into Chinese, we developed voice search system to be available by multiple languages. The development of a multiple language voice search system is using Google Voice Recognition[1]. In addition to search to translated subtitles, we are attempting to use word lists that were translated from morphemes of Japanese subtitles into Chinese words. The aim of this search system is that international students can find in their native language. Using the voice search in Japanese have low recognition rate, in order to not be using voice recognition engine of native language. In particular, beginners of foreign language in voice recognition rate are significantly low.

1. Multiple voice search system

1.1 System flow of voice search

System flow of voice search system as follows: (1) user inputs keyword by voice; (2) mobile tablet PC sends voice to Google Voice Recognition through Google Mobile App; (3) Google Voice Recognition translates voice to text and returns text to mobile tablet PC; (4) mobile tablet PC sends text to video search server; (5) movie lists was return to mobile tablet PC; (6) user selects movie segment from movie lists. This system flow was show in Figure 1.

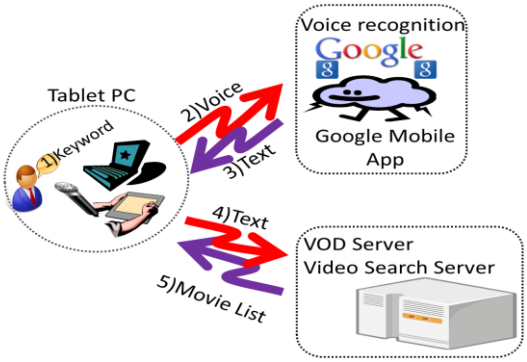

Figure 1 System flow of Voice search

1.2 Voice search to subtitles

Figure 2 shows as an example of voice search by Japanese and Chinese. These are results of search words as "database" in Japanese "データベース" and in Chinese "数据库". Our system displays movie lists on upper right side, and matched words in subtitles by search term are highlighted in red.

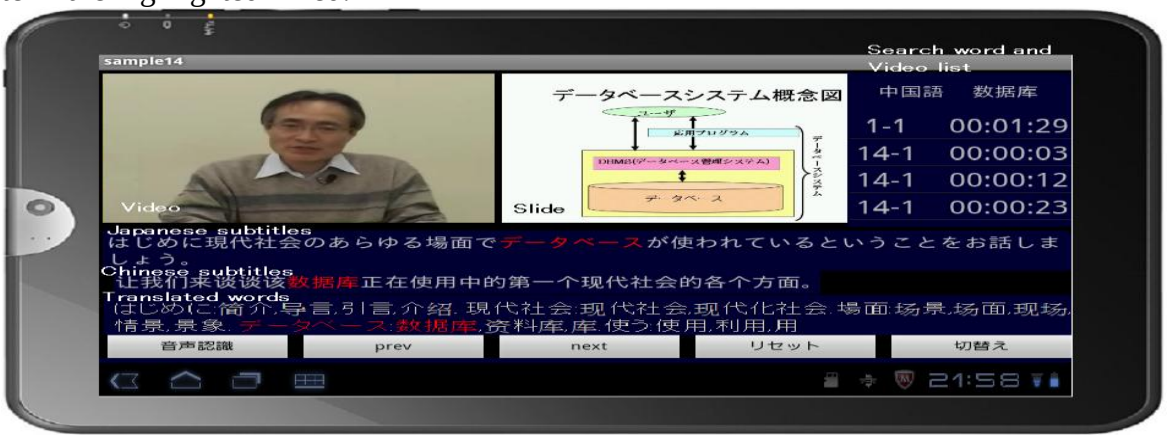

Figure 2 Screen for voice search

2. Voice search by translated words from morphemes of Japanese subtitles

Chinese student translates Japanese subtitles into Chinese in this system. However lack of manpower is concerned. The translations by Software, such as Google translator, are not natural. It is sometimes selected of inappropriate words. Search word is also inappropriate by misconversion of voice recognition and user error. In order to enable inappropriate search, therefore we are attempting to use translated Chinese words from divided morphemes of Japanese subtitles. There are some candidates in morpheme to Chinese word. For example, "検索" in Japanese is translated "搜索", "检索", "搜寻", "查阅" in Chinese. All translated Chinese words of each sentence of subtitles are assigned to its subtitles. In our system, we make movie list by matched assigned Chinese words with search terms. Although ambiguous, we absorb differences between languages.

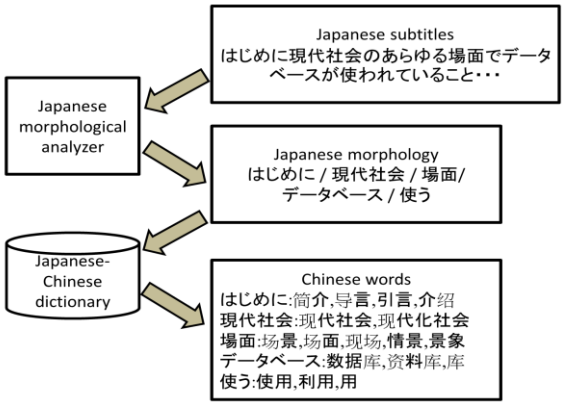

Figure 3 Process of translation from Japanese morpheme to Chinese word

3. Preliminary evaluation

In order to evaluate this voice search system from the viewpoint of user, we used in 14th lecture of the "database" of cyber campus at Okayama University of Science[3]. The subjects were a Japanese student and a Chinese student; the Chinese student came to Japan five months ago. As test words for search words, we used ten most frequent words. Table 1 shows three questionnaire for search words as follows: (a) Ranking of voice recognition. (b) Did you find videos you want by using your native voice? (c) Did you find videos you want by using translated words?

Table 1 Evaluation of a multiple voice search

Search word			Chinese Student				Japanese Student	
Japanese	Chinese (simplified)	English	(a)		(b)	(c)	(a)	(b)
			Voice: Japanese	Voice: Chinese			Voice: Japanese	
広告	广告	advertisement	F	1	N	N	1	Y
キーワード	关键字	keyword	F	F	Y	Y	1	Y
検索エンジン	搜索引擎	search engine	1	1	Y	Y	1	Y
ウェブサイト	网站	website	5	1	Y	Y	3	N
データベース	数据库	database	F	F	Y	Y	1	Y
検索	搜索	search	F	1	Y	Y	1	Y
キーワード広告	关键字广告	keyword advertisement	F	1	Y	Y	1	Y
収入	收入	income	3	1	Y	Y	1	Y
アクセス	访问	access	3	5	Y	Y	1	Y
利用	使用	Use	F	1	N	N	F	N

F: recognition failure, Y:Yes, N:No

4. Conclusion

In this study, we are developing a voice search system on Android Tablet PC. We consider learning to effective for beginners of foreign language. However, the primary goal of the voice search system supports to understand of Japanese VOD lecture rather than is able to attend VOD lectures by their native languages. As a matter of different expressions between Japanese and Chinese language, they match different sentences in subtitles. Therefore movie list also may be different in another language. This solution of the problem may be needed to use for concept dictionary. As future works, we consider developing a search system which reflects user's activity.

References

[1] Google Mobile, http://www.google.com/mobile/

[2] Nakano W., Kobayashi T., Katsuyama, Y, Naoi S. & Yokota H.(2006). Treatment of Laser Pointer and Speech Information in Lecture Scene Retrieval, Proc. Eighth IEEE Intl Symp. on Multimedia(ISM2006), pp.927-932.

[3] Kitagawa, F., Onishi S. (2007). An Experiment on selective Course with Face-to-Face or/and E-learning, and Students Behavior (in Japanse), Japan Society of Educational Information, Vol.22 No.3 pp.57-66, 2007.

[4] Ohtake, K., Misu, T., Hori C., Kashioka H.& Nakamura S.(2010). Dialogue Acts Annotation for NICT Kyoto Tour Dialogue Corpus to Construct Statistical Dialogue Systems, The seventh international conference on Language Resources and Evaluation (LREC), pp.2123-2130.